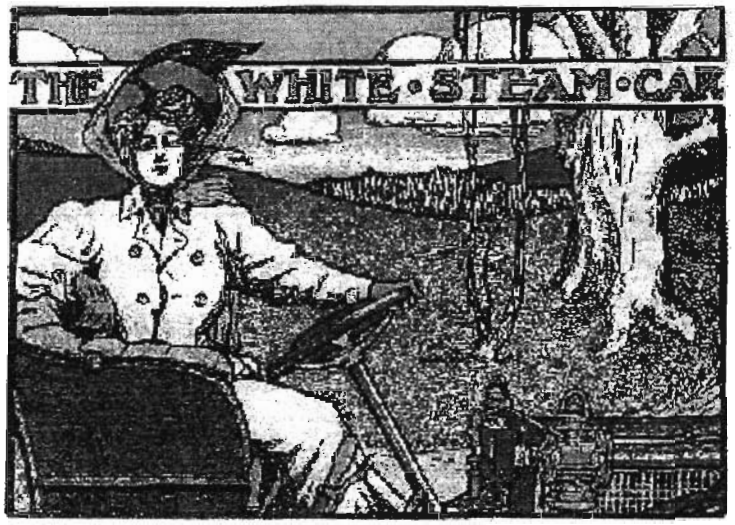
Nomination of

ROLLIN HENRY WHITE

for induction into the

NATIONAL INVENTORS HALL OF FAME



Rollin at the wheel of a Cletrać tractor

NOMINATION FOR INDUCTION INTO THE NATIONAL INVENTORS HALL OF FAME

1. The Inventor
Nominated deceased inventor:

Rollin Henry White
Born 1872, died 1962.

Betty King, his granddaughter, and/or another of White's descendants will represent him at the induction should he be selected. (Her contact information as nominator is below).

2. The Inventions

Rollin H. White contributed significantly to the development of early automobiles and trucks, especially to the White steam vehicles. He applied for the first patent for the White Steam Carriage in 1899 and multiple patents were granted until the White Steamers ceased manufacture in 1910. In 1909, he began work on internal combustion cars and trucks for the White Company.

In an editorial on 3 October 1962 entitled "Departed Glory", *The Washington Post* took note of Rollin's death and said in part, "...The White Steamer had its brief day and was eclipsed by the gasoline engine, but there are those who still believe its possibilities were never properly exploited, those who regret the passing of a vehicle with a glamour that no later motor car has quite attained."

In 1912, White applied for the first patents on the innovative tractors he designed for use on average-sized farms. He left the White Company in 1914 and established his own factory which became famous for its crawler tractors. This line was sold under the trade name of Cletrac and he continued to expand and design improvements for the line until his last patent was granted in 1933.

Rollin White is probably better known today for his contributions to the farm and industrial equipment fields than for his steam vehicles. One reason, perhaps, is that Cletrac and its successor the Oliver Corporation continued to manufacture until 1965. And it is a tribute to Rollin's fine engineering skills that his controlled differential steering concept is still in use by some major crawler tractor manufacturers. In the summer, there is hardly a week in which a show of antique tractors is not held somewhere in the United States or Canada. The number of Cletracs on display at these events is an affirmation of the company's motto: "Built to Endure".

3. The Patents

Some of the most significant patents for White vehicles and Cletrac tractors are referred to in the statement in item 5 below. A fuller list of patents is attached as Appendix A.

We are unaware of any litigation, interference or other proceedings relating to White's patents and inventions.

4. The Nominators

Betty King

(Winter)	(Summer: June-September)
4233 Royal Palm Avenue	4100 Cathedral Avenue, NW, #810
Miami Beach, FL 33140	Washington, DC 20016
305/535-6867	202/966-8221

Email: bettyking1@gmail.com (at both homes)

Landis W. Zimmerman
Zimmerman Oliver-Cletrac
1450 Diamond Station Road
Ephrata, PA 17522
717/738-2573
Fax: 717/733-3529

Thomas E. Goyne
988 South Williams Street
Denver, CO 80209
303/478-0068
Email: TGryphon@aol.com

Letters of endorsement for our application are attached as Appendix E.

Date of Submission 22 March 2009

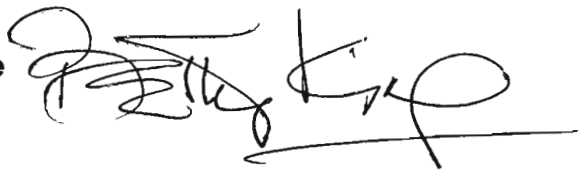
Signature 

Fig. 1.

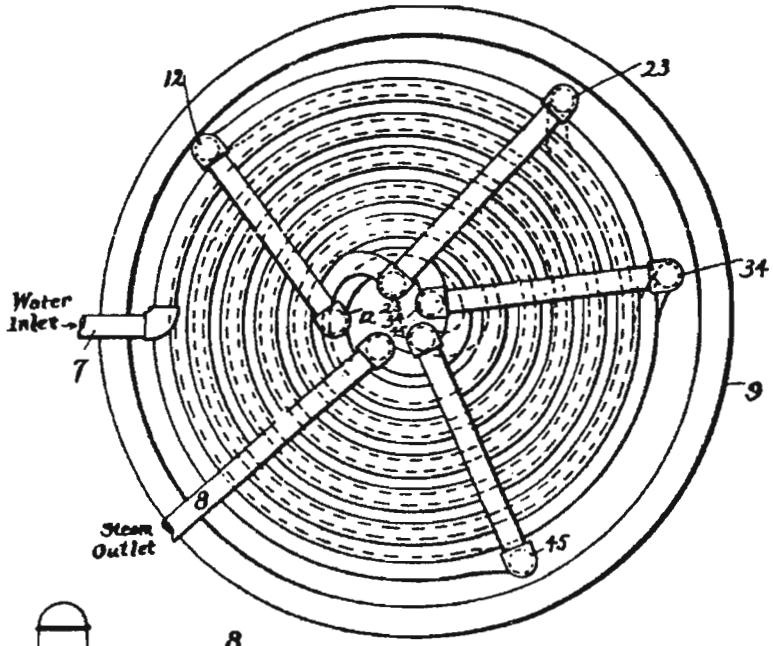
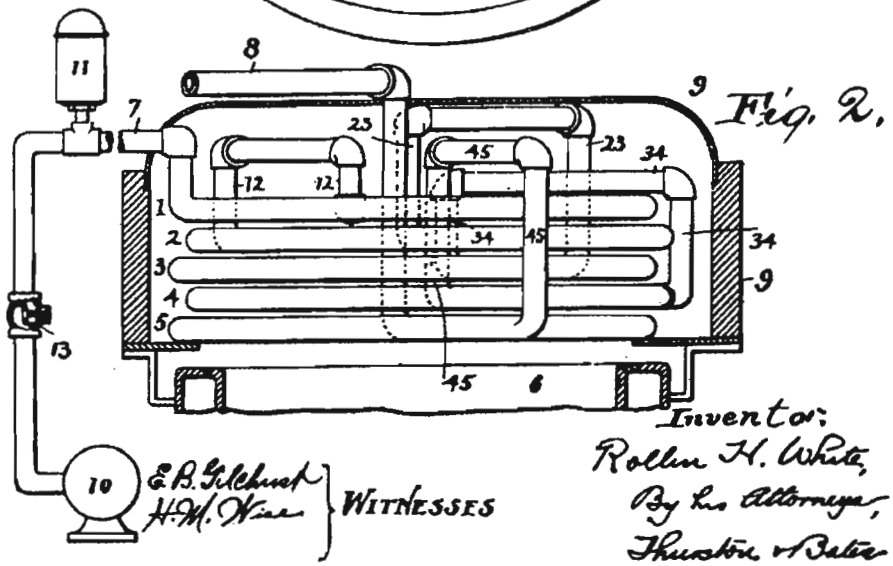


Fig. 2.



Inventor:
Rollin H. White,
By his Attorneys,
Thurston & Bates

E. B. Gilchrist
H. M. Wise
} Witnesses

Illustration for patent no. 659837, steam generator, invented by Rollin H. White. Patent applied for 28 December 1899 and granted 16 October 1900.

5. The Statement

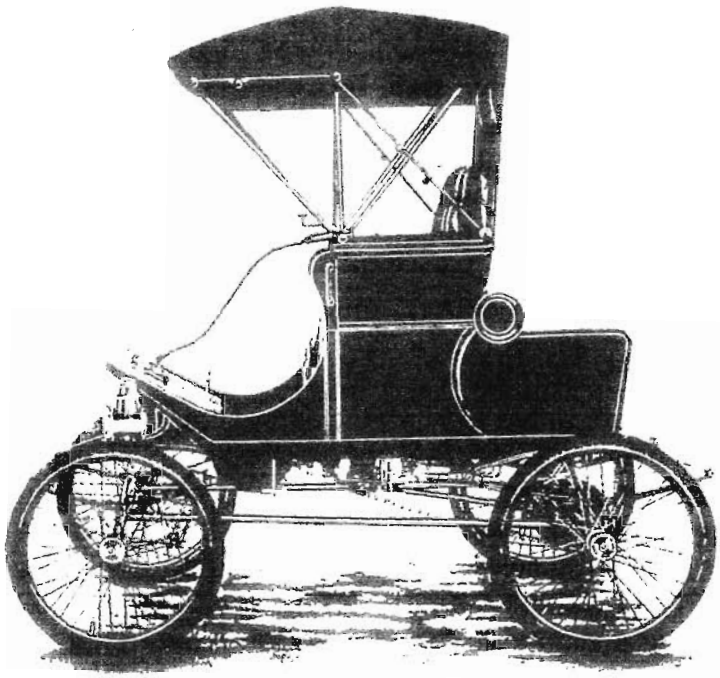
ROLLIN HENRY WHITE was born on 11 July 1872 at Cleveland, Ohio. His father, Thomas Howard White, had moved his prosperous White Sewing Machine Company to Cleveland shortly after the Civil War, drawn there by access to raw materials, especially from the burgeoning iron and steel industries, and by the proliferation of rail and water transportation options for which the city was a hub. In addition to his principal business of sewing machines, Thomas White also manufactured bicycles, roller skates, kerosene lamps, automatic lathes and, for a short period, phonographs.

Rollin attended the Brooks Military Academy in Cleveland and in 1894 he graduated from Cornell University with degrees in mechanical and electrical engineering. His thesis was on the gasoline engine. The following year, his father sent him to France to study automobile and bicycle manufacturing. Upon his return, he was factory manager and later superintendent for the A.L. Moore Company, a bicycle manufacturer in Cleveland. Rollin applied for his first patent on 17 June 1897 for a clamping device for bicycles (Patent 602149, granted 12 April 1898), which he assigned to the Moore Company. That same year, he was granted several patents relating to the manufacture of ball bearings and an automated ball-grinding machine (Patent 609221, filed 4 February 1898, granted 16 August 1898).

White Steamers

In 1898, Rollin went to work for his father's White Sewing Machine Company and in 1899 he invented the flash boiler to generate steam rapidly and safely in passenger vehicles (Patent 659837, filed 28 December 1899, granted 16 October 1900). It was used in all of Rollin's steam cars and this is probably the most important of all his steamer patents. It comprises a set of convoluted tubes stacked on top of each other and, most importantly, having an outlet from each connected to the next through a tube rising to the top of the stack. This meant the steam could flow from the upper coil to the next one without carrying over much of the water and thus it provided the counter flow required for maximum efficiency and compactness. It superheated the steam without a separate steam dome and coils. Also, it was not prone to scaling, a common problem with "pot" boilers and could run on either hard or soft water. (Patents 703220, 676790 and others that followed represent further refinements of the flash boiler).

Richard Wager notes in his *Golden Wheels: The Story of Automobiles Made in Cleveland and Northeastern Ohio, 1892-1932* (Western Reserve Historical Society and the Cleveland Automobile Club, 1975): "In contrast to the tub- or drum-like boilers used in the Stanley and most other steam cars, White's flash boiler consisted of a series of coils of copper tubing, beneath which was a large-rimmed gasoline burner. Water pumped by drops from the top into the pre-heated coil created steam 'in a flash', supplying power to the engine almost



TANHOPE Specifications

Price,	$1,000
Seating Capacity,	2
Wheels,	30 Inch
Tires	3 Inch Double Tube (Goodrich Clincher.)
Tread, (Center to Center. Standard Road Width.)	4 Feet, 8½ Inches,
Weight, (Tanks Filled.)	1,300 Pounds
Capacity of Gasolene Tank,	8 Gallons
Capacity of Water Tank,	20 Gallons
Extreme Length.	8 Feet
Extreme Width,	5 Feet
Extreme Height, (Top Up.)	7½ Feet

Equipment: Top, Side Curtains, Side Lamps, Rubber Boot, Full Set of Tools, Gong.

THE
WHITE STEAM CARRIAGE

instantly." [Although copper tubing may have been employed in early models, later ones used steel to withstand high temperatures better.]

The flash boiler was a critical step in the development of the White steam cars and trucks, of which almost every part, including the nuts and bolts, was manufactured in the White Sewing Machine factory. The first White Steam Carriage, a two seat Stanhope Model, was sold on 1 April 1901 to Lynn J. Hammond of Cleveland.

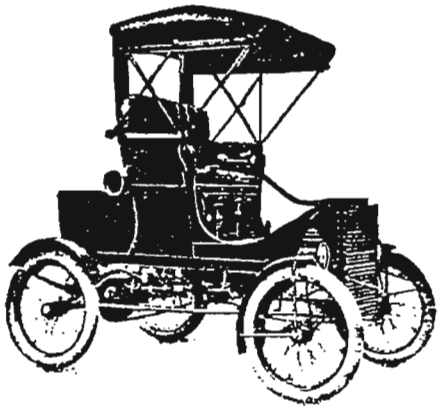
In 1902, Rollin designed a compound engine with a high- and low-pressure cylinder (Patent 753021, filed 1 December 1902, granted 23 February 1904) first used in his 1903 cars. This patent describes a simpling valve to turn a compound two-cylinder engine (one in which steam goes to a small high-pressure cylinder and then exhausts into a larger low-pressure one) into a simple one in which the high-pressure steam is admitted to both cylinders. This offered the advantage of increased economy. However, it requires a means to get the engine started if it happens to stop at the top or bottom dead center on the high-pressure cylinder, which the simpling valve accomplishes. It had been used before, so Rollin could not patent the valve, but he did patent the configuration he used. Its main attribute was that steam held two poppets closed, thus reducing the possibility of leakage. Other innovations in the 1903 Model C were the replacement of the chain drive with a shaft drive and an enclosed differential.

The following year he introduced a bearing adjuster mechanism (Patent 753022, filed 1 December 1902, granted 26 February 1904), which was later licensed to European manufacturers. Keeping the ring and pinion gears properly adjusted in early cars was difficult. Wear on bearings and gears and the lack of rigidity in the housings contributed to this problem. Rollin used a worm gear actuated adjuster on each pinion bearing which could move it with respect to the gear via an external screw. Thus any wear could be adjusted without dismantling the differential. This device was made obsolete within a couple of years by better basic design of the differential housing.

Another important patent was that for a two-speed transmission as part of the differential, ring and pinion assembly, which included the all-important neutral position (Patent 784607, filed 4 July 1904, granted 14 March 1905). Neutral allowed the engine to idle and consequently the boiler pressure was maintained while the vehicle was stationary. It also allowed the engine to be warmed up in a cold start condition, reducing the possibility of water lock which can cause severe damage. No other steamers had this feature, although they did have other means of dealing with water lock.

Rollin received a gold medal for his invention of the White motor at the 1904 Louisiana Purchase Exposition in Saint Louis.

White Steam Carriage



Makes New World's Records.

On September 16, at the Glenville track, near Cleveland, the White Automobile established new records for steam carriages for all distances from 2 to 10 miles. At the same meeting the WHITE also captured the 5 mile race open to steam cars of all makes and weights.

New and Old Records for Steam Vehicles.

NEW. Made by ROLLIN H. WHITE, Cleveland, Ohio, on September 16, 1902.		OLD. Made by GEORGE C. CANNON, at Providence, R. I., October 17, 1901.	
2 Miles,	2:44½	2 Miles,	4:01¾
3 Miles,	4:03⅘	3 Miles,	6:00⅗
4 Miles,	5:24	4 Miles,	7:55¼
5 Miles,	6:43⅗	5 Miles,	9:40¾
10 Miles,	14:59½	10 Miles (Rollin H. White, Detroit, Mich., Oct. 10, '01)	19:05⅘

The White Is a Thoroughbred.

Speed is only one desirable quality of an automobile. White Steam Carriages have made the unparalleled record of winning out in every endurance test in which they have been entered—coming through with soldier-like precision. The White steam generator is absolutely non-explosive, gives pressure in five minutes from cold water, and once in motion is self-regulating. In touring the WHITE will make 100 miles without adding a drop of water or fuel to the original supply. Write for full particulars, including Prof. Thurston's report on our steam generator, and the official reports of important endurance contests.

White Sewing Machine Co.

(Automobile Department), **Cleveland, Ohio.**

22 Union Square, NEW YORK, N. Y.
509 Tremont Street, BOSTON, MASS.
300 Post Street, SAN FRANCISCO, CAL.
609 Main Street, BUFFALO, N. Y.
12 Woodward Avenue, DETROIT, MICH.
300 Rose Building, CLEVELAND, OHIO.

As soon as it entered the market, the White Steamer began winning competitions against the world's best cars and drivers. At Detroit on 10 October 1901, Rollin set the ten mile speed record for steam cars. The following year he held five world speed records and a White Steam Carriage advertisement boasted of these 1902 records. In 1905 Webb Jay, driving a White Steamer called "Whistling Billy" set the world record for one mile at 48 3/5 seconds. Of this feat, Floyd Clymer wrote in his *Treasury of Early American Automobiles* (McGraw-Hill, 1950), "When one considers that this record, considerably faster than a mile a minute, was established only five or six years after the average American had glimpsed his first automobile, it looms as an accomplishment of real proportions".

The White Company was formed in 1906 to spin off the sewing machine company's successful automobile division. In that year, approximately fifteen hundred White steam vehicles were built. The same year, Rollin invented his famous flow motor and its associated control system (Patent 987,932, filed 12 November 1906, granted 28 March 1911). They regulated the flow of fuel to the burner in a predetermined proportion to the water flow to the boiler and provided a relief valve to divert excess water from the pumps back to the water tank without affecting fuel flow. This was the final step Rollin took to automate the operation of his steam vehicles. It allowed the steam system to operate stably, safely and unobtrusively with little or no attention paid to it because of hills, speed and traffic. This was accomplished by purely mechanical means; there were no electrical controls then. This innovation allowed White cars to excel in the important hill climbing competitions.

In 1909, a bad year for all steam cars, Rollin began work on gasoline cars and trucks and the first White internal combustion truck was exhibited at the 1910 New York Automobile Show. The last White Steamers were manufactured in 1910. Altogether, 9,122 White Steamers were produced. The steam car's decline coincided with a greater standardization of internal combustion vehicles, which required less sophisticated mechanics to maintain them. (More information about Rollin's patents relating to steam vehicles is found in Appendix B).

In some ways the White Steamer was *more* efficient than today's cars. It had a two cylinder engine that put out as much power per revolution as an eight cylinder gas car. It required no clutch or transmission, no cranking or shifting of gears. It won engineering awards, speed and reliability competitions and it was an elegant vehicle, much prized by presidents and royalty. When a White Steamer took part in President Theodore Roosevelt's inaugural parade, it was the first time an automobile was used in a presidential inaugural. According to a story in the *New York Times* (2 November 2008), when Congress appropriated funds in 1909 for the first White House motor fleet, a White Model M seven-passenger steam car was one of four that were purchased. (A photograph of the President's White is found in Appendix B).

Cleveland Tractor

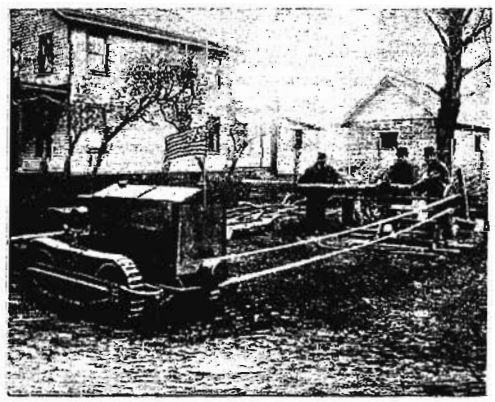
Geared to the Ground

HERE is the one farm tractor that can be used successfully in any section of the country.

It was designed by Rollin H. White, designer of the famous White Motor Trucks, and is being built by a company that has the firmest financial foundation.

Mr. White is building the Cleveland Tractor to perform all of the many tasks requiring power found on every farm. He has made it easy to operate, economical to run, easy to care for and absolutely dependable in operation.

The size of the Cleveland fits it for orchard work.



Develops 20 H. P. at its pulley, more than enough for the average stationary work.

Because the Cleveland crawls on its own track it can traverse roughest land.

THE CLEVELAND TRACTOR CO., Cleveland, Ohio

A 1910 White steam automobile 2 cylinder, compound, model 00, 20 horse power engine is in the collection of The Smithsonian Institution; it was donated by B.W. Laws in 1943 (see Appendix B). The TV star, Jay Leno, owns a 1907 White Steamer he restored and which he drove in the television series *My Classic Car*. In that episode, he expressed the opinion that the White Steamer was a much more sophisticated mechanism than the Stanley.

Cletrac Tractors

In 1911, Rollin visited Hawaii where his brother Clarence had a pineapple plantation. Clarence told Rollin that what the world needed was a good, small tractor. Upon his return to Cleveland, Rollin began to design such a machine. He knew that tractors would one day be as essential to farms as the plow, planter and cultivator.

In 1912, he applied for the first patents on a tractor suitable for the average-sized farm, based on stock White truck components. It was powered by a 4 cylinder internal combustion engine and had a wide traction drum drive and power driven discs. Six of this first model were built, two of which were tested at the University of California/Davis Agricultural School. They performed well, doing a better job than any conventional tractor of pulling two or three implements at a time, but it was found that the weight of the discs caused too much packing of the soil. Further production of this first tractor was abandoned and Rollin turned to perfecting and manufacturing crawler tractors.

Rollin left The White Company in 1914 and formed the Cleveland Motor Plow Company, later the Cleveland Tractor Company, of which he was president and chief designer until the early 1930s, when he became Chairman of the Board. The trade name of Cletrac was adopted in 1918.

