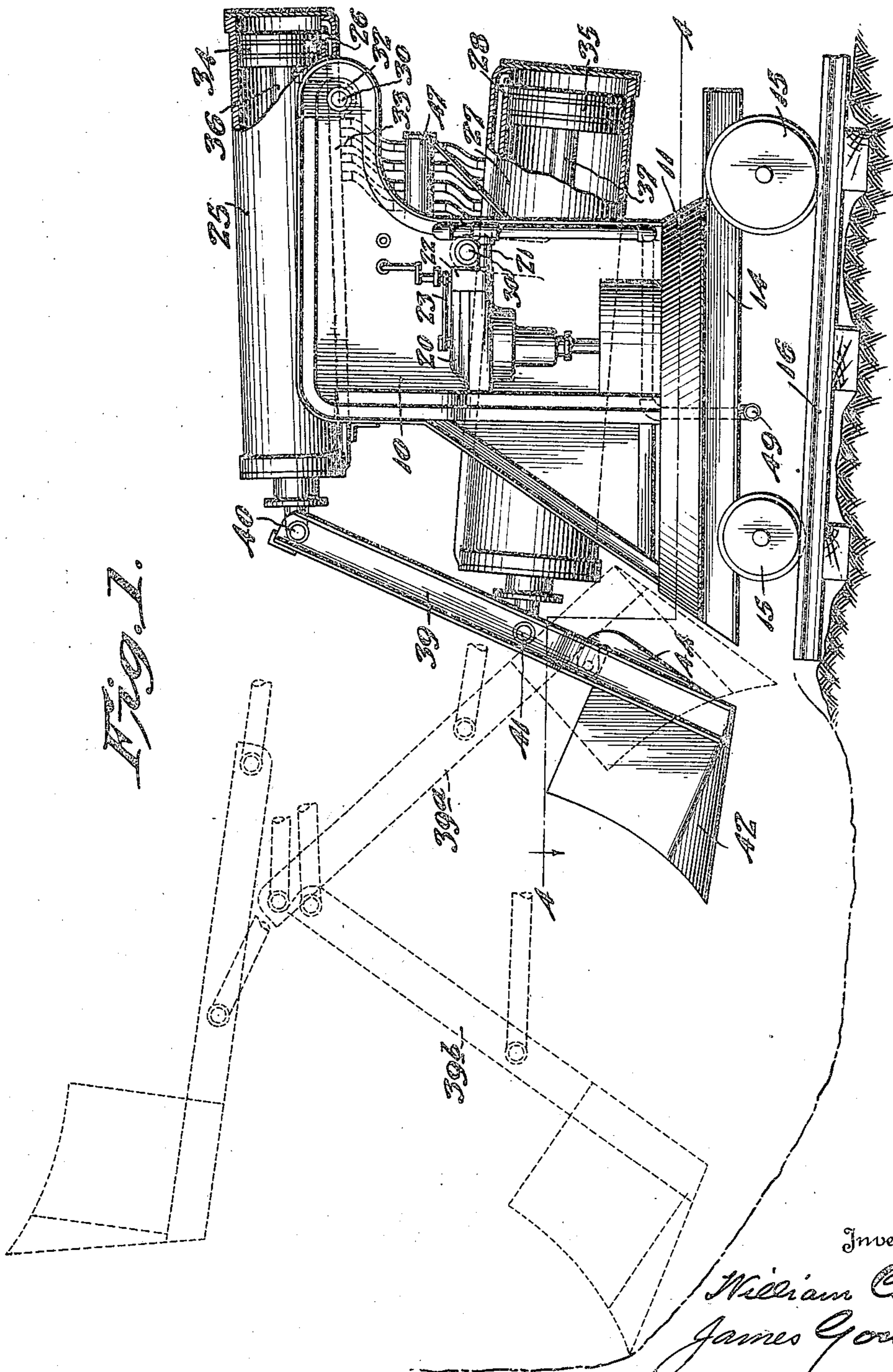


Jan. 2, 1923.

