Dec. 7, 1965 E. TONTI ETAL 3,221,823

DEPTH DRILLING MACHINE MOUNTED ON A FOUR-WHEELED TRUCK

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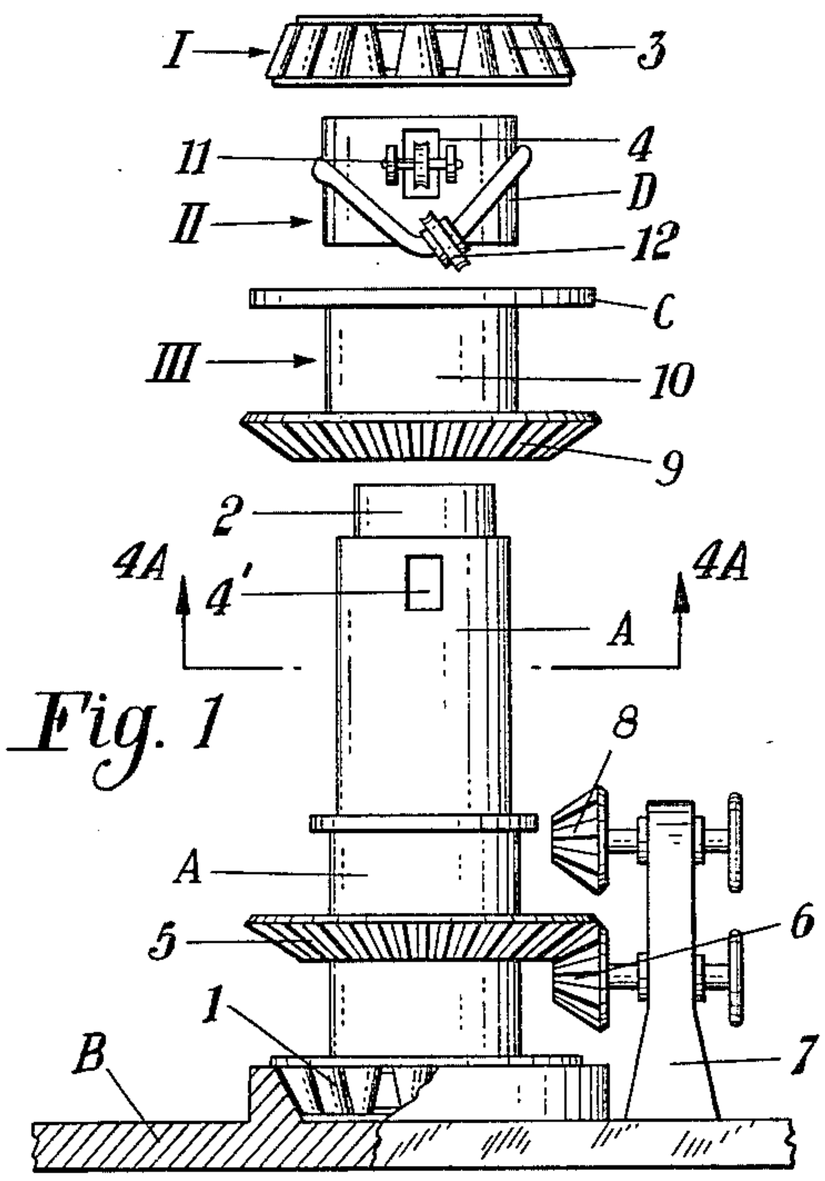