Controlled differential steering, invented by Rollin to make the tractors strong, safe and maneuverable, was a special feature of the first Model R in 1916 and continued in use until 1965 (Patent 1253319, filed 20 December 1916, granted 15 January 1918; reissued as RE149938 on 24 August 1920). Previously, all crawler tractors used large, cumbersome clutches for steering, which had the disadvantage of disconnecting all power from one track. Rollin's invention supplied power to both tracks at all times when turning and used the differential unit to speed up one track and slow the other in order to steer the tractor. Thus, a smaller tractor was able to perform the same amount of work as a larger machine and had more pulling power and greater safety when turning. (A copy of the Cletrac brochure on this invention is attached in Appendix C).

Model F, introduced in 1920, was the smallest crawler tractor Cletrac ever built and had more patents than any other of the company's machines. It had an elevated drive sprocket just like those in modern Caterpillar crawler tractors

CLETRAC MODEL R

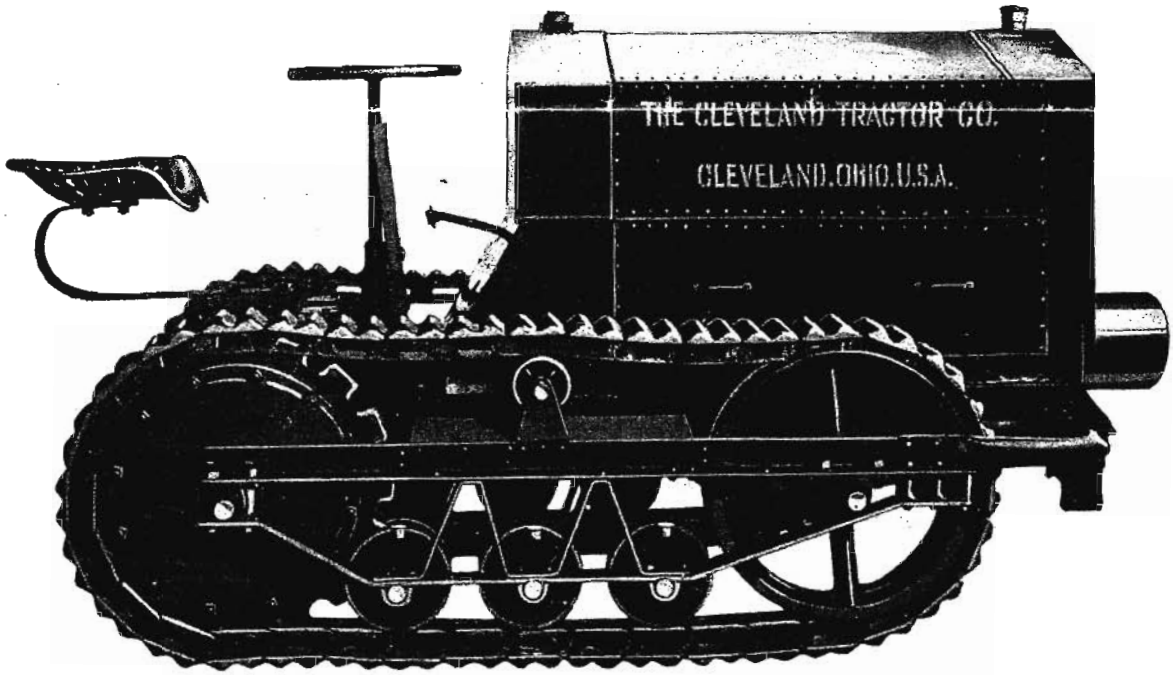
A Paying Investment For You

WITH the Cleveland Tractor at work on your farm you can forget the shortage of men and horses. You can be unhampered by the high cost of labor. You can plow your fields on time regardless of weather. You can perform a multitude of tasks quickly, easily and economically—tasks which now are tedious and burdensome.

The Cleveland is priced well within your reach—only $1185, f. o. b. factory.

It will actually pay for itself in a few months. After that its savings are clear profit for you. You will find it an investment that pays big dividends.

Orders for the Cleveland Tractor are piling up rapidly. Order now and be assured of a quick delivery. Farmers say this machine has no superior as a labor-saving, money-saving device on the farm. Put one to work for you. Send us your order promptly.



SPECIFICATIONS

12 H. P. at Drawbar. 20 H. P. at the Pulley.
High Speed Heavy Duty 4 Cylinder Motor.
Crawler Type Tread. 600 Square Inches Traction Surface.
Weight 2750 Pounds.
Height 52 Inches. Width 50 Inches. Length 96 Inches.
Width of Track 6 Inches. Length 50 Inches.
Width from Center to Center of Track 38 Inches.
Clearance 12 Inches.
Belt Pulley 8 Inches Diameter. 6 Inch Face.
3 Point Spring Suspension.

Price

$1185

F. O. B.

EUCLID, OHIO

THE CLEVELAND TRACTOR CO., Cleveland, Ohio

(Patent 1485104, filed 13 February 1922, granted 26 February 1924; also illustrated and noted in Patent 1485106, filed 5 May 1922, granted 26 February 1924), and a unique bead chain track system referred to as Rollin's "String of Pearls" (Patent 1507762, filed 13 February 1922, granted 9 September 1924). No bottom rollers or front idlers were used; the floating string of pearls served that function. Three thousand of these pint-sized machines were built before production ended in 1922. (Literature published by Cletrac on the Model F is found in Appendix C).

In 1925, the heavier-duty Cletrac Model 20K was introduced. It featured a double drive sprocket, which had a larger contact area and helped eliminate material from packing between the track chain and sprocket (Patent 1693215, filed 17 December 1925, granted 27 November 1928). It also had a centrally located oil pump to lubricate the bottom rollers while the tractor was in motion (Patent 1693214, filed 25 July 1925, granted 27 November 1928).

In 1927, Cletrac introduced Model 100, the largest crawler tractor to date. It was replaced in 1930 by Model 80-60, which was slightly lighter. These started a line of larger machines which continued to evolve into the 1950s and included the Cletrac FG and FD series and eventually the Oliver OC-18, after Cletrac was acquired by The Oliver Corporation in 1944. All of these tractors featured four steering levers which permitted different turning radii using a controlled differential unit together with outboard planetaries (Patent 1872541, filed 19 April 1930, granted 16 August 1932).

In 1928, Rollin built a two-wheeled tractor, the General 10-12, powered by a two cylinder engine and designed to be controlled from the implement to which it was attached. He foresaw that farmers would be interested in machines that could pull implements they already owned that had previously been drawn by horses. Innovations in these machines included the steering mechanism (Patent 1805536, filed 27 September 1928, granted 19 May 1931) and a device to keep the machines level (Patent 1810635, filed 27 September 1928, granted 16 June 1931).

In 1929, Cletrac was doing $8 million of business every year and was turning out 35 tractors of its various models each *day* and still was far behind on orders (*Euclid Observer*, 28 March 1929).

On 1 August 1933, Patent 1920225 (filed 29 May 1930) was granted to Rollin. It was his last patent and was for an improved lubricating system for the undercarriage roller wheels on crawler tractors.

Rollin engineers are constantly working for new standards of performance hitherto not attained in cars at any price. New refinements of springs and a new development in steering gear have just been incorporated in the design of the Rollin, making it one of the easiest steering and one of the most comfortable riding cars on the entire market—regardless of price. You will be amazed at the results attained by this new development.

In no other car will you get this combination of advanced features:

New Easy Steering Design
New Transverse Rear Spring
4-Wheel Brakes
4-Bearing Crankshaft
Full Size Balloon Tires
Force Feed Lubrication
European Type Motor
25 to 30 miles per gallon of gas

Thousands of Rollin cars in practically every State in the Union, as well as throughout the civilized world, are performing way beyond all claims ever made by this institution.

In fact, this car, designed and made by some of the most experienced men in the automobile industry, is daily setting new performance records for efficiency and economy in the hands of thousands of users.

Rollin White—one of the country's foremost engineers, and designer of the Rollin—was probably the first man to incorporate high grade European practice in a popular-priced quality automobile.

The amazing results are astonishing the world.

See the Rollin dealer in your town today.

THE ROLLIN MOTORS COMPANY
CLEVELAND, OHIO

ROLLIN

ROLLIN

The Rollin Car

In the years 1922-25, Rollin designed and manufactured the Rollin, a car which was smaller and less expensive than others on the market but larger than Ford's Models A and T. This diversification into automobile manufacture, his first love, may have been a response to diminished tractor sales during the agricultural depression of the early 1920s. The Rollin Motor Company was incorporated in 1923 and the new car was first exhibited at the 1923 New York Automobile Show. The car's engine was built in the Cletrac factory, but the other component parts were purchased elsewhere. The first Rollin had a four-cylinder engine and was one of the first vehicles to feature four-wheel brakes (Patent 1512153, filed 14 April 1921, granted 21 October1924). The wheels were solid discs, replacing the wooden-spoke artillery wheels. In 1924, 3,660 Rollin cars were produced, but the following year, production fell to 2,000. For the 1925 model, Rollin developed a special manifold and transverse springs. The Rollin was not a commercial success, but the tractor business revived and Cletrac prospered. (Information about the 1925 Rollin Model G Sedan in the collection of the Crawford Auto-Aviation Museum is found in Appendix D).

APPENDIX A

Patents issued to Rollin H. White

1897-1933

PATENTS ISSUED TO ROLLIN H. WHITE

Filed	Patent Number/For	Issued
06/14/1897	609218 Machine for Grinding Balls	08/16/1898
06/17/1897	602149 Clamping Device	04/12/1898
07/14/1897	609219 Ball-Grinding Machine	08/16/1898
11/30/1897	609220 Machine for Sorting Balls	08/16/1898
02/04/1898	609221 Ball-Grinding Machine	08/16/1898
08/08/1898	635215 Machine for Making Balls	10/17/1899
12/28/1899	659837 Steam Generator	10/16/1900
01/03/1900	703220 Feeding Mechanism for Boilers	06/24/1902
07/05/1900	676790 Systems of Regulating Steam Boilers	06/18/1901
12/01/1900	685658 Driving Mechanism for Automobiles	10/29/1901
12/09/1900	806308 Gasoline Burner	12/05/1905
12/03/1900	685658 Driving Mechanism for Automobiles	10/29/1901
12/03/1900	D33794 Design for Gas Burner	12/25/1900
04/19/1901	697586 Throttle Valves for Steam Cars	04/16/1902
04/19/1901	707478 Mechanism for Steam Carriage Burners	08/19/1902
04/19/1901	697585 Hand Pump	04/15/1902
04/28/1902	752137 Apparatus for Generating Kerosene Vapor	02/16/1904
04/21/1902	734028 Air Pump Mechanism for Steam Carriages	07/21/1903
04/21/1902	740210 Air Pump Mechanism for Automobiles	09/29/1903
05/21/1902	740500 Golf Club	10/06/1903

07/26/1902	737984 Water Regulator	09/07/1905
11/17/1902	740208 Stack Construction for Steam Carriages	09/29/1903
12/01/1902	753021 Cornpound Engine	02/23/1904
12/01/1902	753022 Driving Axle Mechanism	02/26/1904
12/01/1902	740209 Steering Mechanism for Automobiles	09/29/1903
01/17/1903	734029 Pump Mechanism for Steam Carriages	07/21/1903
02/24/1903	886103 Hydrocarbon Burner	10/28/1908
04/21/1903	740207 Condenser Mechanism for Steam Carriages	09/29/1903
05/09/1903	737985 Feed Water Regulator	09/01/1903
05/21/1903	753024 Cross-Heads	02/23/1904
10/12/1903	829451 Regulated Heating Mechanism for Steam Generators	08/28/1906
11/04/1903	768320 Steam Automobile	08/23/1904
04/07/1904	784607 Transmission Mechanism for Automobiles	03/14/1905
12/05/1904	806309 Throttle Valve	12/15/1905
01/27/1906	971810 Steam Automobile	10/04/1910
05/10/1906	895525 Brake Mechanism	08/11/1906
09/14/1906	921491 Driving Mechanism for Railway Cars	05/11/1909
11/12/1906	987933 Apparatus for Generating and Controlling Generation of Superheated Steam	03/23/1911
11/12/1906	987932 Flow-Motor and Valves Operation	03/28/1911
09/07/1907	1054066 Hydrocarbon Burner	02/25/1913
11/07/1907	974730 Producing and Burning Combustible Hydrocarbon Mixtures	11/01/1910
10/06/1908	1078976 Automobile Wheel Brake	11/18/1913

01/06/1910	1032458 Oil and Water Separator	07/16/1912
02/14/1912	1051041 Carburetor	01/21/1913
03/06/1912	1987519 Automobile Radiator Supports	02/17/1914
06/08/1912	1260738 Power Propelled Agricultural Machine (1)	03/26/1918
02/24/1913	1268411 Motor Vehicle	06/04/1918
03/31/1913	1170202 Agricultural Machine (1)	02/01/19166
03/31/1913	1258286 Agricultural Machine (1)	03/05/1918
08/14/1914	1269028 Agricultural Machine	05/11/1918
12/03/1915	1316990 Agricultural Machine	09/23/1919
01/10/1916	1285861 Multi-cylinder Internal Combustion Engine	11/26/1918
12/20/1916	1253319 Tractor	01/15/1918
09/12/1917	1261062 Endless Track of Track Laying Tractors	04/02/1918
10/29/1917	1275343 Tractor Frame	0813/1918
01/11/1918	1314722 Track Belt for Track Laying Tractors	09/02/1919
01/28/1918	1275344 Track-Laying Tractor	08/13/1918
01/31/1918	1270576 Track Laying Tractor	06/25/1918
02/11/1918	1032458 Track Belt for Track-Laying Tractor	09/02/1908
02/11/1918	1338059 Tractor Frame for Track-Laying Tractor	09/18/1919
03/26/1918	1260738 Power Propelled Agricultural Machinery	3/26/1918
11/18/1918	1387086 Track-Laying Tractor	08/09/1921
11/18/1918	1338069 Track-Laying Tractor	04/27/1920
01/22/1919	1401221 Driving and Steering Mechanism for Motor Vehicles	12/27/1921

05/01/1919	1326702 Track Laying Tractor	12/30/1919
05/01/1919	1359553 Means for Dust-Proofing Gear Cases	11/23/1920
06/23/1919	1387087 Dustproof Bearings • (2)	08/09/1921
11/11/1919	1399370 Track Laying Tractor	12/06/1921
12/06/1919	RE14938 Tractor	08/24/1920
03/15/1920	1452176 Track Belt and Unit Thereof	04/17/1923
07/17/1920	1485103 Track Belt and Unit Thereof	02/26/1924
07/20/1920	15077761 Track Belts	09/09/1924
07/30/1920	1456348 Track Belt Calk	05/22/1923
12/09/1920	1512152 Track-Laying Tractor	10/21/1924
01/14/1921	1445349 Direction Changing Transmission Mechanism	05/22/1923
04/14/1921	1512153 Brake Mechanism	10/21/1924
04/14/1921	1456349 Direction-Changing Transmission Mechanism	05/33/1923
04/14/1921	1485105 Side Frame for Track-Laying Tractors	02/26/1924
01/14/1922	1512154 Tractor	10/21/1924
02/13/1922	1485104 Tractor	02/26/1924
02/13/1922	1507762 Tractor	09/09/1924
05/05/1922	1485106 Transmission Gearing Mechanism	02/26/1924
05/05/1922	1575475 Sheet Metal Track Belt Unit	03/02/1926
03/17/1925	1693215 Propelling Means for Crawling Tractor	11/27/1928
07/25/1925	1693214 Lubricating System	11/27/1928
08/06/1925	1781486 Track Laying Tractor	11/11/1930

11/14/1925	1635596	Rubber Tread Attachment for Track Links	07/12/1927
11/14/1925	1635597	Grouter Attachment for Track Belt Links	07/12/1927
12/12/1925	1693215	Propelling Means for Crawler Tractor	11/27/1928
12/27/1925	1693215	Propelling Means for Crawler Tractors	11/27/1928
09/10/1927	1799878	Tractor	04/07/1931
06/18/1928	1918201	Fuel Injector Nozzle	07/11/1933
09/27/1928	1805536	Steering Mechanism	05/19/1931
09/27/1928	1810635	Supporting and Driving Means for Tractors	06/16/1931
03/17/1930	1812543	Track-Laying Tractor	06/30/1931
04/19/1930	1872541	Transmission and Steering Mechanism	08/16/1932
04/19/1930	1858553	Lubricating System	05/17/1932
04/28/1930	1849560	Side Frame for Tractors	03/15/1932
05/29/1930	1882679	Seal	10/18/1932
05/29/1930	1920225	Tractor Lubricating System	08/01/1933

(1) White's brother Clarence G. White was co-owner of these patents.
(2) Matthew B. Morgan is co-owner with White of this patent.

APPENDIX B

The Patents of Rollin H. White as Related to Steam Cars
By Thomas E. Goyne

1909 Photograph of the President's Seven-Passenger
40 Horsepower Model M White Steamer

Contemporary Photographs of 1909
White Steamers

1910 White Compound Engine
in the Collection of the Smithsonian Institution,
National Museum of American History

THE PATENTS OF ROLLIN H. WHITE
As related to steam vehicles

November 23, 2008
Thomas E. Goyne

This document is a list of Rollin H. White's patents relating to steam cars with some comments by this writer as to their importance to White and others.

659837 STEAM GENERATOR This claim patents the configuration of White's tubular flash boiler. It comprises a set of convoluted tubes stacked one on top of another with the burner below the set and, most importantly, having the outlet of each of the flat convolutions connected to the inlet of the next through a tube rising to the top of the stack. This particular concept meant that the steam could flow from an upper convolution to the next one below it without carrying over much of the liquid water and thus provided the counter flow configuration required for maximum efficiency and compactness. It also provided a way to superheat the steam without a separate steam dome and coils. A further benefit of the small diameter convoluted tube configuration is that it is not prone to scaling, a common problem with "pot" boilers. The boiler can be run using hard or soft water with impunity. The steam generator (or boiler) described in this patent was used in all of White's steam cars and is probably the most important of White's patents. It set the stage for a compact system that could be made nearly fully automatic, and it kept steam power competitive for a decade against the internal combustion engine. In fact, by 1906 there had been more large White touring cars produced than any other make of steamer or internal combustion car. It should be noted that the flash boiler was not a new concept *per se*. It had been in used in the Serpollet automobile in the late 1800s, but that one did not have White's method of separating steam from water and was thus much more cumbersome and expensive. It is thought, however, that Rollin White conceived his boiler while studying the Serpollet. After building and installing a prototype of his boiler in an 1899 Locomobile steamer he demonstrated it at the Locomobile factory, but they brushed him off. This prompted him to build a steamer in competition with the Locomobile and led, of course, to the White Motor Car Company and its long and distinguished history.

703220 FEEDING MECHANISM FOR BOILERS Flash boilers require that both the steam pressure and the temperature be controlled separately. This is in contrast to the more common pot boiler where controlling the pressure alone was sufficient but where water level needed to be maintained manually. White, with this patent and with number 676790, described and protected his flash boiler control system. This system patent comprised a steam pressure controlled pressure regulator combined with a pressure pulsation damper to insure stable operation with piston-type feed pumps. It provided a compact and reliable way to automatically control the pressure of the boiler by feeding additional water to it when the pressure ran low and by bypassing the pump thus reducing its power draw when it was not required. It meant that the pump could be continuously engine-driven without the complexity of mechanically disconnecting when flow was not demanded.

676790 SYSTEMS OF REGULATING STEAM BOILERS This patent is a very general thus powerful one that combines two controls. The first is a control of the temperature of the steam by regulating the fuel supply with a thermostat in the steam line; the second is the pressure regulator and pulse damper described in the previous patent. It is limited, however, to a flash boiler. White was not concerned with its application to the pot boiler as he rightfully saw it as outdated by his flash boiler. This system was used in all White steamers (and was improved upon in a 1906 patent application for the Flow-Motor).

685658 DRIVING MECHANISM FOR AUTOMOBILES This patent is one which describes a pivoting, self-aligning method of attaching the wheel and axle bearings to the outer ends of an axle. It was used on the early chain-drive White stanhopes, but not used later.

806308 GASOLINE BURNER This patent combines the burner pilot light with its internal vaporizer and drip cup, with the main burner vaporizer, into what White called the sub-burner. This sub-burner was used throughout the production of White steamers and had the advantage of keeping the main burner ready for immediate ignition as long as the sub-burner flame was on. This device is a good example of one of the many steps White took to automate the operation of the boiler system. The design was very successful in its earlier use, but as the formulation of gasoline changed to better suit internal combustion automobiles, the problem of carbonization increased. From 1909 onward drivers were sometimes plagued with plugged sub-burners, vaporizers and nozzles.

D33794 DESIGN FOR GAS BURNER This is a design patent on the specific layout of the slotted burner plate. It covers only the bunsen-type burner, not the later retort-type. Design patents do not provide protection for concepts as do normal patents, but only cover the actual layout of the part, thus are of limited benefit.

697585 HAND PUMP This patent covered the combination of a manual plunger pump with that of its manual shut-off valve. This type of pump was used to pressurize the fuel tank and to fill the boiler with water before a cold start. The plunger pump was operated normally by moving the plunger in and out. The shut-off valve was buried in the bottom of the pump and was operated by depressing the pump plunger to the bottom extent of its travel and turning. Its main attribute was to simplify and logically combine two functions into one action. This was one of the most common themes in the development of the White steamers: make their operation logical, simple and applicable to less well-trained drivers.

697586 THROTTLE VALVES FOR STEAM CARS This patent describes the double-taper throttle valve used in all Whites. The double tapered stem of the valve allowed the operator to gradually increase the steam supply to the engine without jerking or bucking when starting off from a stop, but then to increase power rapidly after the car was moving.

707478 MECHANISM FOR STEAM CARRIAGE BURNERS This described a remotely actuated manual flow control valve to vary fuel flow to the burner. It covers only the remote actuator linkage used on early Whites.

752137 APPARATUS FOR GENERATING KEROSENE VAPOR Although White did not offer a steamer that would run on kerosene until the final year of production, he patented some methods of doing so much earlier. This one utilized a thermostat mounted above the burner with the kerosene running through it. It would shut-off the supply of kerosene and thus the flame when it got too hot thus avoiding the problem of carbonization in the fuel vaporizer. This concept was never put into production.

734028 AIR PUMP MECHANISM FOR STEAM CARRIAGES Described in this patent is an engine-powered air pump to provide pressure to the fuel tank for feeding fuel to the burner. It allows the pump to be easily connected and disconnected from the engine by the driver with a remote lever. It also included in combination, a relief valve internal to the pump to avoid over pressurization of the tank. The concept in this patent was improved on by two later patents, but then made obsolete with the introduction of a non-patented air pump which did not need to be disconnected from the engine but was bypassed by holding its inlet valve open.