1,440,910

W. COLE ET AL.
SHOVELING MACHINE.
ORIGINAL FILED JUNE 28, 1921.

3 SHEETS-SHEET 1



Inventors
William Cole
James Goudie
Thomas R. Harner
Attorney

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3 SHEETS-SHEET 2

Fig. 3.

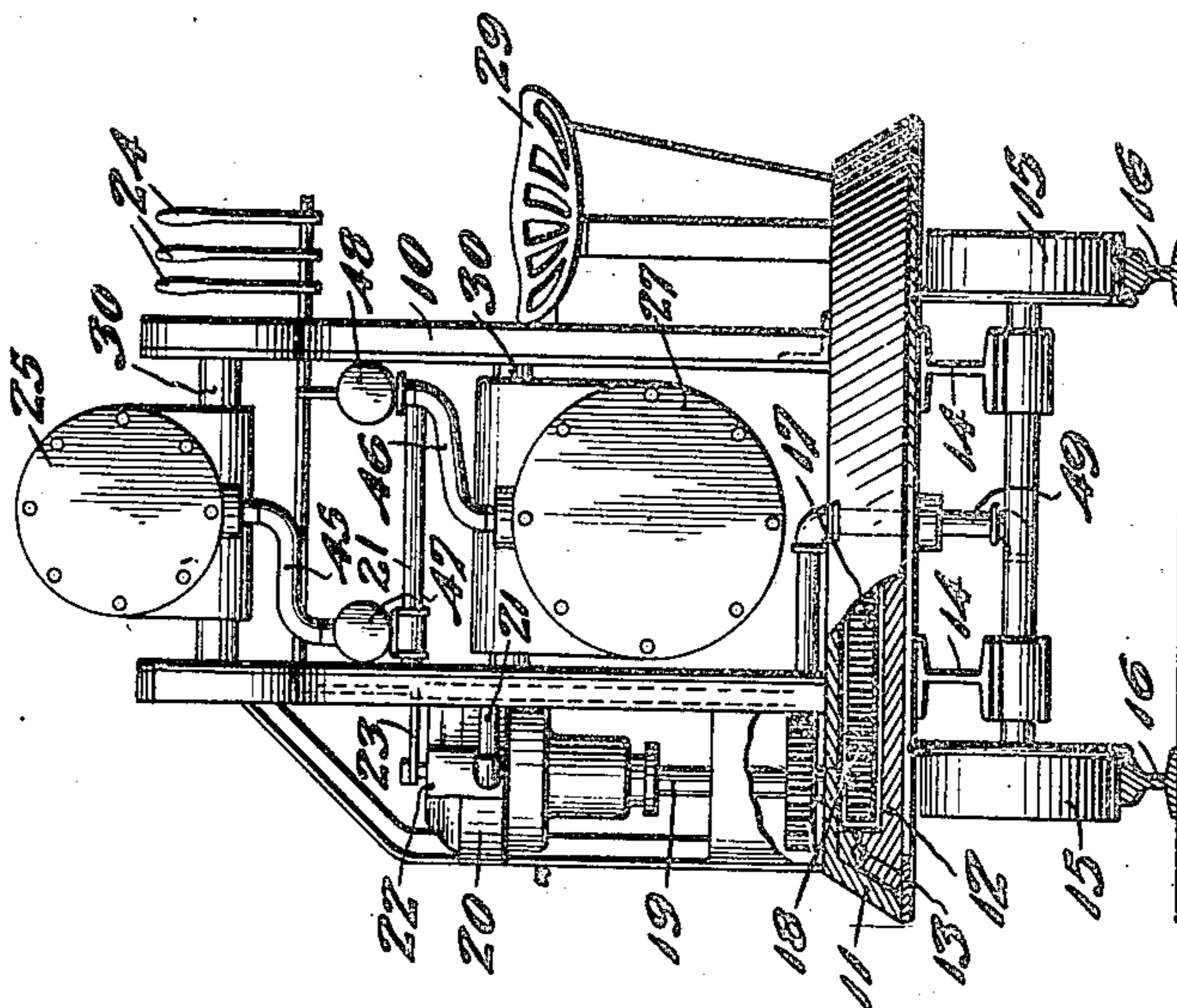
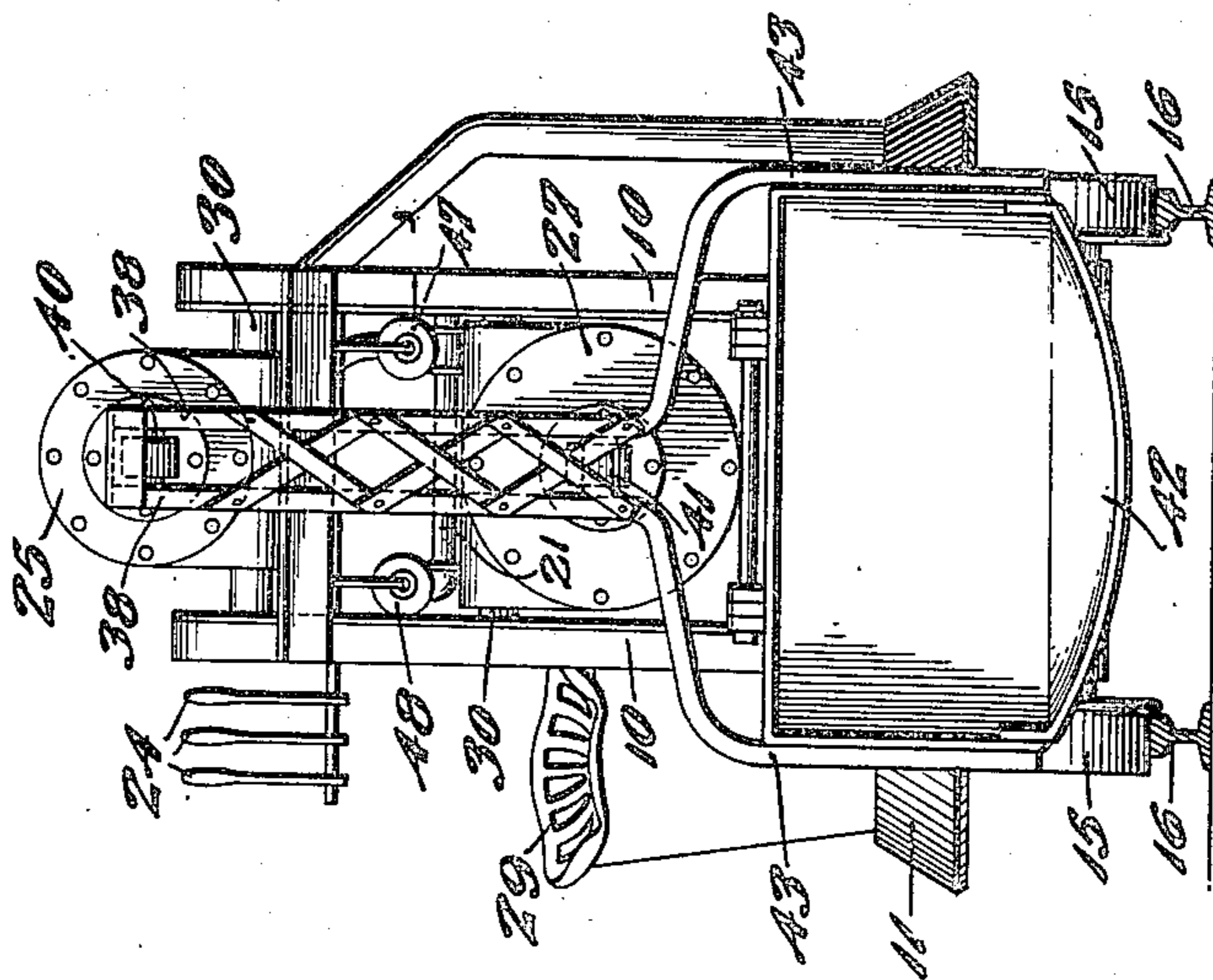


Fig. 2.