Fig. 1

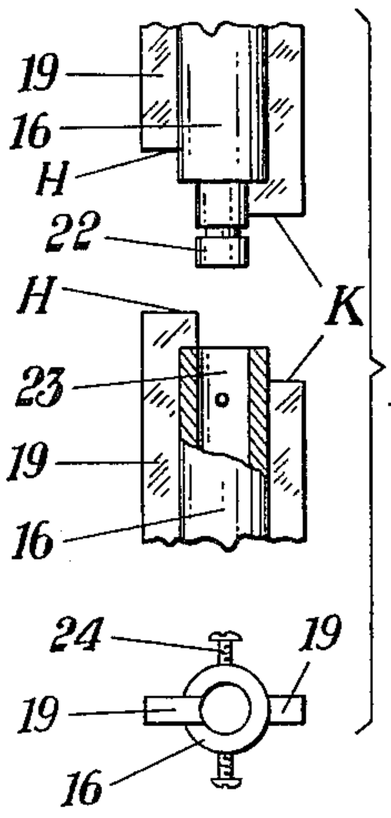

Fig. 5

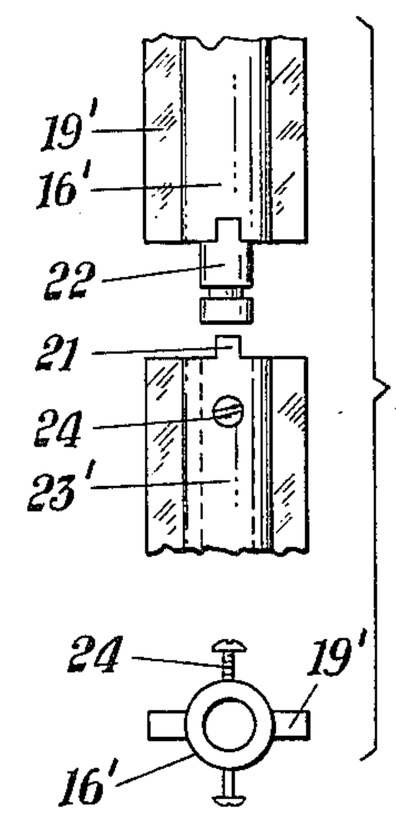

Fig. 5A

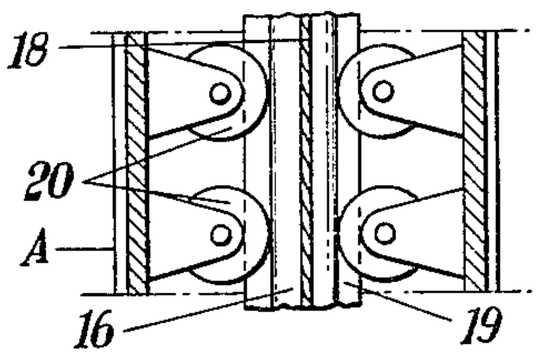

Fig. 4

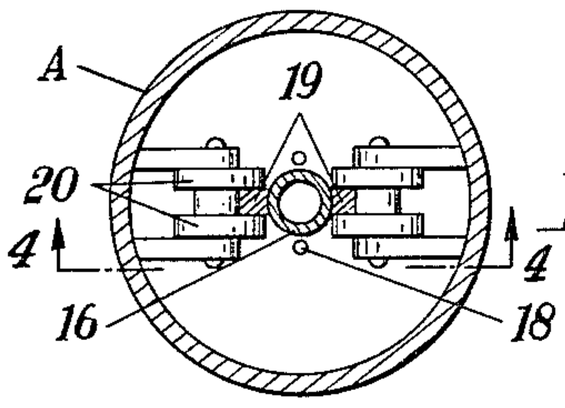