740210 AIR PUMP MECHANISM FOR AUTOMOBILES This improved on 734028 by describing a method for driving the air pump with a bar extending out from the crosshead through the crankcase. In this patent the relief valve was not included presumably because in the first (734028) White needed to add the relief valve to get the patent, but in this more specific one, he did not.

740500 GOLF CLUB All of the above patents were applied for between December 1899 and April 1902, the time during which the model A and B stanhopes were being developed and debugged, suppliers found, a management organization put in place, production lines set-up, personnel hired to staff them, and a sales operation organized. In the midst of this extraordinary activity Rollin White found time to develop and patent an adjustable golf club grip. He must have liked golf a great deal. This patent allows the club's grip to be adjusted to an individual's particular swing style.

737984 WATER REGULATOR The pressure regulator the White used in their early production is described by this patent. It is an adjustable steam-actuated water bypass type that was described in White's patent number 703220 for the regulation system. It is a sturdy compact design with a good external adjuster, but is not vastly unlike others outside the patent coverage.

740208 STACK CONSTRUCTION FOR STEAM CARRIAGES The smokestack of the early White steamers was novel in that it extended from the top of the boiler into a tube that ran across the car and then into fore-and-aft tubes on each side. Its function was to eliminate the possibility of back drafts in wind from any direction, and it did so very well. Included were internal baffles to improve flow.

753021 COMPOUND ENGINE This patent described a simpling valve to turn a compound two-cylinder engine (one in which the steam first goes to a small high-pressure cylinder and then exhausts into a larger low-pressure one) into a simple one (one in which the high-pressure steam is inletted to both cylinders). The compound engine was introduced by White in their steamer in 1903 and offered the advantage of increased economy over the simple engine. It requires, however, a means to get the engine started if it happens to stop at top or bottom dead center on the high-pressure cylinder. The simpling valve does this. It had been used before so White could not get a general patent on it, but he did patent the specific configuration used on the White engine, its main attribute being that steam held the two poppets closed reducing the possibility of leakage. This patent also covered a later configuration used in the 1909 and 1910 Joy-valve engines. Also with the 1903 model C came another significant change. The chain drive was replaced with a shaft drive and enclosed differential.

753022 DRIVING AXLE MECHANISM Keeping the ring and pinion gears properly adjusted in early cars was a problem. Bearing wear, gear wear and the lack of rigidity in the housings contributed to this. White's patent proposed the use of a worm gear actuated adjuster on each pinion bearing which could move it with respect to the gear via an external screw. Thus any wear could be adjusted-out without dismantling the differential. This device was obsoleted within a couple of years by better basic design of the differential housing.

740209 STEERING MECHANISM FOR AUTOMOBILES Despite the title, this patent covered the throttle actuating scheme that allowed the use of an inner "steering wheel" as the throttle actuator. It covered the concentric shaft and tube that formed the steering column and the extension of this shaft through the steering box. It mostly eliminated anyone from copying the White throttle wheel scheme but did not eliminate its use for other applications such as gas and spark lever actuators. These were common at the time and later.

734029 PUMP MECHANISM FOR STEAM CARRIAGES Covered only was a specific configuration where the boiler feed pump and the condensate return pump were mounted opposite each other and actuated with a common rocker shaft off of the engine.

886103 HYDROCARBON BURNER This was a variation of the sub-burner covered in patents 806308 and 752137 whereby the main burner flame impinged on the main burner vaporizer as well as did the pilot flame. It meant that the vaporizer would not get hot enough to carbonize the fuel after sitting idle but lit for an long time, but still would get hot enough to vaporize the fuel when the main burner was in operation. This scheme was used in all of White's later burners with good success. Carbonization was a significant problem and this patent helped reduce it to a large extent. The patent also covered the use of a thermostat in the burner flame as in 752137. This specific attribute was never used in White cars.

740207 CONDENSER MECHANISM FOR STEAM CARRIAGES White introduced the condenser as standard equipment in 1903 (although one was available in 1902 on the stanhope model on special order). The patent describes the divided header tank, which routed the steam first through the rear cooling tubes and then through the front ones. This improved the efficiency of the condenser by making it counter flow. A provision was made to allow condensate to drain from an intermediate point (the second header) eliminating condensate blocking in the varying flow conditions common on steamers.

737985 FEED WATER REGULATOR This improved on the water pressure regulator, patent number 737984, with the addition of a "step-up" lever moving the bypass valve. It gave the valve increased sensitivity and increased flow.

753024 CROSS-HEADS A means of attaching the crosshead pin to the crosshead was covered here. The pin was tapered at both ends locating it accurately and strongly with respect to the crosshead allowing the use of a stout extension on the pin to actuate the air pump described in patents number 734028 and 740210. It was obsoleted by a later design of the air pump.

829451 REGULATED HEATING MECHANISM FOR STEAM GENERATORS This patent adapts a method used in carburetors to atomize kerosene in steam burners. It routes the pressurized air supply in the fuel tank to a venturi chamber surrounding the main burner fuel nozzle, mixing air and fuel and then atomizing it. It is another scheme that White considered to allow kerosene to be burned in his steamers. Its function appears primarily to be to take care of transient conditions when the kerosene is not fully vaporized by the vaporizer. It was never used in White steamers although the Doble steamer used an atomizing-type of fuel mixer, as do most modern fuel oil-burning home furnaces. Their principle of operation is different, however. They use an electrically driven spinner to atomize the fuel. It is not too hard to imagine that if White had pursued the line of thinking in this patent he would have soon changed over to an atomizing system rather than the vaporizer system thus avoiding the problem of carbonization altogether.

768320 STEAM AUTOMOBILE A very general patent title for a mundane patent on an air deflector behind the condenser and ahead of the engine to avoid cooling the engine and steam lines with the air flow through the condenser.

784607 TRANSMISSION MECHANISM FOR AUTOMOBILES This patent was an important one in that it covered a two-speed transmission as part of the differential, ring and pinion assembly, and included the all-important neutral position. The neutral allowed the engine to be idled and consequently the boiler pumps to keep-up boiler pressure while the car was stationary. It also allowed the engine to be warmed-up in a cold start condition reducing the possibility of water lock, which can cause severe damage. No other steamers had this feature although they did have other ways of dealing with the water lock problem. It was (and is) common to see Stanley steamers with one wheel jacked-up idling to keep steam up. The later Doble steamer had a similar problem in that the generator would only run when the engine was running. Their electrically

driven pumps drew so much current that the battery would go flat in a surprisingly short time if the car was left stationary. A neutral would have been useful to that car.

806309 THROTTLE VALVE This patent improved on number 697586 by adding a separate on-off valve seat to eliminate wear on the closely machined valve stem tapers used to control steam flow at lower flow rates. It did so by maintaining a clearance to the taper at all times and not using it to entirely cut-off the supply but rather for this using the separate valve seat.

971810 STEAM AUTOMOBILE This describes the later configuration of White boilers and burners. It was significant in that it allowed the burner to operate without a natural or induced draft smokestack. To do this, the burner was redesigned to be a retort-type rather than a bunsen-type. The latter has two supplies of air brought to the flame to insure complete combustion. The primary source is pulled into the mixing tube by the gas spraying out of the fuel nozzle. The secondary source of air diffuses into the mixing chamber under the burner grate through openings in the bottom burner casing. In the retort burner, there is no secondary source of air and the design of the nozzle(s) and mixing tube become critical for complete combustion to occur. The specific nozzle and mixing tube design used by White is covered in a later patent number 1054066. The retort burner is less sensitive to stray currents of air caused by wind down the smokestack or from under the car than is the bunsen burner and this allowed the smokestack to be replaced by a bonnet over the boiler which directed the spent gas downward and under the car where it diffused away mostly unnoticed. The prime motivation for this burner redesign was the introduction of side-entry rather than rear-entry doors into the rear passenger compartment in the 1906 model F White. The old smokestack interfered with this innovation.

895525 BRAKE MECHANISM This patent provided a means to seal the inner part of the brake drum and the linings against dust, mud, etc when the brake was released. It applied only to internal expanding brakes, which at the time were used as the hand or emergency brake. The service brake was generally an externally contracting type. This sealing system was not used on Whites.

921491 DRIVING MECHANISM FOR RAILWAY CARS This patent applied the two-speed-with-neutral transmission to a pivoting railway truck for self-propelled railway carriages. It had application to internal combustion powered carriages, which were just then coming into use, but whether or not it was actually used is not known.

987932 FLOW-MOTOR AND VALVES OPERATION This patent effectively covered White's famous flow-motor. That device ingeniously regulated the flow of fuel to the burner in a pre-determined proportion of the water flow to the boiler, and provided a relief valve to divert excess water flow from the pumps back to the water tank without affecting fuel flow. It operated in concert with the other elements of the system, which are described in the following patent. This and the following patent are the second most important of White's patents relating to steam automobiles.

987933 APPARATUS FOR GENERATING AND CONTROLLING GENERATION OF SUPERHEATED STEAM The flow-motor, thermostat and pressure regulator are combined in this patent as a system to control the superheat (i.e., the temperature and pressure) of the steam. In the description of the system in this patent, White provides a complete and concise discussion of how the flow-motor with its relief valve, the thermostat and the pressure regulator act in concert to maintain the superheat of the steam. For anyone with a later White steamer this is a must-read. It clarifies how the system works. This system was the final step taken by White to automate the operation of his steam car. It meant that (when all was set-up properly) the boiler pressure and temperature would be reasonably tightly controlled independent of steam flow rate (i.e., independent of car speed, the steepness of the hill, etc.). The system worked well with the one caveat...it must be set-up and adjusted properly. White provided extensive and clear instructions to the car owner on how to do this should it become misadjusted. Interestingly enough, this patent was applied for in 1906 and was, according to an observant White family member, Henry Merkel, the result of watching the riding mechanic in the White Vanderbilt Cup racers twiddle with the fuel and water supply valves to keep pressure and temperature stable during braking and acceleration. The flow-motor system mimicked the riding mechanic and did so pretty effectively allowing the steam system to operate stably, safely and unobtrusively with little or no attention paid to it because of hills, speed and traffic. And all of this with a purely mechanical system; there were no electric controls then. It was a big advance for the time only eclipsed by the Doble system years later.

1054066 HYDROCARBON BURNER Described is the important multiple-hole nozzle and mixing tube configuration that made the later White retort-type of burner work well. The patent provided a basic coverage of nozzle design, which prevented the gas stream from each hole intersecting another until well inside the mixing chamber. This promoted complete combustion and was an important step in allowing a stackless boiler.

974730 PRODUCING AND BURNING COMBUSTIBLE HYDROCARBON MIXTURES This was a vaporizer configuration that mixed air with kerosene or other heavy distillates *before* it entered the vaporizer. It was thought that this would reduce carbonization of the vaporizer and improve mixing. It was not used by White on their steamers. Instead, a vaporizer was developed which had interchangeable inserted rods in the inside passages of the vaporizer to change over from gasoline to kerosene. This later configuration was not used until the last year of steamer production and was not patented although was a good and simple solution to the problem of using heavy distillates in steamers. The use of these is beneficial primarily because of their greater heat value and less cost per gallon, i.e., better mileage and lower cost per mile.

1078976 AUTOMOBILE WHEEL BRAKE This patent describes the externally contracting brake used on the later steamers and early internal combustion cars. Its main improvement is the center pivot used to secure the band rather than an end pivot. It made for equal stopping power forward and backward and avoided the tendency of external brakes to lock-up. It was a good concept, but was outmoded by the later near-universal adoption of internal expanding brakes as service brakes.

1032458 OIL AND WATER SEPARATOR Oil must be injected into the steam just before entering the engine to lubricate it, but must be removed from the water before returning to the boiler as it would carbonize in the boiler. This patent described a means to separate oil from the water with a floating skimmer in the water supply tank. This skimmer transferred the floating oil (plus a bit of water) to an integral but separate compartment within the tank where it separated further by gravity. The system was not used on Whites. Instead, the oil was allowed to separate by gravity alone in the water tank. This was not a very effective separation method and required that the sludge that collected on top of the water be drained daily. White was criticized for not having an effective separator and probably would have put one on their steamers had they not stopped production the year this patent was applied for.

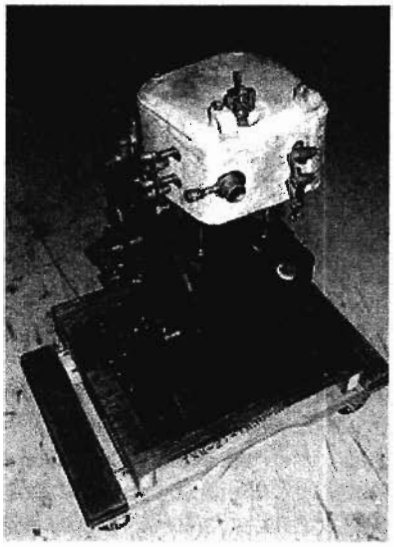
The President's White

Submitted by **Dave** on Sat, 05/26/2007 - 1:05pm.
Tags:

- ShorpyArt
- Cars+Trucks
- G.G. Bain

The President's 40-horsepower White Model M steam-powered touring car. March 1909. Photographed on the White House grounds in the early days of the Taft administration. In the back is the State Department, now the Eisenhower Executive Office Building. **View full size.** George Grantham Bain Collection. Question for the old-car experts: Does each tire really have multiple valve stems?

1909 7-passenger 40 H.P. White Model M (green), property of Ron Thurber of Bois, Idaho, and 1909 20 H.P. Model O, property of Ryan Thurber.



Enlarge image

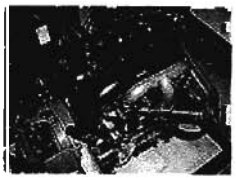
IN CONTEXT

This object appears in the following sections:

- Making Sense of "Failed" Car Technology -- Not so Famous Makes
- Americans Adopt the Auto -- Technological Choices

OTHER VIEWS

RELATED OBJECTS



Autocar truck gasoline engine

White steam automobile engine

Catalog #: 312,596, Accession #: 163,014
Currently on display
From the Smithsonian Collection

The White Sewing Machine Company, was founded in Massachussets in 1858, but moved by the founder, Thomas H. White to Cleveland, Ohio in 1866. The company began making steam powered automobiles in 1900. Cleveland, Ohio was a center of early American automobile production. Other manufacturers in the city included the Winton Motor Car Company, The Cleveland Motor Car Company, and the Peerless Motor Car Company. White Steamers were a popular brand of steam car. The White Sewing Machine Company produced a lot more than sewing machines and cars: in 1901, they also manufactured, among other things, bicycles, roller skates, phonographs, screw machines, and kerosene lamps. Thomas's sons Rollin, Windsor, and Walter, were all auto enthusiasts, and helped get the company into the automobile industry. In November 1906, the automaking part of the business split off into a separate company, named the White Company. After 1911, the company stopped making Steamers and focused on producing gasoline driven engines. Over the course of their steam-making career, the company produced 9,122 White Steamers. In 1918, the company stopped making cars (except if they were specially ordered) and concentrated on making trucks. It still makes trucks and buses.

Physical Description

artifact. 30" H x 18" W x 19" D; 2 cyl. compound, model 00. 20 horse power engine. Mounted on a wooden base.

Details

Date Made: 1910
Dates Used: 1900 - 1911
Locations: Ohio
Note: Cleveland
Credit: Gift of B. W. Laws

History

The first auto manufacturers were bicycle and carriage makers, metalworkers, and machinists. In the 1900s and 1910s, hundreds of new companies created cars of varying price and quality in limited numbers. Early automobiles—reflecting the fluid state of the emerging industry—were built with steam, electric, or internal combusion engines. Still, between the 1890s and 1920s, a standard

White steam automobile

automotive design emerged out of the competition between steam, electric, and internal-combustion cars. Manufacturers chose engines, drive trains, and accessories that they thought would attract buyers or make cars more powerful, cheaper, or easier to operate. The front-engine, shaft-driven internal-combustion car appeared by 1901 and became the norm, particularly after the Ford Motor Company's Model T grabbed a large part of the market share. Steam cars and electric cars fell out of favor and mostly disappeared from the market in the 1920s.

Related People, Places, and Events

Manufacturer
Thomas H. White
Founder of the White Sewing Machine Company, based in Cleveland, Ohio, that began to make automobiles with steam engines in 1900.

Inventor
Rollin Henry White
Son of sewing machine manufacturer Thomas H. White, and inventor of a semi-flash boiler, used in White Steam Engines, as well as designer of the early White Steamers. Rollin White was also an avid racer: he won a ten-mile race at in a Steamer at Detroit's Fair Grounds in 1901 and, in 1902, he drove a specially designed racing car in the Glenville Track in Cleveland. White Steamers also took part, very sucessfully, in endurance tests of the day.

Manufacturer
Windsor White
Son of sewing machine manufacturer Thomas H. White, Windsor became president of the White Company when it split from its parent the White Sewing Machine Company in 1906.

Manufacturer
Walter White
Youngest son of sewing machine manufacturer Thomas H. White, Walter became vice president of the White Company when it split from its parent the White Sewing Machine Company in 1906. He became president of the White Motor Company in 1921, and died in a traffic accident in 1929.

Donor
B. W. Laws
Washington, D.C. resident at time of donation in 1943

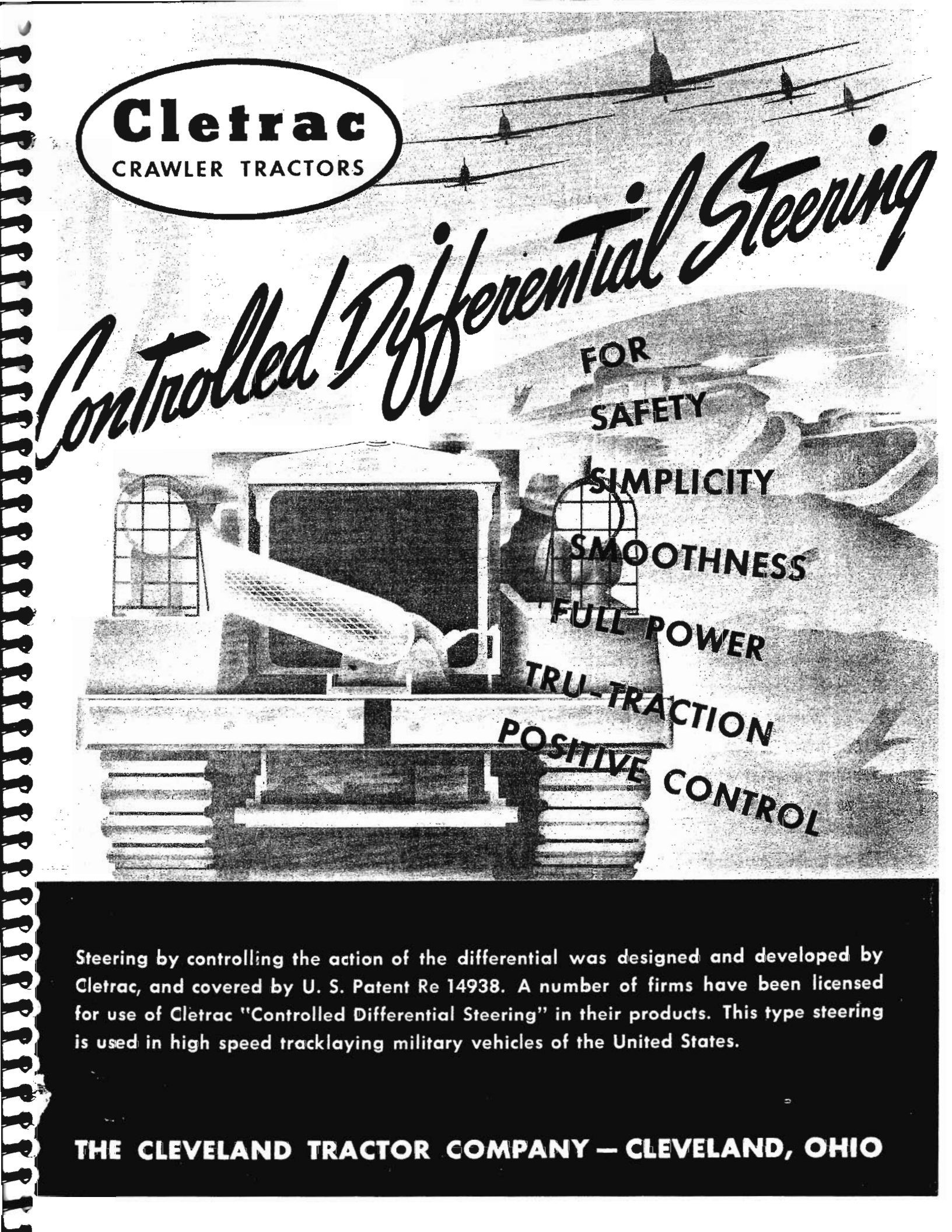
Place of Manufacture
Cleveland, Ohio
One of a number of early automakers who were centered in the Cleveland, Ohio, area. Others included the Winton Motor Car Company, The Cleveland Motor Car Company, and the Peerless Motor Car Company.

Place of Use
Washington, D.C.

APPENDIX C

Cletrac Brochure on
Controlled Differential Steering
For Crawler Tractors

Advertisement for the Cletrac
Model F Tank-Type Tractor



Steering by controlling the action of the differential was designed and developed by Cletrac, and covered by U. S. Patent Re 14938. A number of firms have been licensed for use of Cletrac "Controlled Differential Steering" in their products. This type steering is used in high speed tracklaying military vehicles of the United States.

THE CLEVELAND TRACTOR COMPANY — CLEVELAND, OHIO

STEERING... TRACKLAYING VEHICLES

Steering, in any full tracklaying vehicle, is controlled by varying the speed of the track on one side of the vehicle in relation to the speed of the track on the opposite side. Two methods of accomplishing this variation and control of track speeds are in general use—namely, (1) Clutch Type Steering; (2) Cletrac Controlled Differential Steering.

CLUTCH TYPE STEERING

One method of steering full tracklaying vehicles is to install a dry multiple plate clutch in the power train on each side of the tractor ahead of the final drive. The speed of each track is varied by disconnecting and reconnecting the power to the track located on the side of the machine to which it is desired to turn.

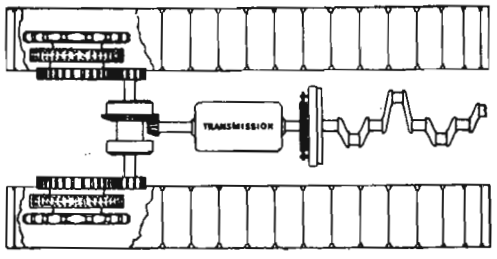
This action of varying the speed of one track by clutches can be illustrated by controlling the speed of your car through declutching and slipping the clutch. If you were driving a car, you could set the throttle and engine r.p.m. to keep the speed of your car at 20 miles per hour. To drive in traffic without touching the throttle, you could leave the motor at a constant speed and control the speed or forward movement of the car by disengaging and re-engaging the clutch—slipping it to maintain the desired speed. In fact, you could stop the car entirely by disengaging the clutch.

