

A Tractor That Turns in the Space It Stands On

By Ralph Howard

WONDERFUL as has been the progress in tractor development in the past, tractor engineers and manufacturers see a further step forward in a tractor constructed on new basic principles now being exhibited in California. Primarily, this tractor is a round-wheel type, having four wheels of equal size with the power distributed equally to all four. The wheels are arranged in pairs on the tractor and held against lateral turning movement relative to the tractor, the wheels on either side of the tractor being connected in driving relation with each other, but only one pair being connected with the power unit of the tractor. The wheels on either side of the tractor are turnably mounted on their axles independently of those on the other side and the driving connection has been arranged to be susceptible of being interrupted relative to either or both pairs of the wheels. On either side the wheels are as readily locked against rotation as they are released from their driving connection. By this means the tractor may be steered in arcs of various radii, or it may be steered at right angles to itself when short turns are made.

With the driving means so controllable as to permit the machine to be turned in arcs, the radii of which may be less than the length of the machine and from that up to any length desired by the operator, according to conditions under which the machine may be working, it became necessary to mount on the periphery of the wheels leaders of such shape and design as to permit the machine to turn without causing the leaders or guides to plow the ground. None of the wheels can be used as steering wheel independently of the tractor as a whole, but when a turning movement is to be imparted to the tractor the entire machine is turned in a rigid movement with the power so applied as not to cause any undue lateral strain on any part of the tractor. The whole operation is carried out with a pivot-like movement, produced primarily by the peculiar construction and arrangement of the leaders or guides on the wheels.

These are so constructed and mounted on the wheels that in a turning movement the leaders on the inside wheels, or non-rotating wheels, act as guides to direct the pivotal movement, but a directly opposite effect is had on the outside, or rotating wheels, to which the power is wholly or in part applied. The diameter of the circle of movement of the inside wheels may be increased or decreased by clutch control, through a relatively small movement of the steering wheel, but the general operation and function of the parts will still be present in the relation described. The entire turning movement is carried out with minimum lateral strain on the wheels or machine as a whole. A slight movement with a minimum of power is obtained by both ends of the guides being beveled so that there is a lifting effect tending to raise the wheels out of the

ground instead of causing the wheels to plow the ground, as they might do were they not so beveled. The angle at which the guide may be set with respect to the axis of the wheel to obtain the maximum turning ability has been determined by practical trials. The turning movement can only be successfully accomplished when the guides are so set with respect to the axis of the wheel. The same successful turning can be done in forward or backward movement. Maximum gripping effect is necessarily of prime importance, and is secured without tearing the ground by giving depth to the leaders.

Equally important in facilitating the turning movement is the application of the power to the drive wheels. Through a specially designed transmission in which the maximum amount of power is delivered, due to the simplicity of construction, the driving power is readily applied or removed from the two wheels on either side. By the application of this power to the front wheels an equalization of power is obtained on all four wheels, which overcomes any tendency for the front end to rear up no matter how great a load the tractor may be pulling, nor how suddenly the power may be applied to the wheels. The power is evenly distributed on all of the wheels.

The operation of the tractor is simple. The operator is comfortably seated with the clutch pedal and gear shift lever at hand, and he has easy control of the movement of the tractor by a neat steering wheel. This wheel, by slight movement, operates a cam control, through which the power is applied or released from either side of the tractor. Further movement of this wheel locks the wheels on either side of the tractor. By this steering mechanism two wheels on one side of the tractor are simultaneously released and a brake applied to them with effective results.

nine types, the text describing each being supplied by the Bureau of Standards as follows:

(A) A dangerous type of tubing constructed of paper, covered with glue, on a wire spiral, the whole covered with a cotton braiding giving it a good outside appearance. The glue soon hardens and cracks upon bending the tubing.

(B) This tubing, constructed like a garden hose of cotton fabric impregnated with rubber, is flexible, gas-tight, but dangerous if subjected to high temperatures.