Fig. 4A

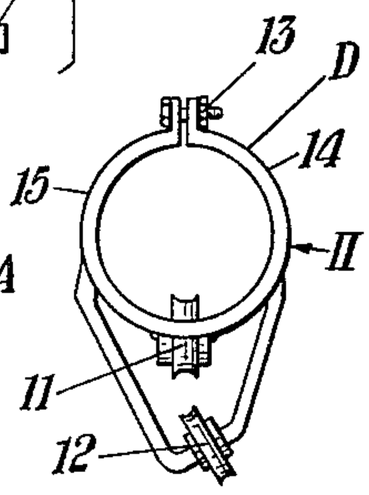

Fig. 1A

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Fig. 2

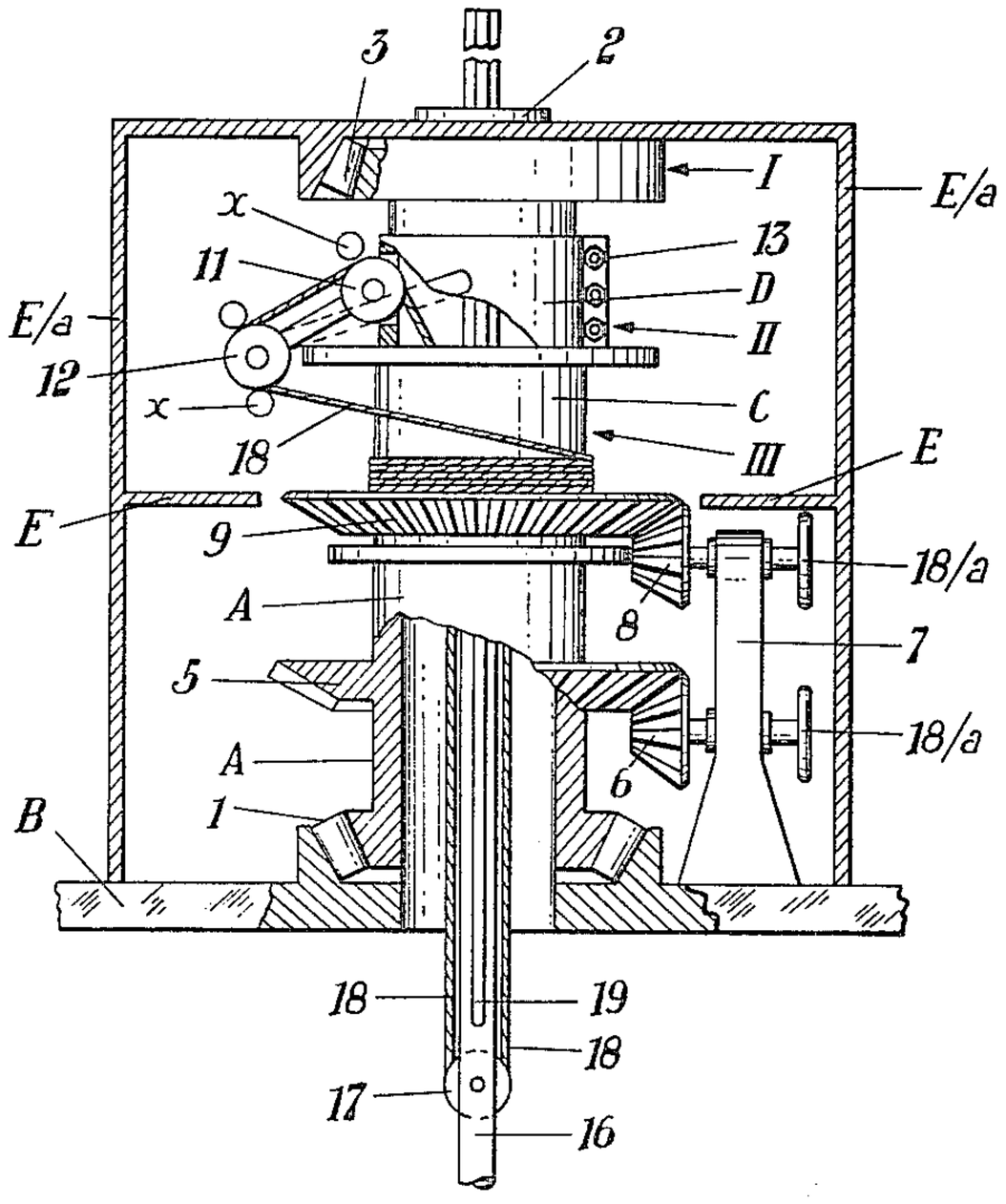
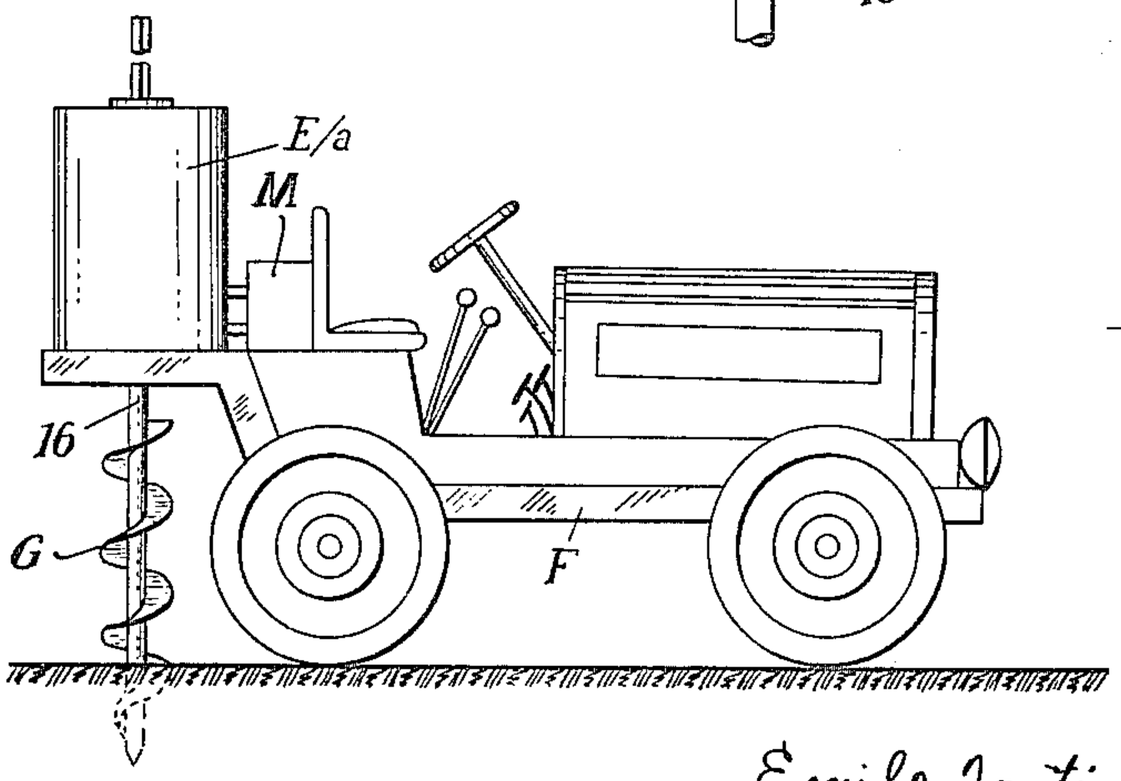