This would be varying the speed and motion by clutching and declutching. You well know that varying movement and speed in this manner would subject the clutch and power train to tremendous wear, shock, abuse and strain. Conditions similar to this exist in clutch steering tractors. To compensate for this wear, shock, abuse and strain in crawler tractors, manufacturers use a large number of clutch plates—some as many as 74 steering clutch plates per tractor.

CLETRAC CONTROLLED DIFFERENTIAL STEERING

The controlled differential method of steering developed, patented, and exclusively used by Cletrac for years, is a system of actuating the differential through a planetary control. This method of steering gives simple, positive, and smooth direction control. Power is engaged to both tracks at all times which insures not only full traction but also eliminates shock to the power train, and torsional strain to the frame, gears, and shafts of the tractor, such as would be caused by continuously connecting and disconnecting the power as when other types of steering are used. The operator varies the speed of each track at will, has full, simple, and positive control at all times.

The Cletrac Controlled Differential is compact (only 16 moving parts which move only when the tractor turns). All movements are rolling movements. The entire unit is immersed in oil so that there is a film of oil between each moving part. All gears in the controlled differential are constantly meshed at all times. Design of this type insures minimum of replacement and maintenance time and cost.



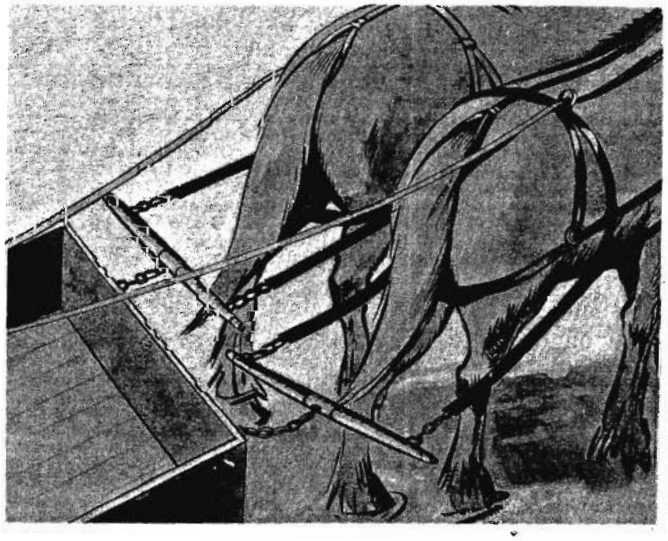
In a Cletrac, the differential is the next unit in the power train after the transmission. A differential as used in automobiles or tracklaying vehicles might be defined as a mechanism to direct power to two separate units in such a way that each of the two units can move at the same speed or at different speeds as desired. When a wheel tractor makes a turn, it is necessary that the wheels on one side move faster than those on the other side—the outside wheels have to travel a greater distance. In order for the tracks to travel at different speeds, they must be connected in such a way that the speed of either can vary. Clearly, a solid connection between the tracks could not be used unless a turn was never made or some other provision was made. The driving wheels of an automobile or the tracks of a tractor must be connected to the source of power and still must be able to be regulated at different speeds. Hence, the differential used in a Cletrac must be able to transmit full power to both tracks and also to allow the tracks to move at the same speed or at different speeds at the will of the operator.

The Cletrac Controlled Differential Steering Mechanism is located in a case common to the transmission. The Cletrac Steering Mechanism is in reality two identical assemblies —right and left—joined or united by the ring gear and the compensating cage. The entire steering mechanism is supported by large, heavy duty, anti-friction bearings and revolves as a unit. The assembly is balanced and is free from over-hanging shafts or gears. This assures long, trouble-free life. When moving in a straight line the entire steering unit turns. The gears in the steering mechanism of a Cletrac turn only when the tractor is being turned. All gears and shafts in the Cletrac steering assembly are accurately machined from chrome nickel steel, and are heat-treated and individually inspected according to strict specifications.

CLETRAC PRINCIPLE BUILT ON TIME-TESTED BASIS

DIFFERENTIAL PRINCIPLE IN TEAM HITCH

Man learned after hundreds of years of using animal power that co-ordination through double trees was the proper method of harnessing a team so that now, no experienced teamster would hitch direct to the load being pulled using a separate set of traces and with a separate pair of lines to each horse. An attempt to vary the speed and to control each horse independent of the other without an "evener" to equalize the pull that each horse is delivering would subject the pulled equipment to internal twists and enormous shocks and strains because such a pull is not balanced. Neither would you attempt to control the action of a team without cross checks on the reins to co-ordinate the action of one horse with reference to the other.



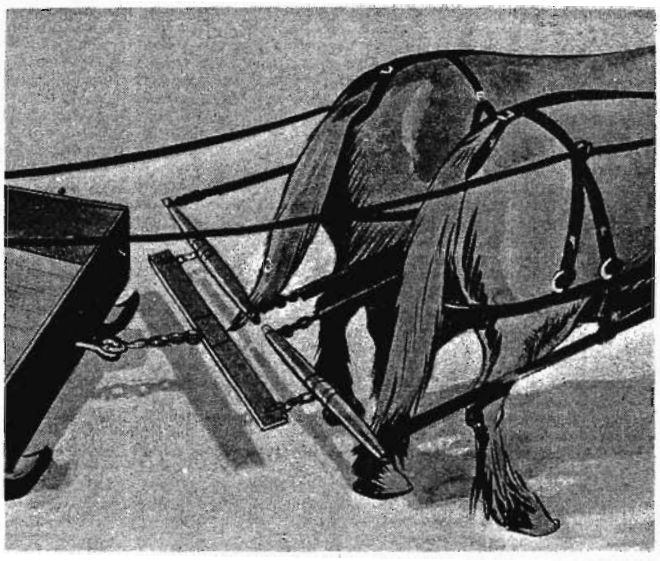
In order to turn a team that was hooked direct, you would have to stop one horse. When this horse was permitted to re-engage the traces and start pulling, a tremendous jerk would occur. This would create grave danger of breaking the single tree, jerking a tug in two, breaking a breast strap, or pulling out a hame ring. By stopping one horse in order to turn, you force the other horse to pull the entire load around without the help and assistance that is ordinarily received from the team-mate on the straightaway.

If you would not consider hitching horses direct to the load with independent control over each horse and if you would not consider a "hitch" that required the stopping of one horse to turn, then why should you consider a tractor that stops one track in order to turn? Such a tractor creates internal strains when steering because of unbalanced traction and power. Further, if the power on this kind of tractor is re-engaged too quickly, the driving mechanism is subjected to great shock, twists and strains.

BALANCE, POWER AND PULL

Any teamster, when working horses, balances the pull of one horse against the pull of the other through the use of an "evener" or "double tree". Thus, the work required of each horse is balanced. When turning a double team, a cross check in the reins is used so that the action of one horse is controlled and synchronized with the action of the other and both horses pull, one traveling faster than the other. Through the evener a constant pull is exerted at the drawbar.

Through the Cletrac Controlled Differential the pull of one track is balanced against the pull of the other. Thus the work required of each track is divided. When turning a Cletrac, the speed and pull of one track is balanced and equalized and coordinated so that both tracks pull—one traveling faster than the other. Through the controlled differential a constant pull is exerted at the drawbar.



The action of Cletrac Steering insures variation of track speed with control of power which eliminates such internal stresses, strains and shocks as may be created in tracklaying units that do not have a differential.

DIFFERENTIAL IN A TRUCK

The Cletrac Steering Mechanism is similar in principle to the differential which you have in your truck or wheel tractor, except that the car or wheel tractor differential has no control. When you steer a car, truck, or wheel tractor you "lead" the frame of the vehicle by turning the front wheels. The differential gears are operated because the rear wheel on the side of the vehicle opposite the direction turned (the outside) must necessarily move faster than the wheel on the same side to the direction turned (inside). Through the frame of the vehicle the differential gears are driven and one axle travels faster than the other. However, power is constantly applied to both wheels. There are no front wheels to a full track vehicle such as a crawler tractor, military tank, etc., therefore the control of the speed of each track is provided within the differential.

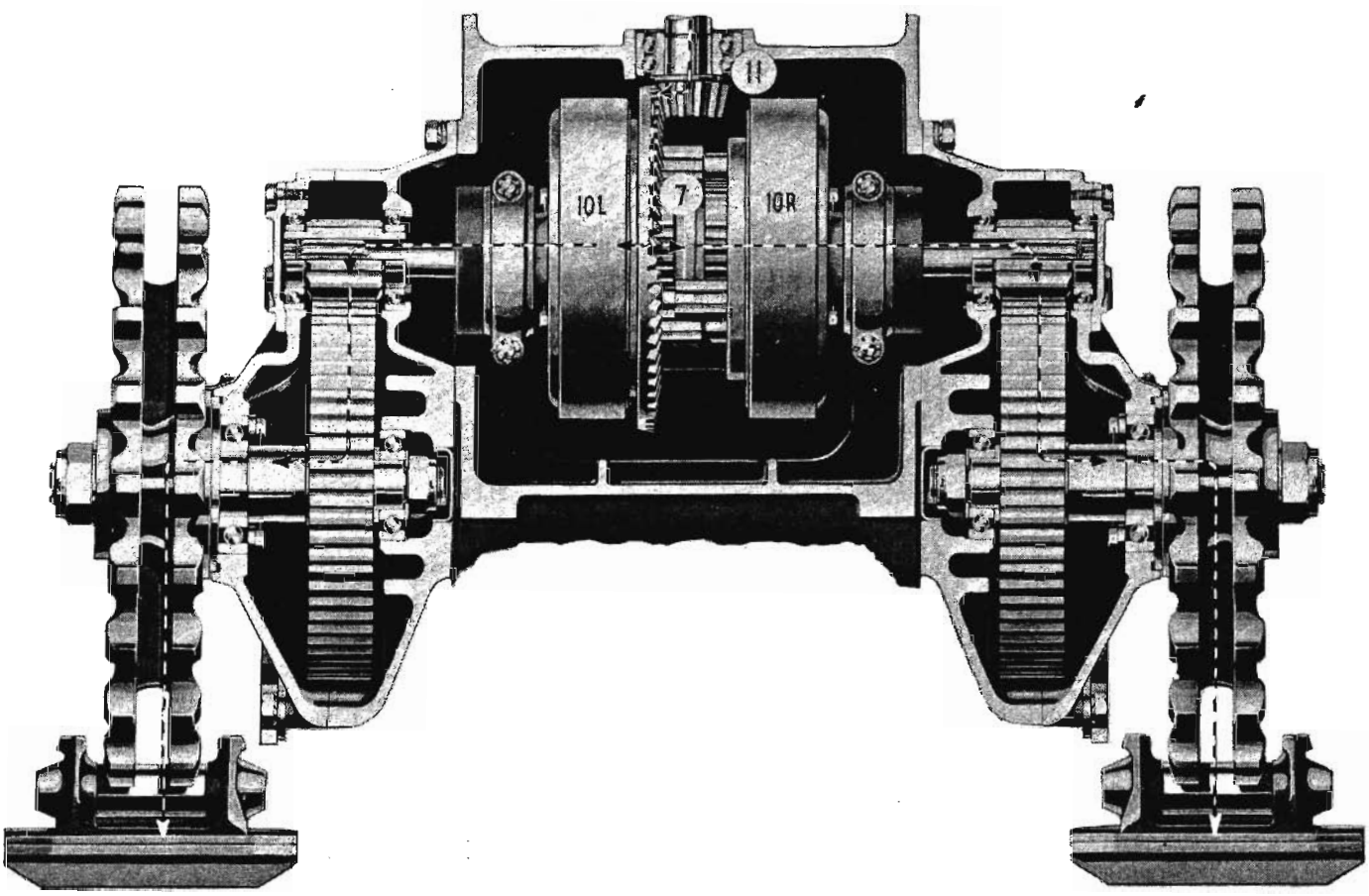
When steering a Cletrac and you desire to turn, pressure on either steering lever stops a drum which actuates the planet gears on that end of the steering assembly. Through the gears thus set in motion the differential action is controlled. This changes the ratio of speed of the drive shafts —one is slowed—one is speeded—(just as in the car or wheel tractor differential). You retain the pulling power on both tracks. **A fundamental difference between Cletrac and the ordinary differential in your car, truck, or wheel tractor is that with the Cletrac Controlled Differential, the action and speed of each track is under positive mechanical control at all times at the will of the operator.**

HOW CLETRAC CONTROLS STEERING DIFFERENTIAL

A description of the Cletrac Controlled Differential will explain how it operates. Bear in mind the differential of an automobile—the means by which one rear wheel can travel faster than the other when the car is making a turn. Cletracs are steered by controlling the differential action.

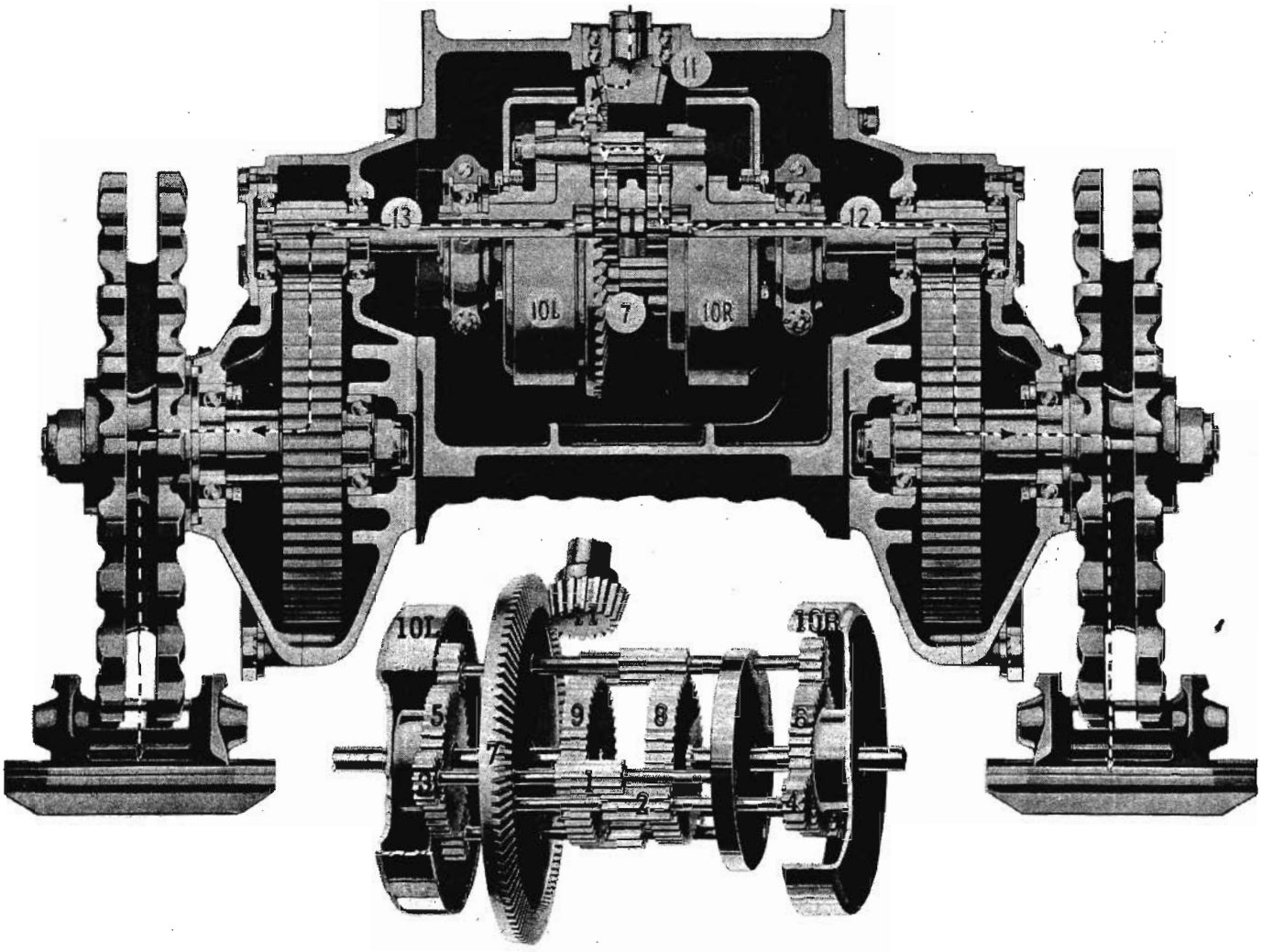
The Cletrac steering differential is controlled by two levers. Pulling on either of these operates a band which contracts around and stops the corresponding steering drum, which actuates the planet gears, causing the tractor to turn. Thus, the differential in a Cletrac, when controlled, changes the relative speeds of the tracks but continues to deliver power to both tracks at all times.

STRAIGHT AHEAD



When the tractor is moving straight ahead, steering drum **10R** and **10L** are free to turn with the entire differential assembly as a unit. Pinion **11** drives bevel gear **7,** turning the entire differential unit and transmits equal power and speed to each track. There is no movement of either gears or shafts within the assembly.

TURNING



To turn right, pull the right steering lever which stops drum **10R** by contraction of steering band.

Gear **6** will also be stopped because it is a unit with steering drum **10R.** This gear is not attached to any shaft.

Pinion **11** continues to actuate gear **7** which continues to rotate the entire differential as a unit.

Under these conditions, pinion gears **4** are driven around gear **6** which is stopped and, therefore, they must revolve and as well must travel or rotate around gear **6.**

Gear **2** being on the same shaft as gear **4,** turns in the same direction as **4.**

Gear **2** meshing with gear **1** drives gear **1** in the opposite direction.

Gear **2** is also meshed with gear **8** and gear **1** is meshed with gear **9.**

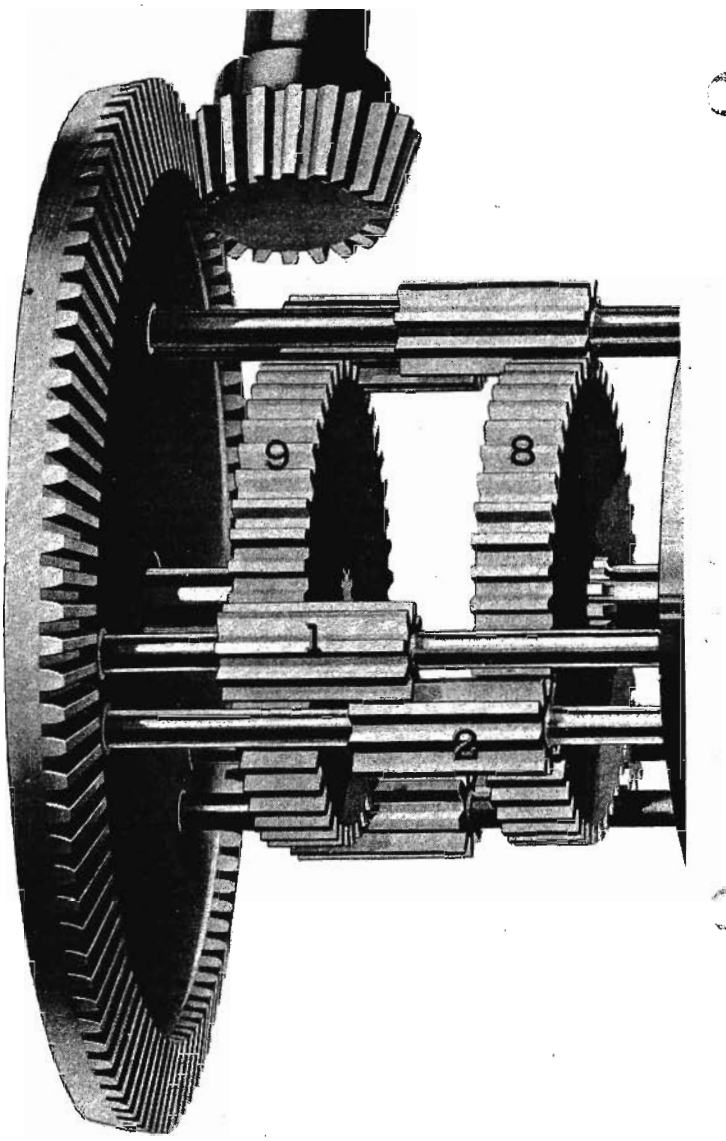
This means that when pinion gears **4** start to rotate because drum **10R** is stopped, gear **2,** turning in the same direction as gear **4** and in the same direction as gear **8,** retards the speed of gear **8.** Gear **1,** turning in the opposite direction of gear **2** and the opposite direction as gear **9,** increases the speed of gear **9.**

Gears **8** and **9** drive the right and left main drive shafts **(12** and **13)** which in turn transmit power to each track, independent of each other.

Increasing the speed of the track on one side and automatically reducing the speed of the track on the other side turns the tractor, yet retains full power on both tracks at all times.

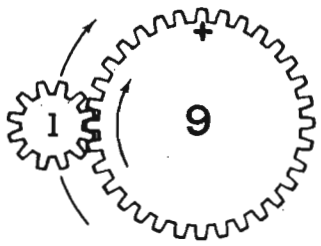
To turn in opposite direction, an identical activity is set up by stopping steering band **10L,** which stops gear **5** and actuates pinion gears **3.**

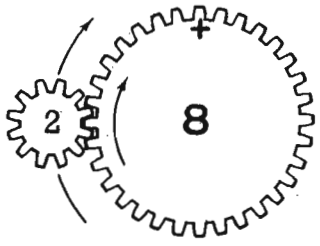
FUNDAMENTAL PRINCIPLE OF CONTROLLED DIFFERENTIAL STEERING



In order to understand differential action and the flow of power through the tractor differential let us examine the action that takes place in gears **2** and **8** and **1** and **9.** Refer to the enlarged section which is lifted from the illustration on previous page.

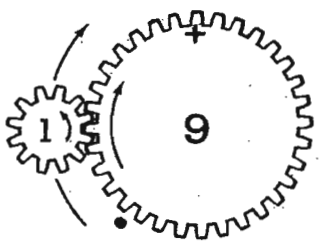
STRAIGHT AHEAD

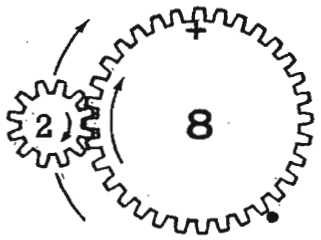




When the tractor is going straight ahead gears **1** and **2** do not revolve on their own axis. Instead the entire assembly rotates as a unit. Gear **1** being meshed with **9** and gear **2** being meshed with **8** act only as a driving power to rotate gears **8** and **9** they rotate as a unit in fixed position (not revolving). Thus gears **8** and **9** are going at the same rate of speed and points "X" will travel from the top to the bottom at the same time.