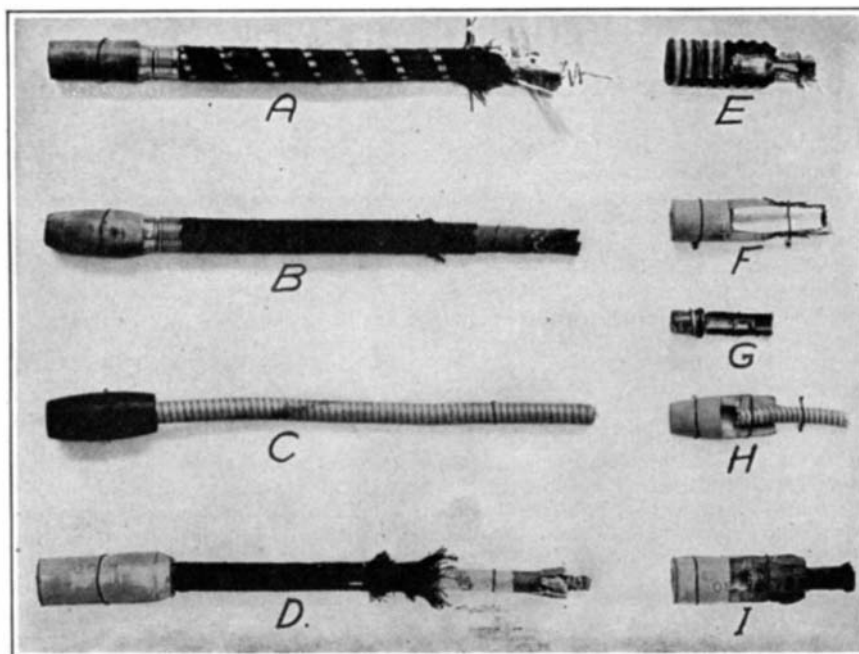
(C) The common type of metallic tubing, which depends for its tightness upon a rubber thread packing within the metal spiral. This rubber thread deteriorates with age, especially if overheated, causing small leaks in the tubing which might allow dangerous quantities of gas to escape, though not presenting much fire hazard.

(D) A very good grade of flexible tubing constructed of a gas-tight metal core covered with successive layers of paper, fabric, glue-glycerine compound, paper, and two braided coverings. It has the advantages of a metallic tubing of type (C) with some additional durability due to the superimposed layers.

(E) A very satisfactory type of tubing end piece if constructed of good quality materials. It consists of a threaded metal tail-piece, one end of which is screwed into the tubing and the other end is screwed into the rubber end piece, making the connection about as strong as the tubing itself.

(F) A common, but not always satisfactory, connection, consisting of a wood tail-piece glued into the tubing and rubber end. The gas passage is unduly restricted. The strength and durability depend upon the quality of glue used and the care with which the end is attached.

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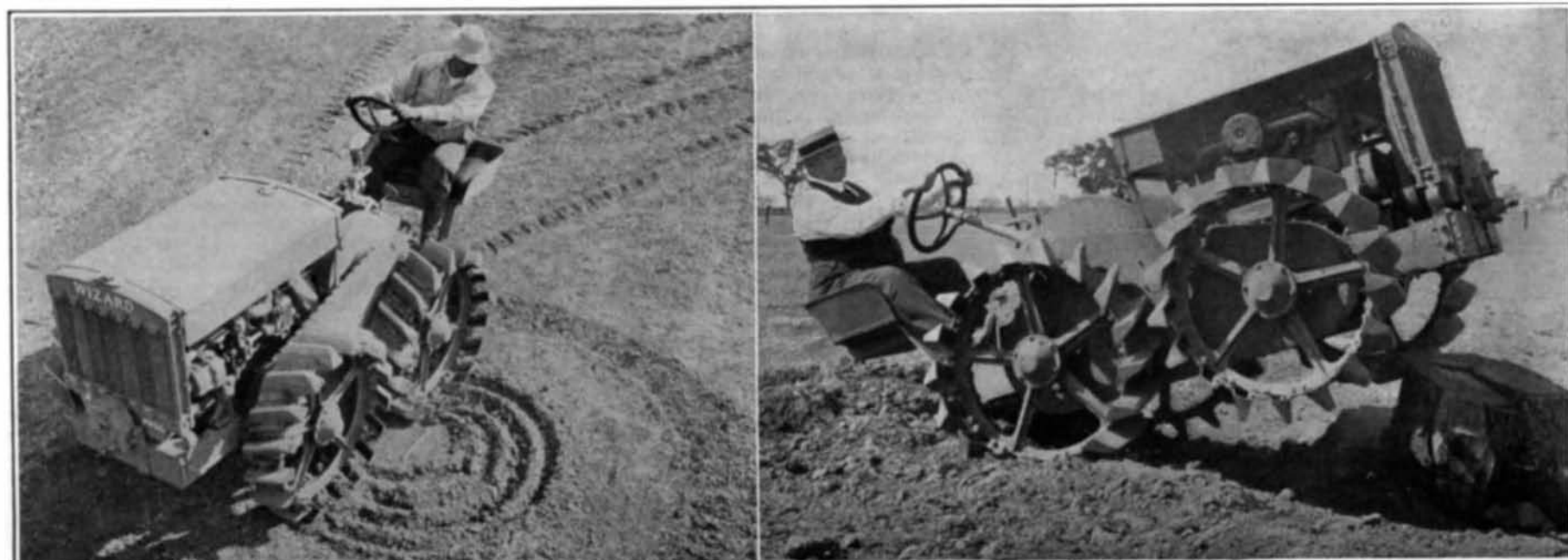
Four types of flexible gas tubing and five end connections which were tested by the Bureau of Standards, with the results set forth in the text