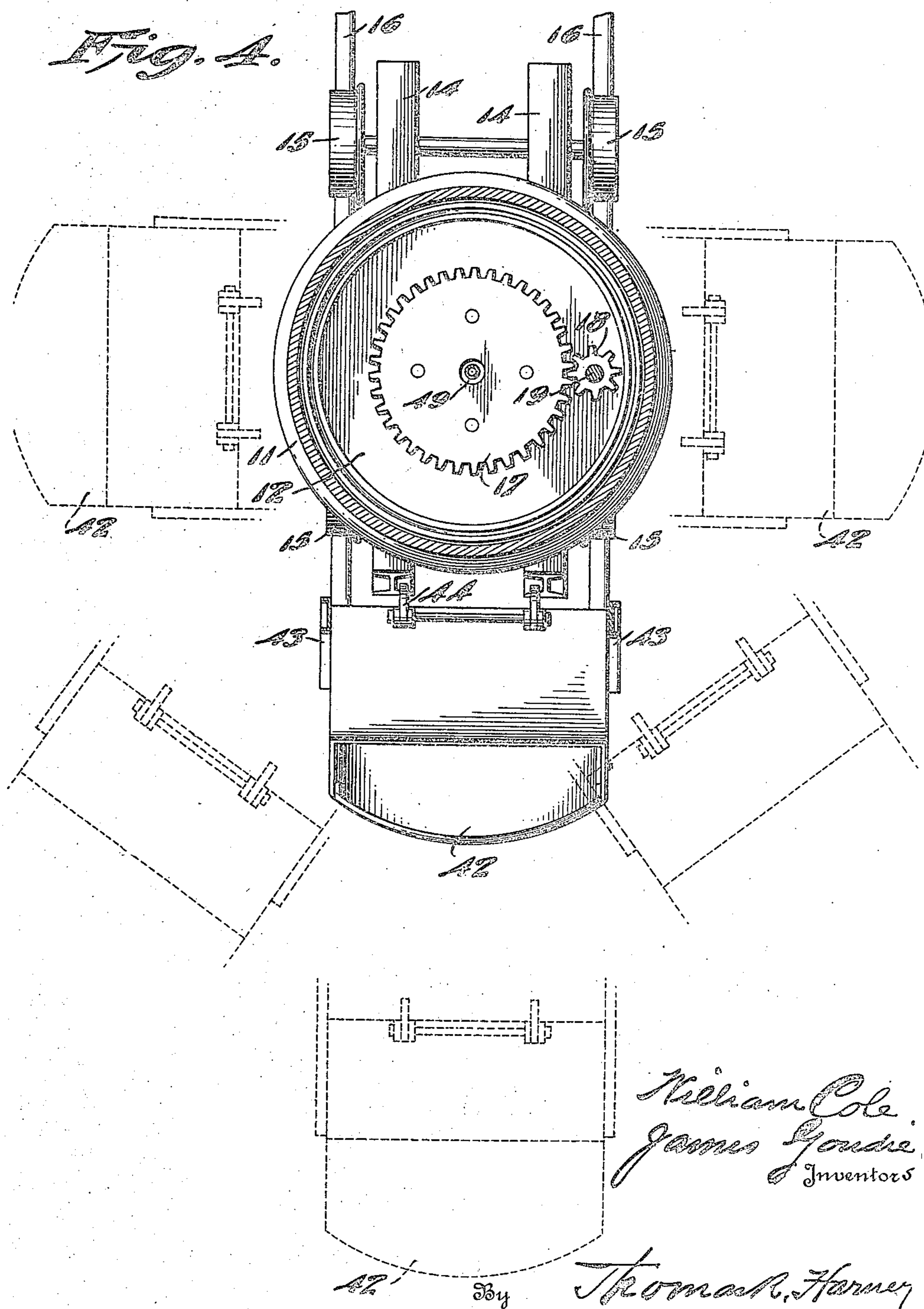
Inventors
William Cole
James Gordie
Thomas H. Harney
Attorney

Jan. 2, 1923.