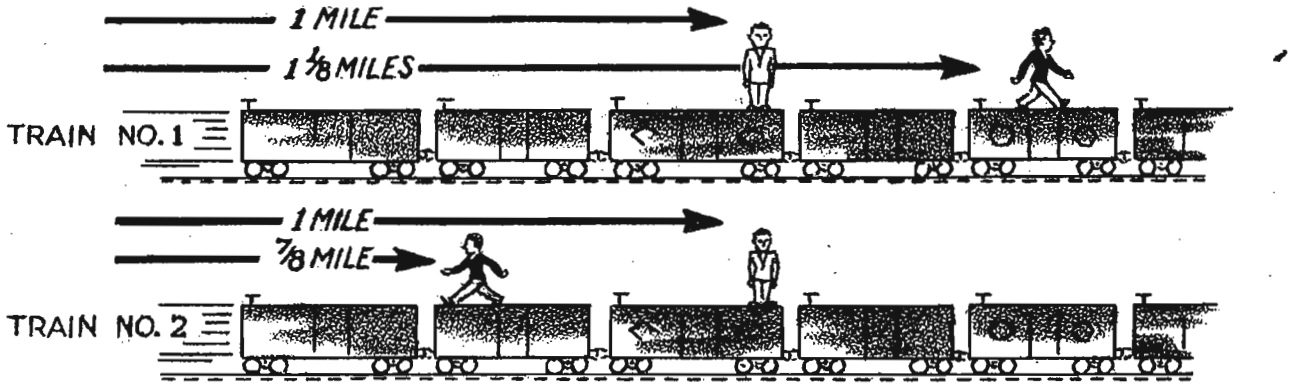
TURNING





To turn right—when you pull the right steering lever and stop the right steering drum you immediately start gear **1** revolving counterclockwise and gear **2** revolving clockwise at the same time rotating **8** and **9** gears. (This revolving of **1** and **2** is an additional action to that as outlined in driving "straight ahead" and which has been previously illustrated.)

Now gear **1** is not only rotating gear **9** but is revolving in the opposite direction. This speeds up the forward motion of gear **9** and a point "X" at the top will travel as far as opposite point "•" in a fixed time at a fixed speed. On the other hand, gear **2** is not only rotating gear **8** but is revolving in the same direction. This retards the forward movement of a point "X" at the top and it will only travel to opposite a point "•" in the same set time and set speed.



An illustration of this action in the case of gears **1** and **9** is the same as a man walking forward on the top of a train which is traveling forward at a fixed speed. When a man standing still on top of the train has travelled a mile the man that walked forward has possibly travelled a mile and an eighth within the same length of time.

On the other hand, the action of gears **2** and **8** is the same as a man walking backward on the top of a train which is travelling forward at a fixed speed. When a man standing still on the top of the train has travelled a mile, the man that walked backward has possibly only travelled seven-eighths of a mile within the same length of time.

To apply this illustration to the movement of a Cletrac, let us consider Train No. **1** as the left track and Train No. **2** as the right track.

The case of the man standing still on each train is the same as gears **1**, **9**, **2**, and **8** standing still in relationship to one another, which moves the Cletrac straight ahead. Each track moves forward the same distance or speed and the tractor travels straight.

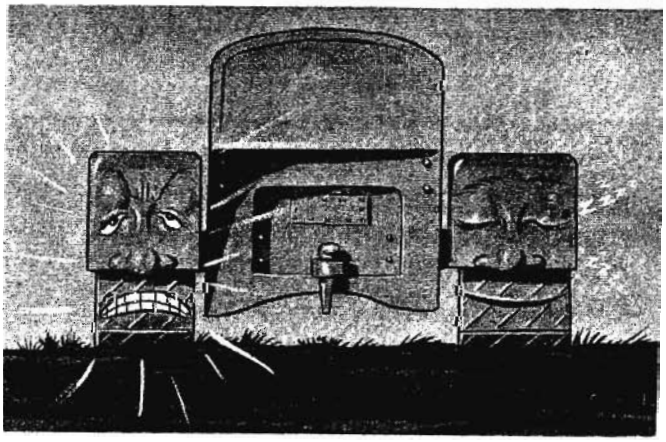
The case of the man walking forward instead of standing still, as on Train No. **1**, illustrates the forward action inducted by the forward revolving and rotating of gear **1** on gear **9**, which moves the left track forward further or at a faster rate of speed.

The case of the man walking backward instead of standing still, as on Train No. **2**, illustrates the backward action induced by the reverse revolving and rotating of gear **2** on gear **8**, which moves the right track forward less or at a slower rate of speed.

ADVANTAGES OF CLETRAC STEERING

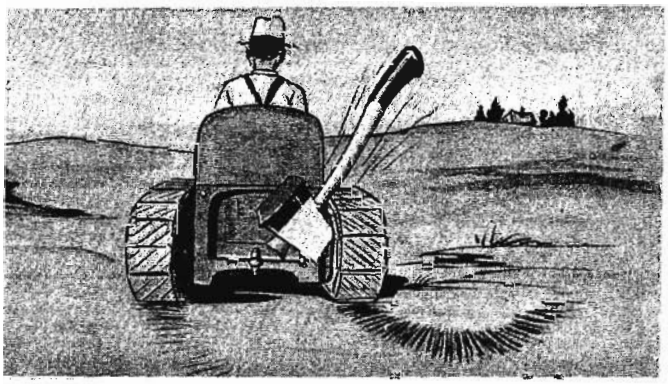
1. POWER ON BOTH TRACKS AT ALL TIMES

Cletrac Planetary Controlled Differential Steering provides power on both tracks at all times, whether on turns or on straight-away. This also permits maneuvering in



close quarters under adverse conditions as, at all times, the speed of each track is under positive control of the operator. With power on both tracks that tracklaying vehicle equipped with Cletrac Steering provides not only full power but, equally important, this provides the full traction area whether on turns or whether traveling straight ahead.

In steering track type tractors other than Cletrac, one track (one-half of the tractive effort) is declutched on every turn. The reduction of this effort is at a time when load resistance increases (because of moving the

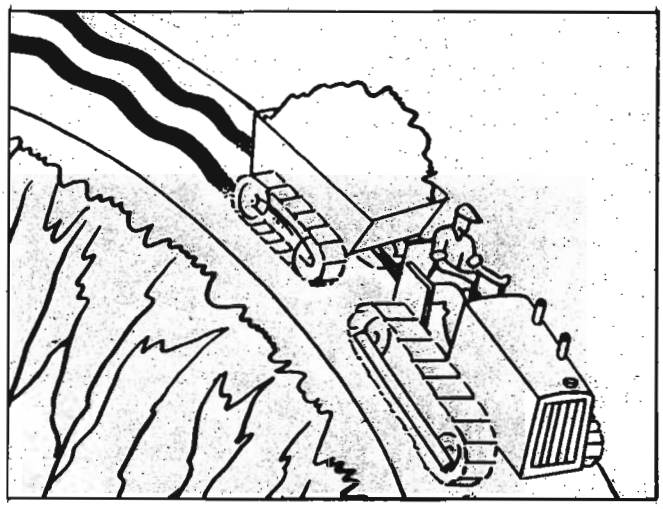


load in a direction other than a straight line). A tractor can pull a load only to the extent that its tracks will "hold" regardless of how much engine power is diverted to a single track. If you reduce track area by 50% through declutching, isn't it logical that you will reduce the effective pounds pull?

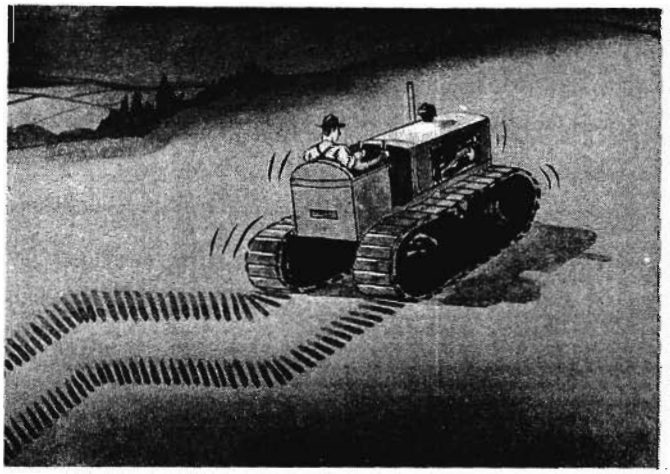
Power on both tracks permits the use of design that eliminates excess weight in the tractor. Excess weight is dead weight—dead weight reduces pay load; therefore "Dead weight pays no dividends".

2. CLETRACS MOVE SMOOTHLY AROUND CURVES

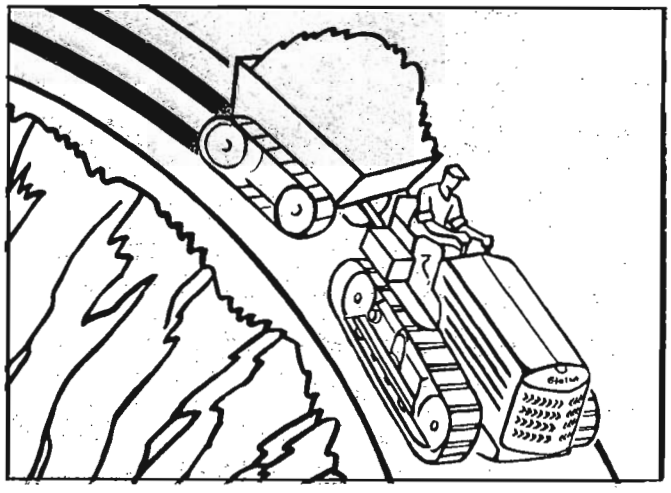
With power constantly applied to both tracks, and with one track operating at a



speed less than the other, Cletracs move gradually and smoothly around curves instead of zig-zagging in a series of bucks and jerks. Tracklaying tractors not embodying



Cletrac type of steering disconnect the power from one track and force the other track around.



Let's again compare steering a tracklaying tractor to hitching a team. Can you estimate the shock and damage to harness and load when a double team is hitched direct and one of the two horses is either constantly lunging forward or dragging back?

3. CLETRACS CONSUME LESS POWER IN TURNING

With power on both tracks the tracks are moving forward and to the side when turning. The action is a rolling action rather than a skidding action. Just demonstrate to yourself. Just turn the steering wheel on your car when it is standing. Then allow the car

to move slightly forward as you turn the wheel. Just notice how much less effort is required. Bear in mind that the contact of your car wheel is but a few inches, whereas the track contact of the smallest tracklayer is measured in feet. Power is required to overcome the inertia of a stationary track and more engine power is required to move the tractor around when skidded. A skidded track digs and scrapes and banks dirt against each side, which further increases resistance. The more power required for movement of the tractor itself, the less is available at the drawbar for useful work. With smooth, easy turning Cletracs you have more power for pulling pay loads.

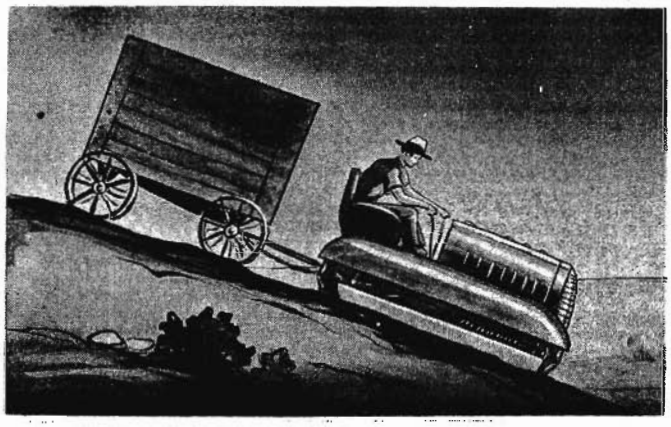
4. LESS TENDENCY FOR TRACKS OF A CLETRAC TO HOOK UNDER ROCKS, ROOTS, ETC.

The tracks of a Cletrac roll—not skid—when turning. Thus, instead of sliding under and against obstructions such as rocks, roots,

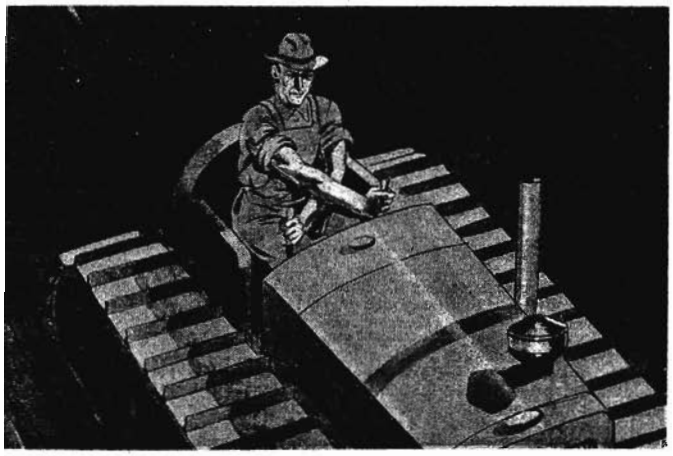
etc., the tracks roll over them. Further, skidding or sliding sideways with the track stopped in soft ground digs holes and banks dirt against the side frames. It takes power to overcome this resistance and it takes unnecessary side frame weight to prevent damage when using skid type steering.

5. CLETRACS STEER THE SAME DOWNHILL AS ON THE LEVEL

On level ground, to steer "clutch type steering" tractors, the power is disconnected from one track and kept on the other. A turn is accomplished in the direction of the side from which power was disconnected because the load resistance tends to retard this track. Tractor operation, however, is almost all uphill or downhill.



When going downhill, and when the clutch type tractor is coasting, or the load pushing, disconnecting the power from one track leaves that track free to coast without the resistance of the engine to control the speed. The engine resistance retards the speed of the track to which the power remains connected. Consequently, on a downhill trip, when an operator pulls the lever



that would, on a level surface, turn the tractor to the "right" his tractor turns to the "left". He has to "cross steer" in order to control the tractor. When the load is pushing the operator doesn't have time to "stop and think" or to "figure out" HOW TO STEER. Would you think of owning a truck

or any vehicle that required you to turn your wheel to the "right" for a "downhill left curve"?

With Cletrac, Controlled Differential Steering gives positive and safe control. Cletracs are controlled the same, whether going downgrade or upgrade. This permits normal, instinctive steering. The power is never disconnected. The relative speed of each track and the speed of both tracks is under positive control. This makes for safety and comfort especially in rugged terrain.

6. CLETRACS TURN SHORTER WITH FULL LOADS

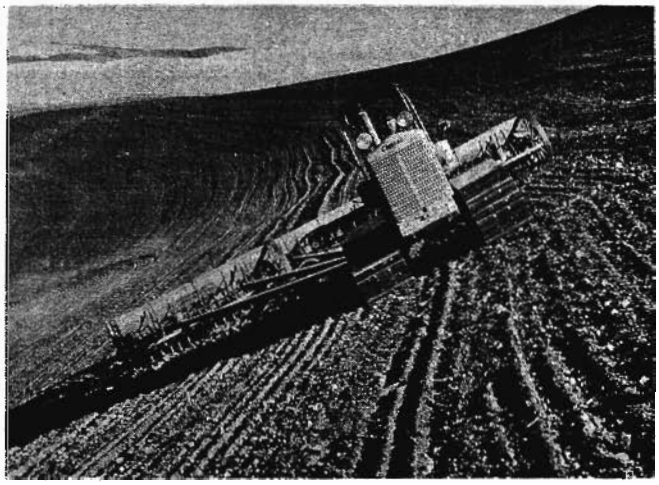
The turning of a Cletrac is limited by the drawn equipment. Any tractor driver, in turning sharply with drawn equipment, has to limit his turn to such a radius as will prevent this equipment from jack-knifing, strik-

ing and piling up on the track. All Cletracs can turn as short as this drawn equipment will permit.

Cletracs have FULL TRACTION WITH WHICH TO TURN as both tracks are pulling. That is why Cletracs can haul and turn with larger loads. Furthermore, Cletracs can turn with loads on soft fills and dumps where other tractors are at a standstill.

7. CLETRACS CAN MANEUVER ON SIDE HILLS OPERATING PARALLEL TO SLOPES

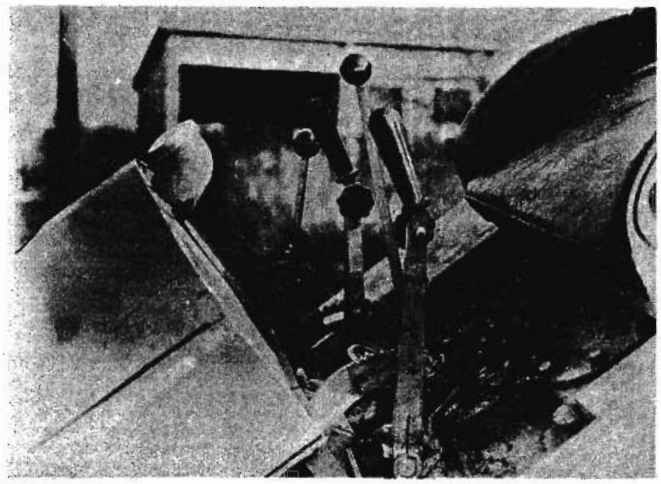
In a Cletrac, regardless of the track on which the weight is greater, that track will be pulling. This is not true of tractors which engage and disengage clutches for steering.



To turn a Cletrac down slope, you merely pull the lever on the downhill side. Should the upper track slip because of lack of weight and insufficient traction, the lower track will still be pulling to help turn the tractor. This would not be possible if we disconnected the power on the lower track and expected the track on the high side (on which there is very little weight and which has very little traction) to pull the load around. The operator can control the speed of each track at will.

8. CLETRACS CAN STOP AND HOLD LARGER LOADS ON HILLS

Frequently there arises the necessity for stopping a tractor, with or without load, on steep, declining slopes. This can be done



with Cletrac Controlled Steering. By merely pulling both of the steering levers to the rear, the steering bands positively hold the differential. When holding the differential, the tracks are locked and the tractor is securely held.

Each steering lever is provided with a quadrant and latch or lock. Engaging this lock in the steering lever quadrant holds the bands and differential. When steering levers are locked in position the driver can leave the tractor seat and make any adjustments to the tractor or to the pulled load in safety. This simple positive system is integral with steering and eliminates the necessity for a separate system of controls.

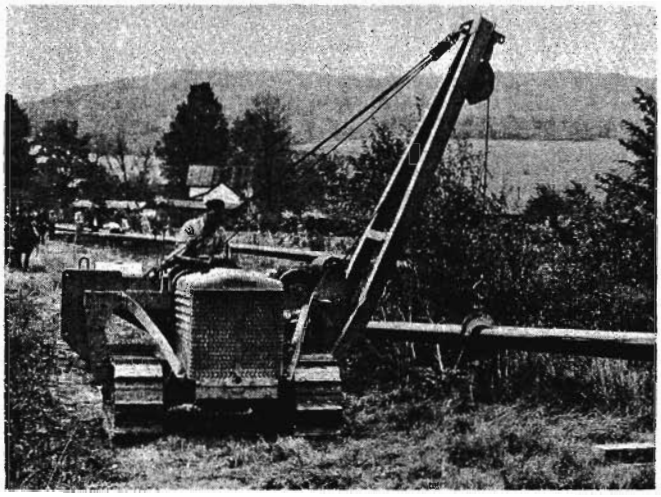
On steep down grade operation the tendency is for the tractor operator to slide forward on the seat. On tractors that require both hands and feet for control, there is little opportunity for the driver to brace himself. Cletrac's hand control enables the driver to keep himself in position.

To start a Cletrac when stopped on a steep decline, it is necessary to only depress the clutch, shift into the desired gear, disengage each steering lever lock, and with feet braced, gradually release steering levers. This release of the levers allows the controlled differential to rotate and the tracks to move. The tractor is steered normally down grade.

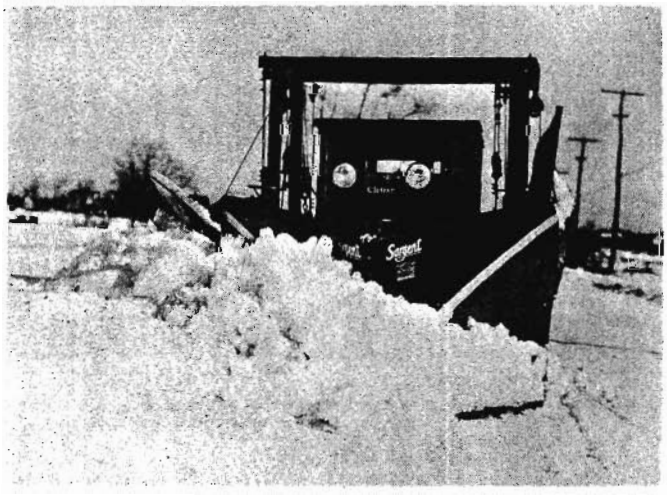
Cletrac Controlled Differential is ahead of the final drive reduction. A mechanical advantage of 10.3 to 1 is thus obtained on some models, and comparable advantage on others. Controlling the differential ahead of the final reduction secures this high mechanical advantage and makes for ease and also positiveness of control under all circumstances.

9. OFF-CENTER LOADS CAN BE HANDLED WITH LEAST TROUBLE

Tractor operation requires that many loads be handled with offset hitches or with load resistance concentrated on one side. This concentration of load resistance on only one side creates "side draft" and tends to cause the tractor pulling such a load to travel in other than a true course. Such a side draft load would be a back-sloping operation with a blade grader. Cletrac's Controlled Differential Steering permits holding the tractor on a true course without whipping or jerking the grader.



Another side load operation is pipe laying. The quickly responsive but smooth steering of a Cletrac enables joining the pipe quickly and safely without whipping or jerking.