Gas-Tubing Tests

By S. R. Winters

THE door is unfastened, the occupants of the room are found cold in death, the reason is unmistakable—briefly summarized, another tragedy is traceable to escaping gas. Not improbable, the leakage of the death-dealing fumes had its source in faulty gas tubings. Recognizing the hazards to life and property incident to unsatisfactory gas conveyances and connections, the Gas Engineering Section of the United States Bureau of Standards has conducted a series of experiments with relation to nine types of gas tubings, the results indicating their relative safety.


The manufacturer who wrote the Bureau of Standards, "The demand is very largely for the cheapest tubing that can be turned out that will stay tight long enough for it to be sold," probably reflects the levity with which flexible tubing and tubing ends are installed. The design which is constructed of paper, covered with glue, on a wire spiral, being covered with a cotton braiding of inviting appearance is pronounced dangerous by the Gas Engineering Section of the Government. The photograph herewith displays the



Two views of the new tractor, showing the sharpness with which it will turn, and the manner in which it attacks an obstacle

PYORRHOCIDE POWDER

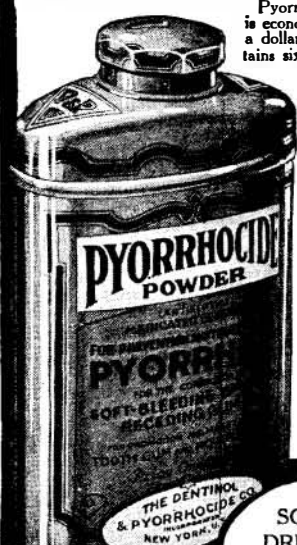
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manure and that he very quickly had a product which gave results superior to the manure alone.

It is rather curious to note that although the Scotch landlord's advice was apparently forgotten, the same method is recommended to farmers by agricultural experts today. Hundreds of farmers have a supply of such fertilizer available but have made no use of it.

Indeed, a peat bog is often the most valuable part of a farmer's acreage, but it is a common sight to see land cultivated up to the edge of a swamp and the swamp itself neglected. In spite of the fact that our peat resources are almost untouched, the bogs are already producing most of our commercial crops of celery and onions and a large part of such crops as carrots, lettuce, cabbage, horseradish, peppermint and cranberries.

The methods used at a peat plant at Alphano, N. J., one of the largest in the country, illustrate modern methods of production. The bog here consists of about 1,500 acres and the deposit varies from two to twenty feet in depth. The land was a marsh until reclaimed by a drainage system.

The first step in the process is to till the land. Great crops of celery are raised here every year. The plowing and disking of the soil in farming it sun dries the surface and cultivation during the season kills off the weeds so that there will be no weed-seeds in the finished product, while lime is added to "sweeten" the soil. At the end of the season about three inches of the top soil, which is then dried to a moisture content of about 65 per cent, is scraped off and piled in great storage heaps near the plant.

The soil scraped off is then replaced by a specially designed machine which digs up peat with a chain bucket, shreds it, and then scatters it by means of a powerful blower. Thus after each crop the area of the bog is cut down a little by slicing away the sides to cover the top. This machine is shown on the cover of the present issue.