Fig. 3



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DEPTH DRILLING MACHINE MOUNTED ON A FOUR-WHEELED TRUCK

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3 Claims. (Cl. 173—25)

The present invention relates to a depth drilling machine.

An object of the invention is to provide a construction wherein no winch-supporting truss for the drawing winch of the tubular rods coupled with the drilling bit is required.

A further object of the invention is to provide means for drawing and winding a cable connected to the tubular rods of the bit which will slide upon rollers.

A still further object of the invention is to provide a winding roll which will operate synchronously with the rotary unit which drives the bit.

A still further object of the invention is to provide a construction which can be mounted upon a truck capable of being driven wherever desired.

A still further object of the invention is to provide a drilling machine which may be quickly transported from one location to another and which can be immediately placed in operation thereby saving time and effort.

For better understanding of the invention reference is made to the attached illustrative drawings, wherein:

FIGURE 1 is an exploded side view with parts in section of the main parts of the device;

FIGURE 1A is a top plan view of the member II in FIG. 1;

FIGURE 2 shows a side view of the assembled device with certain parts broken away in vertical section;

FIGURE 3 shows a side view of the device assembled on a truck;

FIGURE 4 is a vertical section taken along the line 4—4 of FIG. 4A;

FIGURE 4A is a horizontal section taken along the line 4A—4A of FIGURE 1;

FIGURES 5 and 5A shows two different embodiments for coupling the tubular rods with one another.

FIGURE 1 shows the various component members before being assembled. The rotary main cylindrical body A is mounted on a roller bearing **1** placed on a suitable housing therefor provided on the assembling surface B. A similar roller bearing **3** (I) is located above a member D referred to below.

Moreover, the cylindrical body A is reduced in size at at **2** at the top portion thereof. A window **4'** is provided for the passage of the draw cable of the tubular rods connected to the drilling bit. A helical spur gear **5** is integral with the rotary cylindrical body A and meshing with the similar pinion **6** supported by a suitable support **7** therefor. The support **7** supports a further pinion **8** similar to the preceding one **6** and designed for meshing with the gear **9**, similar to the gear **5**, but provided on the takeup roll C, with room **10** for winding the already mentioned draw cable. The roll C is the third member (III).

The second member D (II), namely the one which in the order (I–II–III) precedes the take-up roll C, besides being designed to retain the take-up roll C in position, provides for guiding with its pulleys **11** and **12** the cable issuing from the eye **4'** of the main body A.

It can be observed that the window **4** recurs in said member D and that in the same is arranged the first pulley **11** designed for guiding the issuing cable and thence the second pulley **12** which, in a slanting position,

guides the cable on the take-up roll C–**10**. Secondary small-size pulleys X suitably positioned close to the main pulleys **11** and **12**, prevent the cable from escaping from the main pulleys.

It is evident that for the setting up of the assembly, the members I–II–III are to be inserted on the cylindrical body A according to the above mentioned order. The member D is shown in plan in FIG. 1A so that, by screwing down the screws **13** of the jaws **14** and **15**, the latter press against the cylindrical body A to fasten on the body A, the member D.

FIGURE 2 shows an elevational view of the drilling apparatus, somewhat enlarged. In the figure, there is shown from top to bottom: the first roller bearing **3** (I); the band D carrying the pulleys **11** and **12** (II); the take-up roll C–**10** (III) and the main cylindrical body A. It is understood that the take-up roll C rotates independently on the cylindrical body A since it is provided with a gear **9** of its own and a pinion **8** of its own. It is evident that the rotary cylindrical body A acts also as an axle for the roll C. The assembly is partly cut away to show, at the interior, the engageable length-tubular rod **16**, with the pulley **17**.