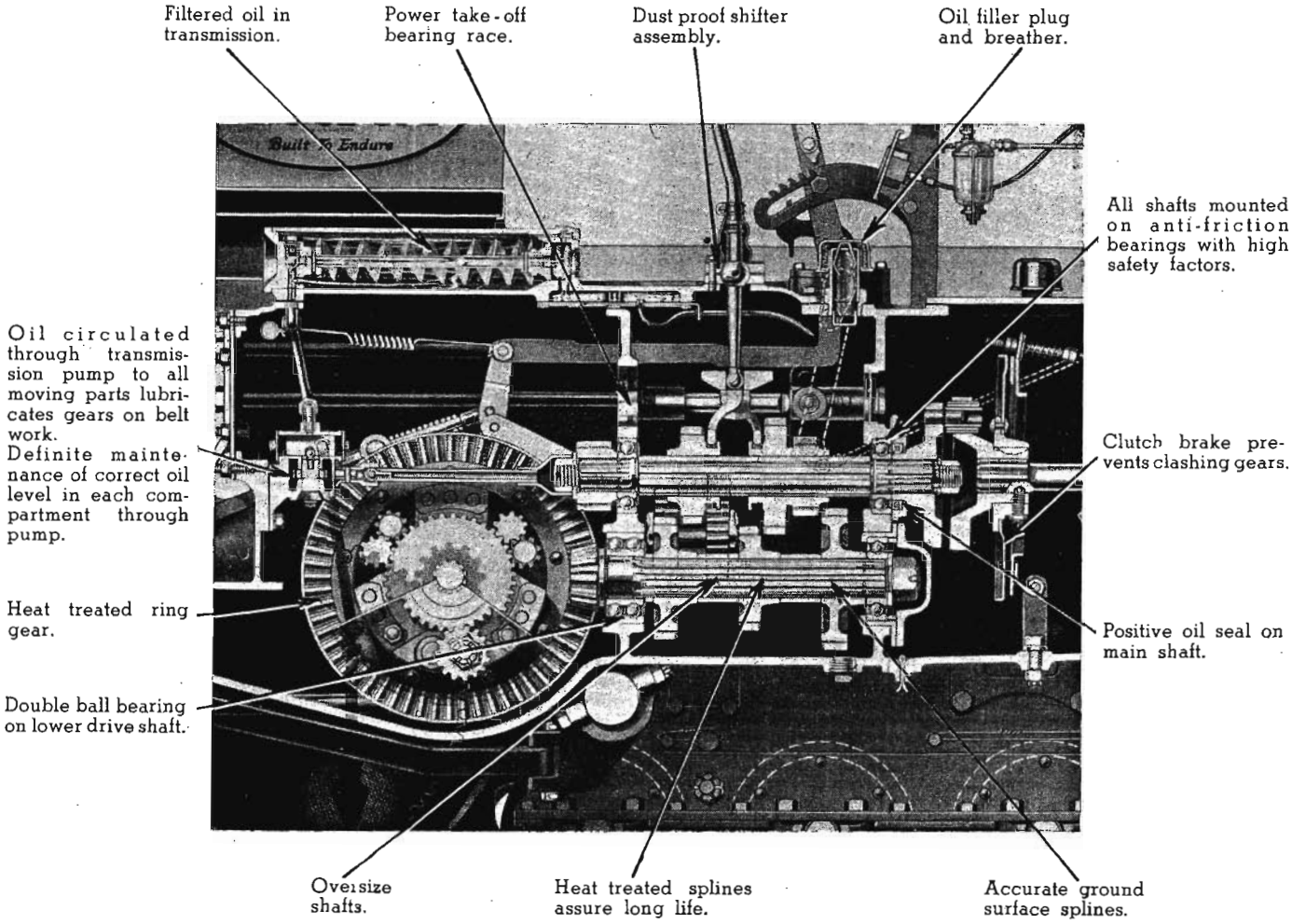


Widening roads with a V plow in snow removal work creates tremendous side thrust. The nose of the plow must be constantly held to the snow. Cletrac Controlled Differential Steering is designed so that this can be done without constantly jerking the plow into the bank.

Still another important off-center operation is "trailbuilding." When cutting roads in the side of hills or mountains a zig-zag or pivot out of control would tumble the tractor down slope. This operation demands positive Cletrac Controlled Differential Steering and is one of the important reasons why Cletracs are the preferred tractor for trailbuilding work.

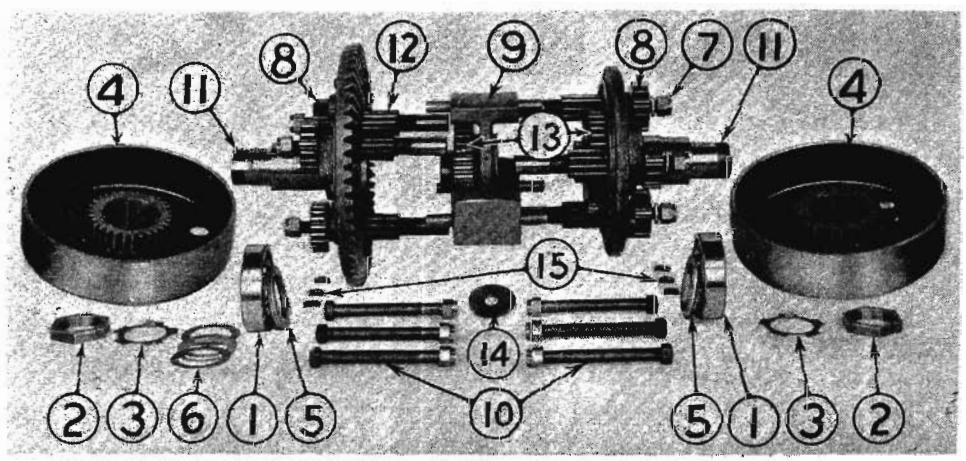
10. POWER IS NEVER DISCONNECTED — GEARS NOT SUBJECTED TO ACUTE SHOCKS AND STRAINS

Clutches are not engaged and disengaged when steering a Cletrac. All gears in Cletrac steering system are constantly in mesh and power to them is never disconnected. All movements in a Cletrac mechanism are rolling movements—and there is a film of oil between each moving part. Instead of stopping and starting long trains of gears and tracks by clutching and declutching, Cletrac merely accelerates and decelerates the speed of these gears thereby reducing shock loads to the minimum. This elimination of shock loads gives greater safety factors with the same materials, or the same safety factors with less bulky construction.



11. THE CLETRAC STEERING MECHANISM HAS FEWER PARTS THAN ARE USED IN OTHER TYPES OF STEERING

When a Cletrac is traveling on the straightaway there is no movement within the controlled differential as the entire unit rotates. When a steering lever is engaged, gears roll slowly, positively, with an oil film between each part. There are only sixteen moving parts in the Cletrac steering mechanism and these move only when turning. Some tractors using clutch type steering have as many as 74 clutch plates.



12. LESS LOADING STRAIN ON SIDE FRAMES WHEN TURNING

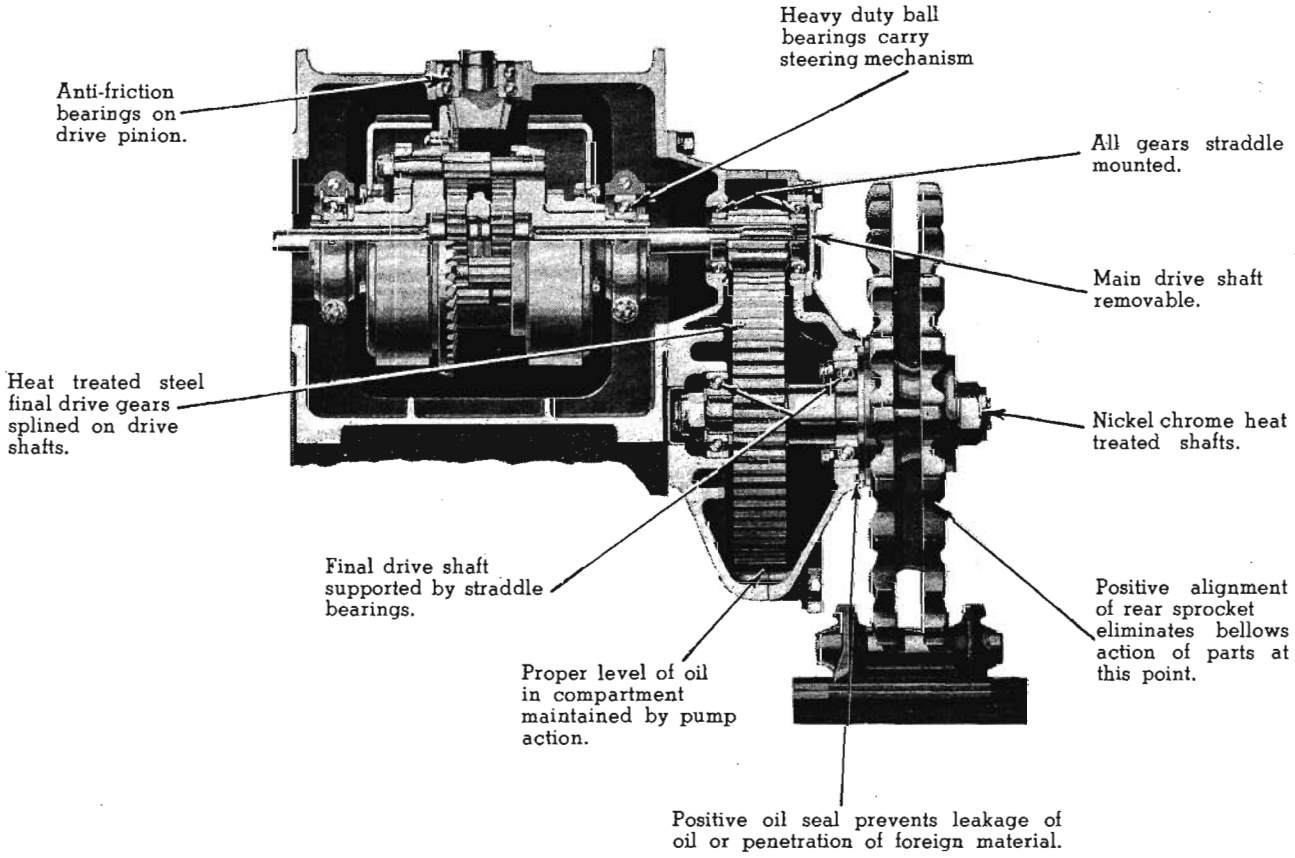
Track type tractors do not pivot like a man on his heel—they pivot like a man with his weight resting flat on his foot.

Just try pivoting on one foot resting flat on the ground. The strain and twist on your knee is enormous. This is nothing compared to what would happen if your foot hit an obstruction while pivoting. With this demonstration you can understand why tractors that stop one track and twist around when turning, need such heavy, bulky, side frame construction and must overcome this twisting action in side frame alignment.

Cletracs roll around instead of twisting around. Thus they scoop up less dirt—do less damage to the soil or surface on which they are turning.

13. ALL CLETRAC STEERING AND FINAL DRIVE PARTS WORK IN A COMMON OIL BATH WHICH SIMPLIFIES MAINTENANCE

Tractors embodying clutch type steering have to seal each side of the clutches so that oil is kept away from them. This makes a number of compartments, each of which has to be kept at a proper oil level—this means increasing the number of "check and fill points" (three or more) for proper maintenance. This compartmentation means that four or more oil seals have to be placed on fast driven shafts.



Cletrac has a common oil bath for transmission, steering mechanism and final drives. There is one compartment for all moving parts and they all churn in oil. Proper quantity of oil is maintained in each level by an oil pump. Oil seals are necessary only on final drive shafts, which are slow moving and easy to seal.

14. THE CLETRAC STEERING MECHANISM DOES NOT REQUIRE OPEN DRAIN PLUGS TO TAKE AWAY SEEPAGE

Because of the tendency for oil seals to seep, because of the necessity for keeping clutches dry, tractors embodying clutch type steering have drain plugs in the housings under the clutches. These plugs are supposed to remain "out" except when fording streams or working in water, etc. When performing work in wet conditions, the plugs are supposed to be installed.

Cletrac planetary controlled steering has no separate compartment to prevent lubricants from reaching it. Instead, Cletrac's transmission and steering differential mechanism churns in a bath of oil. This single compartment construction eliminates the necessity for openings that might permit the entrance of dust, dirt, or water.

15. THE CLETRAC STEERING MECHANISM ELIMINATES PERIODICAL CLUTCH AND COMPARTMENT WASHING

Fast-moving, slipping and sliding dry clutch members have a tendency to become "glazed" from being engaged and disengaged. Hence, periodic "washing" of clutch facings helps preserve effectiveness.

There are no dry clutch members being engaged and disengaged when steering a Cletrac. There are no clutches to slip—there are no clutches to wash. Cletrac steering differential operates in a bath of oil, with an oil film between each part.

16. THE CLETRAC STEERING MECHANISM REQUIRES LESS MAINTENANCE

The Cletrac steering mechanism has fewer moving parts than the steering system of other tractors. These moving parts are working in a bath of oil, hence less maintenance.

Instead of having various compartments for lubrication, each of which has a separate fill point and check level, Cletrac has one fill point and the level of lubricant to maintain in one place.

There is no slipping of unlubricated parts in the steering mechanism of a Cletrac.

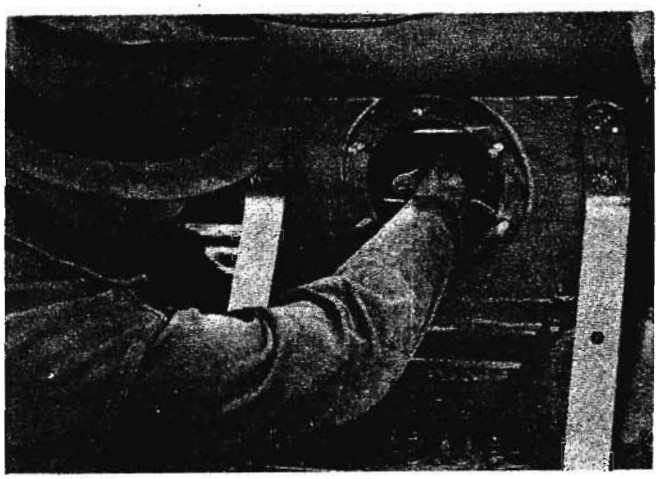
Further, as a simplification of maintenance, there is no separate brake system to maintain, as there is on tractors using other types of steering.

There is only one point of "adjustment" on a Cletrac steering mechanism, the steering bands, and they are easily accessible.

17. ADJUSTMENT OF CLETRAC STEERING MECHANISM IS SIMPLE AND ACCESSIBLE

By removing the plate in the rear of the transmission, the steering band adjustments are readily accessible. There are no keys to remove nor locks to unlock. Bands are securely held in position by an ingenious

V groove cut in the long adjusting nut. This V fits the shaft through which the adjusting clevis pin passes. This holds the nut in a fixed position and eliminates the use of lock



washers, cotter keys, etc. To adjust the band you merely reach into the opening in the rear of the case and turn the adjusting nut to the correct adjustment.

When necessary to reline the bands, merely remove the transmission cover. The bands can then be withdrawn or re-entered without the necessity of disconnecting any driving shaft in the tractor. The life of steering bands is exceptionally long because they work submerged in oil and merely control the balance and action of the differential.

18. OPERATORS USE ONLY THEIR HANDS FOR STEERING AND THEY CAN SHIFT THEIR SITTING POSITION AT WILL

Tractors having clutch type steering require a separate brake system. A brake is necessary to control that track from which power has been disconnected because it is traveling "free" when "cut away" by declutching. This requires that the operator use his hands for declutching and his feet for braking. The

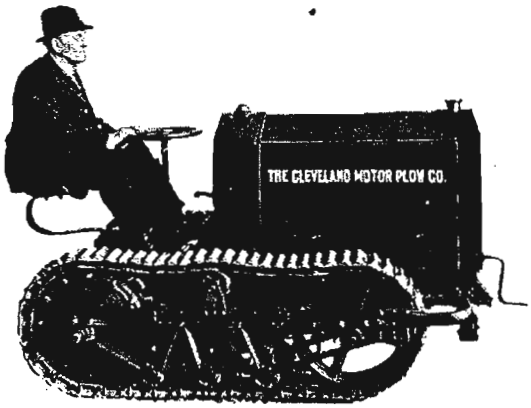
necessity for using a brake on each track means that the operator has to sit in one position during operation of the machine.

With Cletrac, the control of each track is positive and at the will of the operator through steering levers, and operators can change their position (or stand). This eliminates fatigue and keeps operators at peak efficiency.

19. INEXPERIENCED OPERATORS CANNOT DAMAGE CLETRAC STEERING MECHANISM

An inexperienced driver can subject a clutch type steering mechanism to high shock loads if a steering clutch is re-engaged too quickly. These clutches are supposed to be "slipped" when engaging, in order to prevent this.

Cletrac steering has built-in equalizing or compensating features which prevent the power train being subjected to these shocks. Thus an inexperienced operator does not subject a Cletrac to the possible damage due to improper handling.



1916 CLETRAC CRAWLER TRACTOR

The Cleveland Tractor Company invented controlled differential steering—and has used it ever since. The first Cletrac built had "Controlled Differential Steering". This first model had every advantage found in the modern Cletrac steering mechanism.

In this early model, bands were contracted on the steering drum by turning a wheel which operated a cam on the bottom of the steering column. Today this action is improved and simplified, but the modern Cletrac Steering Mechanism and the one produced in 1916 are identical in principle. Thousands upon thousands of owners over this period of years have been loud in their praise as to economy and efficiency of this steering mechanism.

THE OLIVER CORPORATION *Successor to*

THE CLEVELAND TRACTOR COMPANY

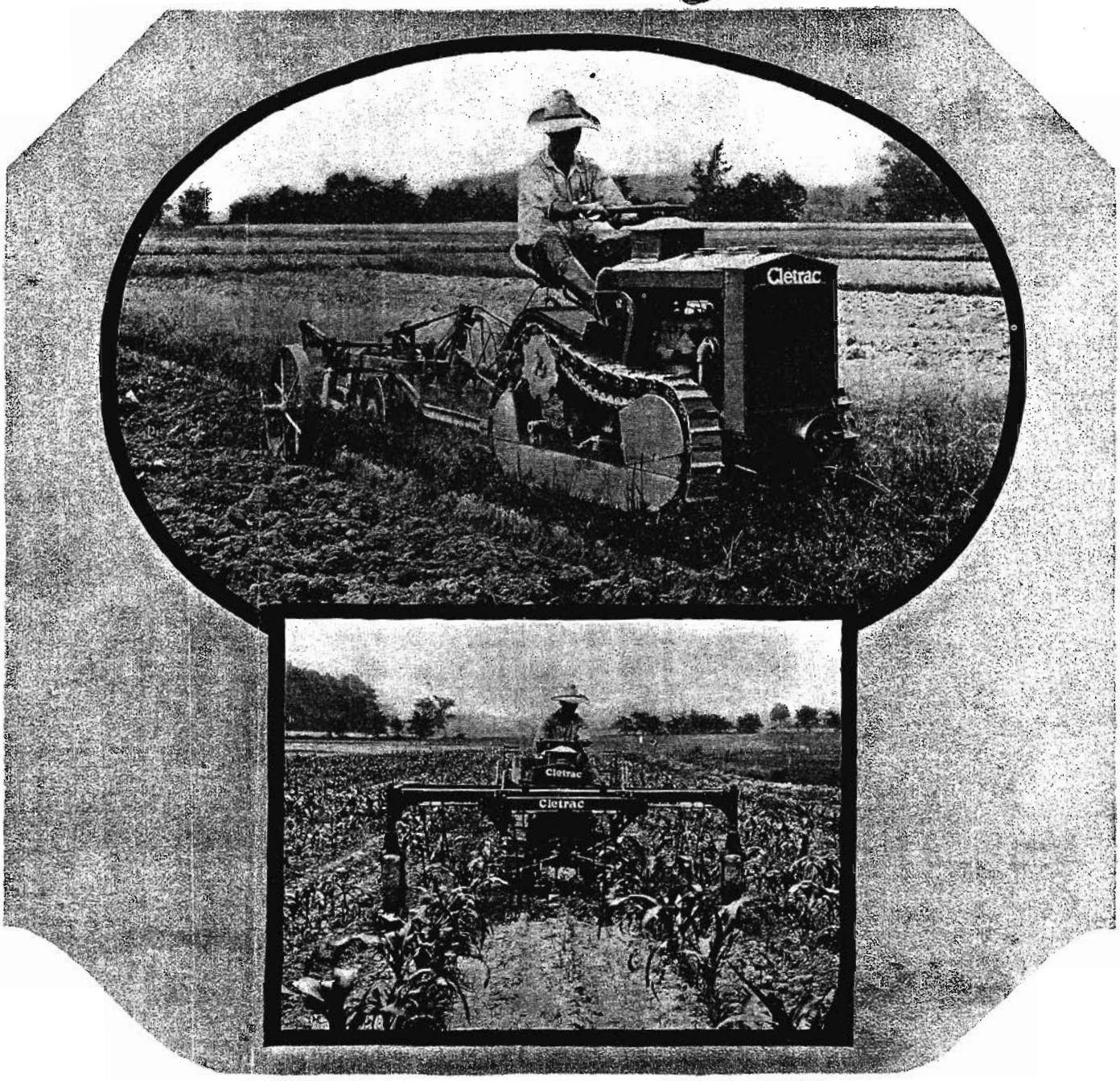
19300 Euclid Avenue

CLEVELAND, OHIO, U. S. A.

Form No. 937

Litho in U. S. A.

Announcing—



the most important Power Farming Development since the introduction of the Tank-Type Tractor

The New Model F Cletrac TANK-TYPE TRACTOR

$845

Complete ~ F.O.B. Cleveland

The First and Only Tank-Type Tractor that CULTIVATES—in addition to doing ALL other farm jobs—

CLETRAC MODEL F is the tractor farmers everywhere have been waiting for since the beginning of the tractor industry—a tractor that actually replaces the horse and mule, that will do *all* the work on the average farm and yet sells at a price the average farmer can afford to pay.

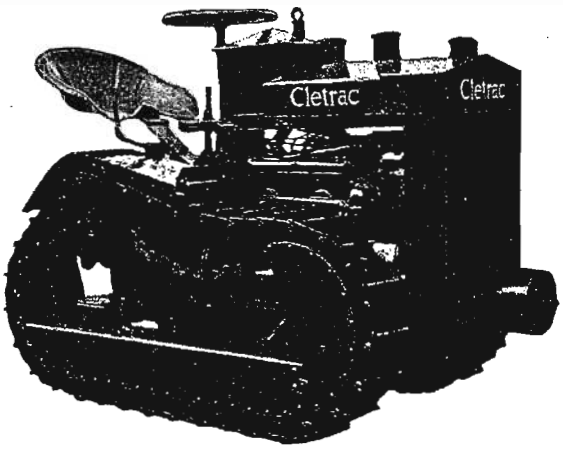
Cletrac F handles ALL farm work—and because of its sensible, tank-type construction upholds the record of its famous tractor mate—Cletrac W—in doing "more work per day, more days per year."