The peat goes through a general conditioning process in the storage piles and the bacteria are added to it here. When the peat is taken into the plant it is first passed through a set of spiral knives, operating like a lawn mower blade, which reduces the peat to a very fine granular form. The potash and other chemicals are added in a mixing machine and the peat goes through a final process of drying in huge mechanical dryers. Great care is taken not to overheat the mixture so that the bacteria are not injured.

This final drying has a double purpose. By reducing the moisture content a considerable saving in freight is effected in shipping the product in bags, and the peat is rendered more absorbent. Fertilizer is often applied with the grain drill along with the seed at the time of planting. A fertilizer for this purpose must be finely pulverized and must flow freely. The peat has the ability to absorb so much more moisture than the atmosphere can possibly give that it does not become soggy. Once the fertilizer is in the ground this absorbent quality causes it to act as a sponge in absorbing and holding water and it is a protection against drying out the land.

Part of the peat, which is sold to other manufacturers of fertilizer, is dried out very thoroughly before leaving the plant and it does not undergo the conditioning processes.

The growing popularity of peat fertilizer in the last few years has been largely due to the fact that many nitrates, which had hitherto been available for fertilizer, were used in making explosives for our army and navy. Most of the ammonia formerly used in fertilizer, the scarcest and most expensive of the ingredients, used to come from the tankage or waste of the great packing houses. But ammonia has advanced in price so that it is no longer profitable to use it for fertilizer.

Peat has its own natural supply of am-

monia and because it is put there by nature it is distributed more perfectly than could be done by the best of mixing machines. Peat fertilizer has the advantage over chemical fertilizers that all of the chemicals are not immediately soluble. About one-third of them are at once available as plant food but the rest are released only through decay and the activity of the bacteria. The fertilizer hence remains effective for about five years after it is applied.

The new-born industry has been greatly aided by the American Peat Society, organized in 1907. The society now has some 300 members, with offices at 17 Battery Place, New York City. Its officers serve without pay. The society publishes a quarterly journal which includes original papers of practical experience, abstracts from contemporary literature and patents, and descriptions of the latest uses for peat, etc.

Although certain parts of Europe have used peat for fuel for many years, due to a lack of coal deposits, the annual consumption there now totaling about 10,000,000 tons, it is only recently that European peat manufacturers have recognized a common interest and have begun organization. The "Union des Tourbières de France" has just been organized in Paris.

Because of this world-wide reawakening in the industry itself, as well as the widening scope of usefulness for the product and the great advancement in the science, we may expect to hear more and more of peat in the years ahead.

Gas-Tubing Tests

(Continued from page 499)

(G) An all-metal end-piece screwed into the tubing; a very satisfactory connection where it is not necessary to connect and disconnect frequently. In attaching to an appliance care must be taken not to get the threads crossed.

(H) Tubing is glued into rubber end-piece directly. The strength of this type of attachment is usually small and leaks are very frequent with it.

(I) Metal tail-piece is screwed into end of tube and is held in rubber end-piece by corrugations which fit corresponding corrugations in the rubber. This is usually a satisfactory method of attachment.

"Tennessee"—Our Latest Battleship

(Continued from page 501)

The "Tennessee" and "California" are the last ships that we shall build carrying the 14-inch gun. The next class, consisting of four vessels, the "Colorado," "Maryland," "Washington" and "West Virginia," will be about 1,000 tons larger than the "Tennessee"; but otherwise, so far as general appearance is concerned, will resemble her. The principal difference will be that eight 16-inch guns will take the place of twelve 14-inch guns, and that a great weight of protective armor will be employed.

First Aid for Inventors

(Continued from page 502)

tions of the committee provide that it shall investigate "any subject referred to it by the institute or by any of its sections," or, by a majority vote of the members present at any stated meeting, it may investigate any subject presented on motion of a member or by application. The method of procedure for the unknown inventor to enlist the services of the committee is to write to Dr. R. B. Owens, Secretary of the Institute, stating what he has to offer and requesting an application blank. This is issued when the Secretary, through correspondence, is convinced that the appliance or process has merit.

The application blank contains the following questions which must be answered:

1. What is the specific purpose of this invention?
2. What is the condition of the prior art in this regard?



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