The two pinions **6** and **8** connected with the reverse run device M through the two connector axles **18**/*a*, can rotate in the same direction simultaneously and alternately being at all times in mesh with the gears **5** and **9**. In fact, upon drilling, the cylindrical body A and the take-up roll C rotate in the same direction and at a slightly different speed for the roll C, by losing some revolutions in comparison with the rotary body A, this can permit the gradual unwinding of the cable and the gradual loosening of the same for the desired rundown of the drilling bit connected to the tubular rods. Upon the rewinding of the cable **18** for the draw of the drilling bit, they rotate on the contrary in an alternate way: namely, while the take-up roll C provides, as already stated, for drawing the cable **18**, the main body A remains stationary or rotates, if desired, in an opposite direction for a faster lift of the drilling bit. Such an alternative is controlled by means of suitable levers operated from the drive place.

Should the driver accidentally incur a control mistake and the take-up roll should rotate for a while in a reverse direction as far as to cause a loosening of the cable **18**, a baffle plate E placed inside the cover *E/a* prevents the cable from ruinously entangling in the underlying members.

For the same purpose it is also possible to extend the diameter of the gear **9** as far as the wall of the cover *E/a*.

The heavy assembly is covered by a metal cover *E/a* and placed on a suitable four-wheeled truck therefor, driven by means of a conventional steering gear.

FIGURE 3 shows the four-wheeled truck having a frame F in a preferable shape and suitable for the laying of the apparatus. The cover *E/a* thoroughly covers the assembly and under the truck is clearly visible the drilling bit G.

FIGURE 4 shows the tubular rods **16** provided with two guide-splines **19** and forced to slide on four giude rollers **20** arranged inside the main cylinder A.

FIGURES 5 and 5*a* show various coupling systems between the connecting parts **16** and **16'** with guide-splines **19** and **19'**. In the first case the offsetting can be noticed of the two ends H and K, whereas in the second case it can be observed that the two ends are mating and that only the offsetting of the two splines **21** provides for the locking of one end onto another. The pin **22** is at all times designed to enter the hole **23'** therefor. Two screws **24** provide for securing the pin **22**.

Various embodiments are possible without departing from the spirit and the scope of the invention.

What is claimed is:

1. A depth drilling machine adapted to be mounted on an engine driven four wheel truck having a power take-off unit, comprising in combination a platform rigidly arranged on the truck having a circular hole therein, a first roller bearing arranged on said platform in correspondence with said circular hole, a first rotary hollow drum placed on said first roller bearing and having a first window provided at the upper portion thereof and a reduced end portion, a first helical spur gear ridgidly secured to said first drum, a second rotary hollow drum adapted to rotate around said first drum, a second helical spur gear provided at the lower end of said second drum, a cylindrical split member having a second window, means for fixing said member on the upper portion of said first drum to cause said first and second window to coincide, a first pulley arranged on said member within said second and first window, a U-shaped bracket rigidly secured to said member and downwardly directed in front of the zone comprising said second window, a second pulley arranged on said bracket, a second roller bearing placed on said reduced end portion of said first drum, a vertical post arranged on said platform parallel to said first drum, a first and second pinion supported on said post and meshing with said first and second helical spur gear, respectively, a reversing gear unit operatively coupled with said pinions and the take-off unit of the engine of the truck, guide means rigidly fixed to the inner wall of said first hollow drum, a cylindrical cover for protecting the entire assembly and having a hole for said reduced end portion of the first drum, tubular elements shaped to slide in said guide means for rotating together with said first drum, coupling means for rigidly connecting said tubular elements to one another, a drilling bit

provided at one end of a first tubular element, and a cable fixed at one end onto said second hollow drum, wound on said second drum and passing through said second pulley, first pulley, first and second window, and fixed at its other end onto the inner wall of said first hollow drum, whereby by rotating said first drum the tubular elements will perform the drilling operation causing the cable to unwind owing to the weight of the tubular elements, whereas for lifting the bit the second pinion will be operated for winding said cable on said second drum.

2. A drilling machine as claimed in claim 10, wherein said guide means comprise roller pairs arranged diametrically to one another within said first drum and said tubular elements consist of hollow tubular rods having two opposite longitudinal skirts guided by said roller pairs.

3. A drilling machine as claimed in claim 10, wherein said coupling means comprise a pin rigidly secured to one end of said tubular elements, said pin entering in the hollow tubular rod of a successive tubular element and being secured by two opposite screws.

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