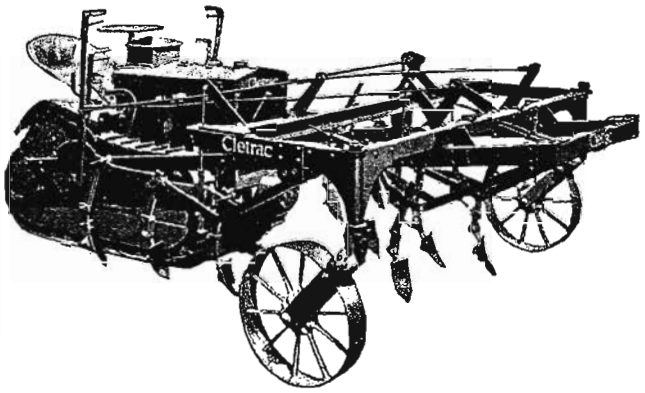
Plows, discs, harrows, hauls, does *all* farm work

Cletrac F plows 6 to 8 acres a day with any 2 bottom 12-inch plow—discs 15 to 20 acres a day—harrows 20 to 25 acres a day—seeds 25 acres a day—handles two 6 ft. mowers hitched tandem as well as any rake, tedder or loader—harvests 20 acres a day—takes care of haulage jobs, and all ordinary belt work. Easy to operate, economical in use, simple to maintain, ready for any work. Sensible tank-type construction puts Cletrac F into the field ahead of any other tractor and keeps it at work day in and day out, adding many jobs and many days of usefulness on the farm.

Cultivates, too—quickly, accurately, easily—10 to 20 acres a day

In two minutes you can attach the New Cletrac Two-Row Cultivator to Cletrac F—and you have a power cultivator that will cultivate from 10 to 20 acres of corn or cotton a day—and will work in corn up to 60" in height. Unlike any other tractor Cletrac F *travels between the rows* in cultivating—applies power from *behind*—lets the operator sit comfortably in the tractor seat and gives him a clean-cut vision of his shovels *ahead* instead of straight down. No other method of cultivation is as *easy, quick and accurate* as cultivating with Cletrac Model F. Any type of shovel, sweep or weeder is used.





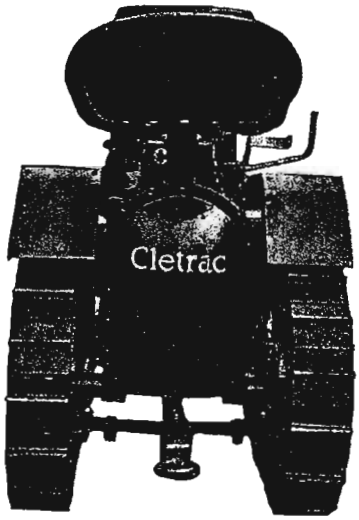
1. Handles every farm job.
2. Plows 6 to 8 acres a day using any 2-bottom 12-inch plow.
3. CULTIVATES *corn, cotton and other farm row crops.*
4. Every part subject to wear constructed of chrome steel—weighs only 1820 pounds
5. Automatically lubricated—no grease or oil cups.
6. Simple, carefree design—burns kerosene.
7. Every working part quickly accessible.
8. Unprecedented value at $845 complete.

Chrome steel construction—simple, compact design—low price

Cletrac F is a *quality* job *at an unprecedented price.* It is constructed of Chrome Steel—the strongest, toughest material obtainable—and it embodies unique engineering principles that save the farmer money on initial cost, operating expense and upkeep. Here is a tractor with a 4-cylinder kerosene burning motor, with variable speeds of from 1 to 3 miles per hour, governor controlled, which is so thriftily and compactly designed it weighs only 1820 pounds and measures only 83″ in length by 50″ in height by 32″ in width. It is so simply designed that after a few minutes of instruction anyone can not only operate it, but can take care of it perfectly without the assistance of an expert.

Automatically lubricated, carefree, accessible

With Cletrac F you have only to pour oil into the case and your lubrication worries are over, for every working part is automatically lubricated. There are absolutely no oil or grease cups to fill. Think what this feature alone means on a busy day.



Simple, Accessible Design

By simply removing the rear plate on Cletrac F you have quick access to every working part of the differential and gear case. You can take care of Cletrac YOURSELF. Remember, too, Cletrac F has no oil or grease cups. It is AUTOMATICALLY LUBRICATED.

All-job usefulness, flexibility, dependability an unprecedented value at $845.00

Cletrac Model F places at the disposal of the farmers of Am ica a tractor without an equal for day-in and day-out, all- usefulness, flexibility and dependabil Cletrac F represents the biggest tractor sell opportunity in recent years—a tractor t handles any farm job on any farm—a trac that farmers everywhere have been waiting and that farmers everywhere can afford to b Low first cost—small operating expens ability to do all farm jobs includ *cultivating*—easy to operate and care fo Cletrac F offers you *your* opportunity to up with the biggest tractor *value*—from viewpoint of Utility, Quality and Price— the American market today.

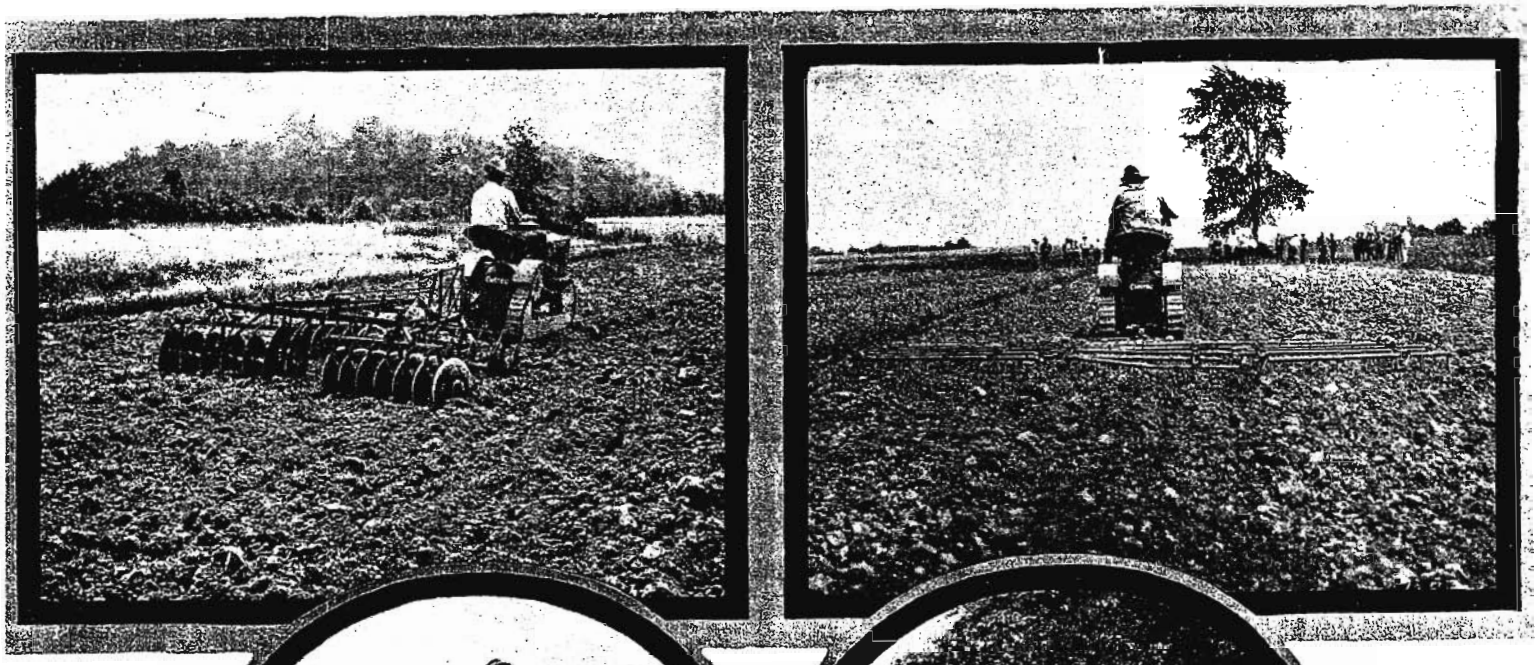
Full information in regard to Cletrac F a open territories upon request from resp sible dealers.

THE CLEVELAND TRACTOR C

Largest Producers of

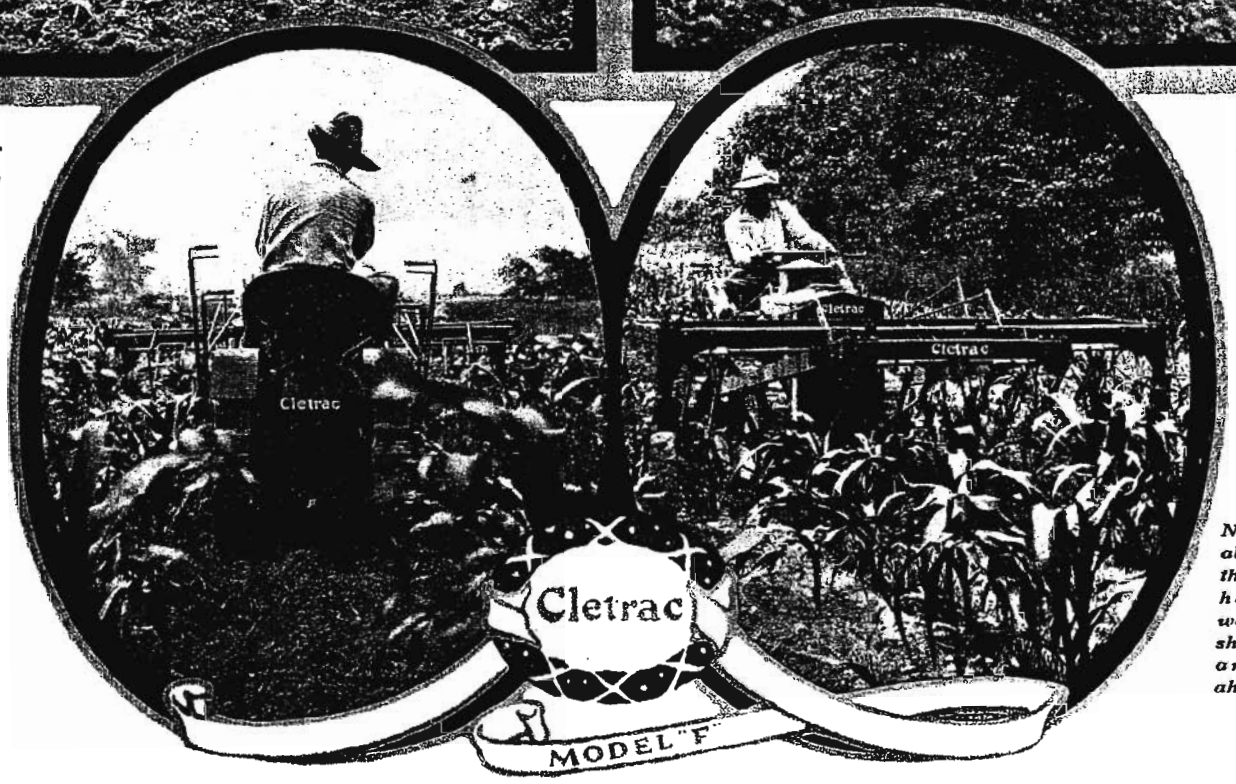
Tank-Type Tractors in the World.

Euclid and Lamb Aves. Cleveland,



Cletrac F will Disc 20 acres a day with a 6 ft. double disc.

Cletrac F will harrow 25 acres a day with a 3-section spike-tooth harrow.



letrac F travels etween the op rows and etrac Cultiva- r handles rn up to 60 ches. Price of etrac Two-Row ltivator $135 O.B. Cleveland

Note comfortable position of the operator—he has nothing to watch but the shovels and they are straight ahead.

CLETRAC F—The biggest value and most dependable sales opportunity in years—the tractor that fits the farming needs and price requirements of the largest tractor market, America's average size farms.

Does *all* farm work—plows 6 to 8 acres a day—discs 15 to 20—harrows 20 to 25—cultivates 10 to 20 of corn, cotton and other row crops—takes care of haulage jobs and all ordinary belt work.

Unique in construction. Chrome steel construction wherever a part is subject to wear. Unusually *quick accessibility* to all parts. *Automatically lubricated*—no oil or grease cups.

For full information write to Main Office at Cleveland or nearest District Office.

District Offices

anta, Ga., 254 Peachtree St.
icago, Ill., 2025 So. Mich. Ave.
nneapolis, Minn., 714 Wash. Ave. W.
s Angeles, Cal., 1029 S. Grand Ave.
w York City, 225-227 W. 57th St.
lahoma City, Okla., 515 W. Main St.

THE CLEVELAND TRACTOR CO.

Largest Producers of Tank-Type Tractors in the World

Euclid and Lamb Aves. Cleveland, O.

District Offices

St. Louis, Mo., 3118 Locust St.
San Francisco, Cal., 147 Montgomery Street.
Spokane, Wash., 30 E. Sprague Ave.
Cleveland Tractor Co. of Canada, Ltd., 72 Pitt St. E., Windsor, Ont.

APPENDIX D

1924 Rollin Model G Sedan
in the collection of the
Crawford Auto-Aviation Museum of
Cleveland, Ohio

Overview Specifications

Vehicle Spotlight

Rollin White was the son of Thomas White, the man who had built a respectable business producing washing machines, small machines, bicycles, roller skates, and other products. Rollin was an engineering student at Cornell who displayed a passion for the automobiles. After graduating from college he went to Europe to study their automobiles, designs, and techniques. Upon his return to the United States, he began producing automobiles powered by a steam boiler that he invented. The vehicles were originally sold under the White Sewing Machine Company. As the business expanded, his brothers, Windsor and Walter joined the company and helped with the building of the steam powered cars. Production progressed rather well. Steam powered vehicles were popular due to their quiet operation, smooth ride, and excellent performance.

Thomas White passed away in 1914 and shortly thereafter, Rollin left the company. He spent his time away from the company recovering from what he described as ill health. Upon recovery he produced farm tractors under the company name of Cleveland Tractor Company. His product, the Cletracs became well known throughout the world and another successful business venture spearheaded by Rollin prospered. In 1923 he again focused his attention on automobile production. He created the Rollin Motors Company and established himself as the chairman. The vehicles that were produced were rather ingenious, being one of the first to utilize four-wheel brakes. The wheels were comprised of solid disks which replaced the wooden-spoke artillery wheels. The quality and affordable price helped drive interest in the vehicles.

During the 1924 model year, the Rollin Company produced over 3660 cars. A year later, sales slowed to just over 2000 examples. Due to declining sales, bankruptcy, and stiff competition from other companies, the Rollin factory was forced to close its doors forever. Rollin focused his attention to his tractor business. In 1944 the tractor factory was merged with the Oliver Corporation. In 1960 that corporation was purchased by White Motor, a company that had been created by Rollin White.

Rollin: 1921-1930
Similar Automakers
Add Review
Other models by Rollin
ADD THIS

Related Articles and Event Coverage
Crawford Auto-Aviation Museum

Other Model Years
1924 Model G Sedan

conceptcarz.com
From Concept to Production

Overview Specifications

Vehicle Spotlight

1925 Rollin Model G Sedan

Year	1925
Make	Rollin
Model	Model G Sedan
Engine Location	Front
Drive Type	Rear Wheel
Price	$1,275.00

Engine

Engine Configuration	I
Cylinders	4
Engine	Cast en block
Aspiration/Induction	Normal
Displacement	149.30 CU IN. | 2447 cc. | 2.4 L.
Horsepower	41.00 HP (30.2 KW)
HP / Liter	17.1 BHP / Liter
Fuel Type	Gasoline - Petrol
Pistons	Aluminum

Rollin: 1921-1930
Similar Automakers
Add Review
Other models by Rollin
ADD THIS

Related Articles and Event Coverage
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Other Model Years
1924 Model G Sedan

Full album Exterior photos *1925 Rollin Model G Sedan information*
Link to this Crawford Auto-Aviation Museum
ADD THIS

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URL: http://files.conceptcarz.com/img/Rollin/25_Rollin_M




338

APPENDIX E

Letters of Endorsement for
Rollin H. White's Nomination to the
National Inventors Hall of Fame

Vice President for Selection
The National Inventors Hall of Fame Foundation, Inc.
P.O. Box 1553
Akron, Ohio 44309-1553

Ronald W. Thurber
4087 S. Talavera Way
Boise, Idaho 83706

Re: Endorsement letter
Rollin White

The White steam cars, built between 1901 – 1910 in Cleveland Ohio by the White Sewing Machine Company comprise a very important chapter in automotive history. Whites and Stanleys, the two most prominent makes of steam cars, had very little in common mechanically, other than they were both powered by steam, which was produced in very opposite fashions. By 1910, White had produced approx. 8,000 units, with Stanley at 6,000. Large Whites sold for $4,000, small ones for $2,000, while Stanleys averaged about $1,200. By 1906, in the United States, there were more steam cars on the road than internal combustion gas cars.

Internal combustion gas engines at the turn of the last century were rather experimental, yet steam engines had been developed, perfected, and employed for over 70 years. The "standard" method of producing steam by 1900 was a strong, large, heavy boiler (often wrapped with piano wire for additional strength) containing small vertical "fire" tubes to help distribute heat from the burner below. They were referred to as "fire-tube" burners. Weight, safety, and the length of "firing-up" time were lingering problems.

The first Whites of 1901 had a revolutionary new steam generating system designed by Rollin White. It consisted of several hundred feet of tightly coiled pipe, continually filled by water pumps from the top, and a burner below. As the water was pumped down to the hot coils, the water "flashed" into steam. This new system was referred to as a "water tube" steam generator or a "flash" generator. After passing through the engine, the steam was condensed back into water and reused. This gave a great advantage in that the system held very little water and therefore could be fired up in about 5 minutes, vs. 20 to 30 minutes for a Stanley. Practically, it was much lighter in weight, posed no danger of explosion, and was much more efficient. White Steamers excelled on several of the early Glidden Tours.

The White family, notably Rollin and Walter, were very active in the manufacture and promotion of White steamers. Before building automobiles, they had successfully operated the second largest sewing machine company, behind only Singer. President Teddy Roosevelt often rode in the back seat of his big Model G White of 1907, and the U.S. Government bought an equally large Model M of 1909 for President William Howard Taft.

I hope that you will recognize Rollin's contribution to this early phase of automotive development by nominating him for induction into the National Inventors Hall of Fame.

Yours very truly,

Ronald W. Thurber

Gmail BETA

Betty King <bettyking1@gmail.com>

Info on Roland White and the Steam Car.

1 message

Richard Landry <rich36001@yahoo.com> **Wed, Jan 14, 2009 at 8:09 PM**
Reply-To: rich36001@yahoo.com
To: bettyking1@gmail.com

Have been a Steam Car fan since I was a little kid in the 40's and went to a antique car parade with my mother. In putting him up for nomination it would do him a great Honor as I think he accomplished the most advancements in the steam automobile. If you go to J. LENO'S Garage, on the internet, he has four viewable short films on steam cars. Two Stanleys, a 1907 White, and a 1924 Doble. The Doble classed as the epitome of steam autos. He only made 37 or so of the cars from the twenties to the early thirties. Roland built almost 10,000 cars in the ten year history of White Steam Automobiles, and he did it without electric controls. When you watch the Leno videos you will see how automatic the White was in 1907 (Better IN 1910) compared with the Stanley where you are monitoring many things and PUMPING all the time. To accomplish such automatic control of fuel and water without having electrical sensors was and is a fantastic accomplishment. To accomplish the same control the Doble relies on many electrical components. Let me know of your accomplishments in your quest.

Sincerely: RICH LANDRY, Minneapolis, MN

David K. Nergaard
367 King Street
Littleton, Mass.
01460-1248

978 486 9695

Vice President for Selection,
National Inventors Hall of Fame,
Box 1553,
Akron, OH
44309-1553

Respected Sir,

First, a word of introduction. I am the vice president of the Steam Automobile Club of America and own (actually, am owned by) two steam cars; an essentially original 1907 White model "H" and a much modified 1922 Stanley 735.

I am in favor of nominating Rollin White to the inventor's hall of fame. His steam generator was the only automotive "flash boiler" to enjoy real commercial success.

The tests by Prof. Benjamin of Purdue University and Prof. Carpenter of Cornell of the White steam systems showed very high efficiencies and, to this day, remain the best documented tests of automotive steam engines ever published. (I know of good tests of Stanleys and Dobles, but only from college theses or private papers.)

One clue to the esteem which the White enjoyed is an article in the Automotor Journal of July 1908 "Steam from a Petrol Point of View". The author compared a 30 hp. White with a gasolene car he held to be of equal quality; the Rolls-Royce "Silver Ghost"!

Only two other makes of steam cars with "instantaneous steam generators" had some degree of fame; the Serpollet and the Doble. Leon Serpollet made fewer cars in his unfortunately short life than White made in a year. And the Doble brothers made fewer cars in their life times than White made in three weeks!

My Stanley is registered as a "daily user", not an antique, and is driven quite often. The White needs some repairs; some of the original 1907 boiler tubes have failed and the steering box needs to be rebuilt. The White is too valuable a car to drive on roads shared by what Massachusetts licenses as "drivers". However, I have driven it enough to know it might well out perform my Stanley on a long trip.

Respectfully yours,

David K Nergaard

15 January 2009

HISTORICAL CONSTRUCTION EQUIPMENT ASSOCIATION

October 15, 2008

Vice President for Selection
The National Inventors Hall of Fame Foundation
P.O. Box 1553
Akron, OH 44309-1553

RE: Endorsement of Rollin Henry White for induction into the National Inventors Hall of Fame

Dear National Inventors Hall of Fame Foundation:

The Historical Construction Equipment Association (HCEA) is a non-profit organization dedicated to the preservation and public education of all aspects of the history of the construction, surface mining, and dredging equipment industries. This history includes corporate archives, histories of product development and use, descriptive literature, technical data, photographs, movies, memorabilia and, of course, preservation and demonstration of the machines themselves. The HCEA is headquartered on a 40-acre tract in Bowling Green, Ohio, which includes a library, archive, and a museum with nearly 100 pieces of construction and mining equipment.

The HCEA endorses the inclusion of Rollin Henry White into the National Inventors Hall of Fame. White was the founder of the Cleveland Tractor Co. and principal engineer and designer of most of the company's early crawler tractor models. Although not the first company to build crawler tractors, it was among a handful of the earliest tractor makers, and one of the most innovative. Based largely on Rollin White's ingenuity, Cleveland Tractor grew to become one of the largest crawler tractor manufacturers in the U.S., rivaling Caterpillar in both sales and number of models offered during the 1920s and 1930s. During his lifetime, White was awarded at least 94 patents, of which 53 were related to crawler tractors built by the Cleveland Tractor Co.

Because of their excellent design and craftsmanship, a large number of Cletrac tractors have survived to the present in spite of the rigors of farm and construction use and remaining outdoors most of their lives. Some preserved Cletrac tractors as much as 90 years old are still running and are regularly brought to farm and construction equipment shows. The HCEA holds a convention and equipment show every year and at least one Cletrac tractor shows up. Twenty two Cletracs were displayed and operated at the HCEA National Show in 2007 held at Colchester, Connecticut and about a dozen were brought to the 2008 HCEA Show at Brownsville, Pennsylvania. In addition to the hundreds of other such shows around the country, there are still a significant number of Cletracs in regular use on farms and small construction projects, a testament to the design and quality of the tractors.

Two of Rollin White's inventions for crawler tractors are still in widespread use today: differential steering and interchangeable rubber tracks. Differential steering was adopted by the U.S. Army

HISTORICAL CONSTRUCTION EQUIPMENT ASSOCIATION

during the 1930s' for use in steering tanks, and was used in all tanks built for the Second World War and later. The Army also worked with White and his engineers in the 1930s to perfect a rubber-tracked crawler tractor for moving bombers and other large aircraft into position for take-off or into hangars. These tractors are known in military parlance as prime movers and thousands were built by Cletrac for the war effort. Another tractor innovation was his central oiling system, which provided constant lubrication for the undercarriage.

In addition to his tractor inventions, Rollin was also an early developer of the steam automobile and held a number of patents that significantly improved efficiency and safety of the steamer. He and two of his brothers founded the White Motor Co. and built it into what would become one of the largest manufacturers of medium- and heavy-duty trucks in the world.

In summary, Rollin Henry White was one of the early pioneers of the automobile, truck, and crawler tractor industries. He possessed that rare combination of mechanical innovation and business acumen.

Based on this legacy and his numerous other inventions and accomplishments, we believe that he deserves to be inducted into the National Inventors Hall of Fame.

Bruce Crawford
President

Graham Brothers

Construction Group Ltd.

9004 Yellowhead Trail
Edmonton, Alberta
T5B 1G2

Tel: (780) 413-1725
Fax: (780) 479-2551

November 3, 2008

Vice President for Selection
The National Inventors Hall of Fame
PO Box 1553
Akron, OH
44309-1553

Re: Nomination of ROLLIN H. WHITE to the National Inventors Hall of Fame

Dear Vice-President for Selection:

The purpose of this letter is to provide you with my strong endorsement of the nomination of ROLLIN H. WHITE to the National Inventors Hall of Fame.

Our family owns and operates a roadbuilding construction company founded in 1920. We have owned and operated hundreds of crawler and wheel tractors over the past 88 years, allowing us the opportunity to compare the performance of many makes and models of equipment including Rollin H. White's Cletrac products.

Over a broad range of models, Cletrac's power to weight ratio is superior to other manufacturers' competing products of the same era. Cletrac's durable undercarriage design with its floating bushings, wide roller stance and high flanges are much less prone to derail or break than other makes when operated on steep side hills or among the stumps in logging operations. Many of Cletrac's original undercarriage concepts are being utilized in modern machines today. Cletrac's controlled differential steering continues to this day to be a superior method of guiding crawler tractors and has been adopted by other manufacturers.

We presently have 45 Cletrac tractors of various models in our fleet/collection. We continue to use many of these Cletracs for yard work, snow-ploughing and to stage live demonstrations of Cletrac's superior handling and pulling power in agriculture and road construction.

ROLLIN H. WHITE, through the development of numerous, enduring engineering concepts and Cletrac products has made a significant contribution to the worldwide mechanization of agriculture and industry and must surely be included in the National Inventors Hall of Fame.

T.W. Graham

T.W. (Bill) Graham
President

Antique Power Inc DBA
Ertel Publishing
P.O. Box 838, Yellow Springs, OH 45387
P: 937.767.1433 F: 937.767.2726
www.ertelpublishing.com

Vice President for Selection
The National Inventors Hall of Fame
PO Box 1553
Akron, Ohio 44309-1553

To Whom It May Concern:

I understand that The National Inventors Hall of Fame will soon consider admitting Rolland H. White, the founder of The Cleveland Tractor Company, into the Hall of Fame. I am writing to recommend his induction. Mr. White holds over 80 patents in the areas of agricultural machinery, automobiles, trucks, and manufacturing. His contribution to mechanized agriculture cannot be overstated. Through his pioneering work with the crawler type tractor Mr. White has contributed immensely to the welfare of mankind by greatly increasing the productivity of farmers throughout the world. In particular, his invention of Controlled Differential Steering made crawler-type tractors far more efficient. This invention made it possible to build a light crawler tractor for use on small farms and marginal land, making previously unusable land available for food production.

My familiarity with Rolland H. White's contributions is a result of my position as editor of *Antique Power* magazine. I have spent many years studying the progress of mechanized farming in the 20th Century, and few inventions I have studied surpass the importance of Mr. White's Controlled Differential Steering. This invention was so forward-looking that it is still used on new tractors today.

In my view, Rolland H. White is certainly a worthy inductee to National Inventors Hall of Fame.

Sincerely,

Patrick W. Ertel
editor

Attention: Vice President for Selection
The National Inventors Hall of Fame
PO Box 1553
Akron, OH 44309-1553

Dear Sirs:

I graduated from Rensselaer Polytechnic Institute, Troy, New York, as a Mechanical Engineer in 1958. I had the good fortune to be hired by the Oliver Corporation of Cleveland, Ohio, and was assigned to the Engineering Department's Design Group, in its Testing Group. I did not know Rollin White, but do recall being advised of his role in the development of the advanced designs incorporated in the Oliver-Cletrac products.

During my time at Oliver, I was involved in the design and testing of the new Spot Turn Steering System which was used in the OC-4 through the OC-15. I was also active in the development of the new OC-4, OC-46, OC-9, and OC-96 dozers and loaders. The OC-9 and the OC-96 had a power shift transmission with a torque converter that provided far superior performance and ease of operation, compared to any of the competition at that time. It had substantially more drawbar pull in its horsepower class, and was much more maneuverable than any others.

I recall several operational, experimental tractors that had features that were far ahead of the times, many of which were being incorporated into the new products. The Oliver-Cletrac machines were, and had historically been, innovative leaders in the industry. They were many miles ahead of other crawler tractor manufacturers in features and durability. Interestingly, many of the innovations developed and used by Cletrac and Oliver have recently been presented in the products of competitors, and have been claimed by them as their own creations.

In conclusion, Cletrac-Oliver was a leader in its industry, and certainly has a proud heritage, much of which was due to the leadership and contributions of RollinWhite.

Yours truly.

Richard L. Knight

November 7, 2008

To the Vice President for selection
The National Inventors Hall of Fame

As users of Cletrac & Oliver tractors my family & I sincerly belive Rollin H. White should be entered in the Inventors Hall of Fame

My dad, in 1933 bought a used Cletrac model W, then a used model F. He liked the way they worked the hills. When he bought his first E which in my opinion was the best crawler built, I was old enough to start driving them.

We used Cletrac's until 1950 when we bought an Oliver 88.

Our farms had many hills, and differential steering was ideal for this type of farming

The slogan on the Cletrac's BUILT TO ENDURE said it all.

Years later I started my collection of around 40 Cletrac and Oliver crawlers.

Thank You

Wilbur F. Lutz

Wilbur F. Lutz
825 Fritztown Rd.
Sinking Spring, PA. 19608 610-678-2933

JAMES R. OWENSBY

Mr James R Owensby
190 Fernwood Rd
Cochranville PA 19330-9491

Cletrac
Crawler Tractors

12-1-08

Vice President for Selection
The National Inventors Hall of Fame
P O Box 1553
Akron, Ohio 44309-1553

Gentlemen:

I am writing this letter for Rollin H. White and why I feel he should belong in the National Inventors Hall of Fame. He is more than qualified for this prestigious honor.

My father purchased his first Cletrac Crawler in 1942, which was a Model W. I was 7 years old at the time & we had a Saw Mill & used this Cletrac to log with.

During the 2nd World War you could not purchase any tractor at that time. When the war was over he was able to buy a brand new Cletrac Model-D with a Hiel winch on it and six months later he bought a Hiel Blade for the tractor & It was very difficult at that time to buy attachments such as the blade & winch.

The Cletrac tractor proved to be so good that he started an Excavating Business, grading houses & digging basements & streets, this was around 1947.

We had so many Contracts that we had to purchase several more Cletrac B's & a Cletrac D Bulldozer. A little later we purchased a Model Cletrac D with a Sargent overhead loader. This worked out quite well in Dad's Excavating Business.

In 1953 we purchased a new Oliver OC-18 Bulldozer with a Hiel Blade & Wadrich winch that we could pull a Garwood Scraper with. We also acquired an Oliver OC-12 Crawler loader.

I have 4 Brothers that operated these tractors along with myself for my Dad.

We liked these tractors so well that my Brother + I started Collecting the Old Cletracs as a hobby.

We have Cletracs such as the Models H, W, F, + K + the 80. We also have several more of the Older Cletracs in our Collection.

We also Collect Old Sales Brochures on the Cletrac + Oliver Tractors which brings a lot of memories back when we were young kids.

I am so thankful for Rollin H. White, the founder of The Cleveland Tractor Co.

The Cletrac & Oliver Tractors made life so much easier for those in the Construction, Logging + Farming business...

Sincerely,
James R. Carmichael

Rollin H. White
Induction into the National Inventors Hall of Fame

It has come to my attention that Rollin H. White is being considered as an entrant into the National Inventors Hall of Fame. I am writing the short letter that follows as an endorsement for his inclusion.

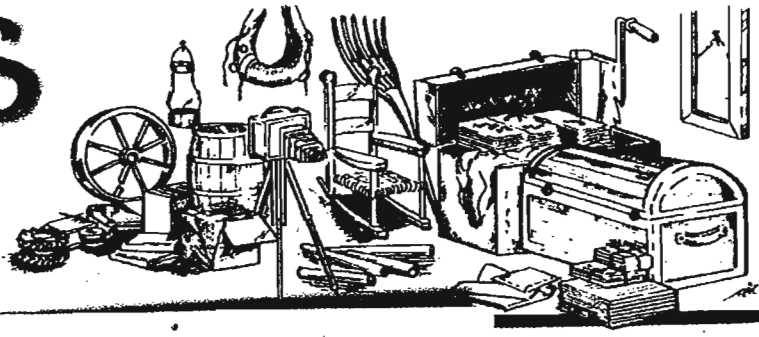
My name is Ed Bezanson and among other things I am an antique tractor collector who specializes in crawlers. I am also an antique tractor and machinery historian and have been writing articles about them for over 20 years. These articles have appeared in all the major antique machinery magazines printed in America and around the world. For the past 19 years I have written a series called "The Yankees Attic" which has appeared in every issue of "Antique Power Magazine". This ongoing series focuses on tractors built in America since the turn of the last century. Over the years I have featured many articles about Cletrac Crawlers.

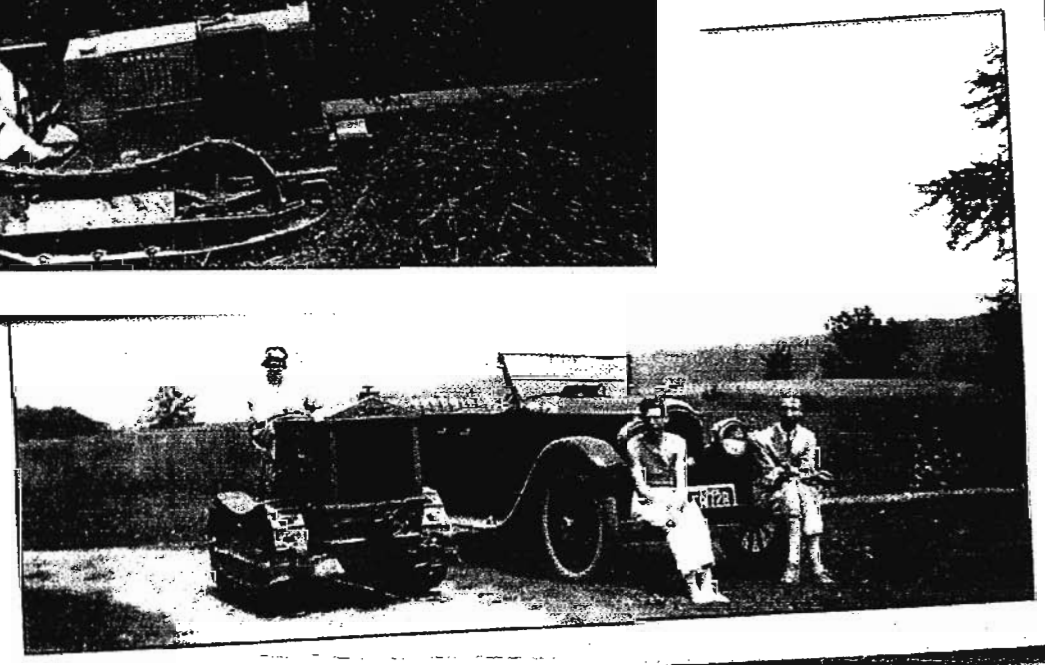
Rollin H. White's contribution to American invention is varied and comprehensive. He held many important patents on all kinds of mechanical devices during his life. I will only talk about one of them. Mr. White was one of the first men to build a reliable and successful small crawler tractor for farmers. His first design the Model"R" was followed by dozens of ever improving designs. His Cletrac crawlers and later Oliver were to play a very important in America's agricultural and construction future.

For me as a collector one of his most interesting tractors was the little Model "F" that was introduced in 1919. For it's time it was a very innovative design unlike anything before it. This was a very small tractor that today would fit nicely in the back of a half ton pickup truck. It was designed for the market farmer and could be used for all the jobs required on small farm. What sets this tractor apart from other designs of that period is the location of the track drive sprocket. Rollin's design placed the sprocket high up at the rear. This puts the drive gear above the ground level and away from the destructive forces of the dirt. It may be noted here that Caterpillar adopted this same design layout in the 1980's nearly 60 years after Mr. White received his patent for it. This fact alone shows what an important inventor he was. That little "F" had a lot of other important design features that showed the inventive genius he was. The one that always makes me smile is his placement of the crank handle. It was a known fact that many farmers were hurt in the early days when they accidentally started their tractors while they were in gear. Since they had to crank them in the front if the tractor started it had a bad tendency to run them over. In many cases this caused serious injury or even death. Mr. White gave the crank handle on the "F" two jobs. The handle was also the shift handle. In order to start the tractor the handle had to be shifted into neutral before it could be removed to start the tractor. Because of this innovative design the tractor could not be started unless it was safely in the neutral position. For me ideas like this made Mr. White an important force in early tractor development in America. His induction in the Inventors Hall of Fame is long overdue.

Yours Ed Bezanson ""The Yankee" 11/10/2008 Waterford, CT

The YANKEE'S ATTIC





A Young Woman and her Cletrac W

I always love to find interesting personal photos of people and their tractors. Among the pictures in someone's old picture album was this pair that show a young woman and her Cletrac 'W'. No information was written on the photos, so all we know is what we can see. We have a pretty girl, a Cletrac 'W', an old touring car, and two interesting gentlemen.

The Cletrac appears to be a fairly recent addition to this beautiful country home somewhere in Wisconsin. I say Wisconsin, because the license plate on the very nice 1920s-era touring car says so. I think the car is a Packard from the shape of the radiator shell, but I can't be positive.

I would love to know the connection between these people and their machines, but we can only guess. From the way they are dressed and the beautiful stone house in the background, it appears that these folks were pretty well off. Maybe the Cletrac had just arrived from the dealer, and they decided to show it off and take some pictures.

If it still exists, I would love to know where the Cletrac is today. I have been looking for more than 10 years for one of those cast-iron air cleaners that is hanging on the right front of the tractor. I need it to complete a tractor I have. Because of their position they are usually missing.

Collecting old photos like this is a popular pastime. I guess we must be happy to see these neat old photos and enjoy the moment in time that they record. It is fun to speculate on why, during a long-ago summer, three people and two machines came together to have their picture taken.

'Till next time, Happy Hunting!

—Ed Bezanson, "The Yankee"

CLASSIC TRACTOR *FEVER*
P.O. Box 437
Rockland, DE 19732
Phone: (302) 478-5787
Fax: (302) 478-3606
www.classictractors.com

TO THE ATTENTION OF
VICE-PRESIDENT FOR THE SELECTION
THE NATIONAL INVENTORS HALL OF FAME
PO BOX 1553
AKRON, OH 44309-1553

DEAR SIR:

My name is John Harvey. I created the Classic Farm Tractors Calendar while a public relations manager with DuPont Agricultural Products, in Wilmington, Delaware. One of my responsibilities was to oversee the selection of tractors for each calendar ... various brands from across North America. (The calendar's purpose was to promote a new DuPont soybean herbicide in 1998, named "Classic." This calendar has become one of the most popular published, and a number of imitators now exist.)

In talking with hundreds of antique tractor enthusiasts at tractor shows and other agricultural events, the name CLETRAC kept coming up as a tractor to feature on the Classic Farm Tractors Calendar. Every calendar gives a concise description about the tractor featured, important information such as horsepower, and that tractor's innovations that contributed to the advancement of the farm tractor industry here and abroad in the last century.

Several Oliver-Cletrac crawler tractors have appeared on my calendar, and with photos and captions, we have shared the virtues of these marvelous machines with thousands of tractor buffs through the years.

Example: The 1996 Classic Farm Tractors Calendar, on the August page, pictured a 1950 Oliver-Cletrac HG 68, owned by Robert H. Tallman, Harbeson, Delaware. He and his family operated these tractors for many years on their farms, and had a dealership as well. Thus, you could say they practiced what they preached ... they talked the talk and walked the walk!

The enclosed calendar shows the beautifully-restored tractor, perfect for potato growers – as the caption points out. Also, on the January page of the 2001 edition of my calendar, we featured the 1931 Cletrac 15, a small, compact tractor ideal for vineyards. It is owned by a father-son team, William J. Bechthold, and son William E. Bechthold, Lockeford, California.

I also remember my father telling me of the many patents that the factory and Mr. White held. One specific patent was the differential steering for the tractors. I cannot remember which other tractor company came to the White's to talk a merger in order to get that design for their equipment. It was either the Best Tractor out of California, or the Holt Tractor from Texas. As my father told me, the merger didn't materialize and Holt and Best merged to become Caterpillar Tractor and had to stay with the "clutch steering design" that they had.

Mr. White was diagnosed with some type of terminal illness, maybe cancer, that, according to my father, gave him reason to sell the company. The Oliver Corp of Chicago bought the company in the late forties. They did not understand the construction equipment industry and the company went downhill until finally closing in the fifties.

Rollin White also had an important patent for automobiles. Hydraulic brakes. Until he invented this new brake design, all cars had mechanical brakes which were extremely dangerous because of the tendency to lock up. When the Rollin Automobile Company closed down, my father bought all the existing parts and became a wholesale distributor for the company until he ran out of parts.

This is all from memory of what my father would share with me on many business trips I took with him.

I would especially enjoy meeting Ms. Betty King. Does she live in the Cleveland area? If so, I would appreciate an address and or phone number. Hopefully you would let her know in advance of my intention to contact her.

Have a wonderful holiday, and hope that you will reply to this request. You may also contact me through my email address. tlt4400@sbcglobal.net

Sincerely,

Tom Turner

Thomas L. Turner
440/823-4007

10/27/2008

DEAR LANDIS,

I WAS TOO YOUNG TO KNOW ABOUT R H WHITE

MY GRANDFATHER OR FATHER MIGHT HAVE.

THE CONTROLLED DIFFERENTIAL STEERING IS ONE OF HIS INVENTIONS WHICH IS IN USE THROUGH OUT THE WORLD.

HOPE HE IS NOMINATED AND IS INDUCTED INTO THE NATIONAL INVENTORS HALL OF FAME.

BEST WISHES AND GOOD LUCK ON THIS PROJECT TO YOU AND BETTY.

A BRIEF SUMMARY OF
C. W. WATSON & SONS, INC.

IN 1926 MY GRANDFATHER CHARLES WILLIAM WATSON WAS AUTHORIZED AS A CLETRAC SALES AND SERVICE DEALER FROM THE CLEVELAND TRACTOR Co. CLEVELAND OHIO. HE RETIRED IN 1946

MY FATHER, RALPH O. WATSON, RAN THE BUSINESS TILL HIS DEATH IN 1970

I RICHARD W. WATSON CONTINUED TO OPERATE THE DEALERSHIP UNTIL JUNE 1, 1987 END OF OPERATION.

LANDIS, I WAS BORN WITH
CLETRAC BLOOD IN MY VEINS
A DAY, TO DATE, DOES NOT GO BYE
WITHOUT ME SEEING OR THINKING CLETRAC
HAD MANY LOYAL CLETRAC CUSTOMERS.

Dick

BECHTHOLD TRACTOR SERVICE
10755 EAST HIGHWAY 12
LODI, CALIFORNIA 95240

In the mid teens of the 20th Century, Roland White spent quite an amount of time on the West Coast of America. He acquainted himself with most of the tractor manufacturers in California, where the tracklayer industry in the U.S. got started. Whereas, the manufacturers of tracklayers were building ever larger machines, Mr. White saw the need for a smaller, compact tracklayer for the smaller grower and also, a need in the narrow-row orchards and vineyards commonly cultivated by horses, but too narrow for four-wheeled tractors.

Upon returning to the Midwest, he experimented with and manufactured some of the first successful small tracklayers, many of which were sent to the West Coast. Their attributes were small-size, high horsepower (for their size), and their steering system outshone every other manufacturers' design.

The planetary steering was so innovative, it gave the industry new standards to live up to. The competitors clutch and brake steering was not favorably comparable to the planetary design in many hillside and soft-soil pulling or pushing operations.

Under Roland White's supervision, Cleveland Tractor Company built a dependable, maneuverable, powerful tractor for the American farmer.

Another major innovation was the "oil" lubricated lower wheel assemblies used on the track system designed and used long before the remainder of the industry. Smaller, more compact transmission-differential-final drive housings were also favorable design features over the industry standards of the time.

Our family has used, serviced, and sold Cletracs since the earliest 1916 model.

Sincerely,

William Bechthold