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W. COLE ET AL.
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3 SHEETS-SHEET 3



William Cole
James Gordon
Inventors

Thomas R. Harney
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM COLE AND JAMES GOUDIE, OF IRONWOOD, MICHIGAN.

SHOVELING MACHINE.

Application filed June 28, 1921, Serial No. 481,121. Renewed December 1, 1922.

To all whom it may concern:

Be it known that we, WILLIAM COLE and JAMES GOUDIE, citizens of the United States of America, residing at Ironwood, in the county of Gogebic and State of Michigan, have invented certain new and useful Improvements in Shoveling Machines, of which the following is a specification.

Our present invention relates generally to improvements in shoveling machines and more particularly to improvements in shoveling machines of the type described and claimed in the Patent No. 1,321,983 granted to William Cole under date of November 18, 1919.

Among the various objects of our improvements we aim to provide an extremely compact, simple and effective arrangement capable of entire operation by air pressure although not necessarily limited to the use of such fluid, as well as an arrangement in which the relative location and particular connection of the parts permits of quick effective operation in extremely limited spaces such as for instance the loading of mine cars under ground.

Like in the patent above referred to our present improved apparatus employs two piston cylinders controlling and actuating a dipper arm, but unlike the arrangement of the above patent, the dipper arm is in the present instance rigid with the dipper bucket and pivotally engaged at spaced points by the piston rods of the two cylinders in such manner that in all normal operations there is but slight variance in the position of the upper cylinder and the head room necessary for proper operation of the machine is reduced to a minimum as hereinafter particularly set forth.

In our present apparatus we employ a rotating frame mounted and operating much similar to the rotating frame of the above patent, but we avoid certain disadvantages of the above arrangement detracting from speedy effective operation by the employment of a dipper including a dipper arm and a bucket rigid with the dipper arm, apart from and connected to the pistons of the two cylinders.

With this general outline our invention will it is believed be thoroughly understood and its advantages appreciated from a consideration of the following description referring to the accompanying drawings,

which latter form a part of this specification and wherein.

Figure 1 is a side elevation of our improved machine, parts of the cylinders being broken away and in section,

Figure 2 is a front elevation,

Figure 3 is a rear elevation, parts being broken away and in section, and

Figure 4 is a horizontal section taken on line 4—4 of Figure 1.

Referring now to these figures, the rotating frame of our present machine, including stiffened parallelly spaced uprights 10, securely fastened at their lower ends upon a downwardly opening base ring or platform 11, is mounted as in the patent above referred to upon a circular supporting base 12, portions of the platform and supporting base having anti-friction balls or other members 13 therebetween to relieve friction. The supporting base 12 is fixed upon a truck 14 having wheels 15 adapted to rolling movement on mine tracks and the like 16, and has secured thereon a stationary ring gear 17 with which a pinion 18 is in engagement at one side. Pinion 18 is mounted upon the lower end of a motor shaft 19, the latter depending from a motor 20 which, in the present instance is a rotary fluid motor to which a fluid supply pipe 21 leads through a valve box 22. The valves of this motor which may be of any suitable type are controlled through manually actuated connections 23 from one hand lever 24 of a series of such levers located at the right hand side of the frame looking forwardly and at the side opposite to that upon which the fluid motor 20 is mounted. These levers 24, one of which controls the supply of air to the opposite ends of the upper cylinder 25 through its ducts 26 and the other of which controls its supply of air to the opposite ends of the lower cylinder 27 through its ducts 28, are mounted above and forwardly of the driver's seat 29 so as to be within his convenient reach for proper and effective manipulation at all times.

The two cylinders 25 and 27 are each provided with a transverse pivot pin 30 whose opposite ends are journaled through bearings in the side plates 10. Both of these pins are located intermediate the ends of the cylinders, the pin of the lower cylinder being at a point but slightly to the rear of the center of the cylinder whereas the pin 30 of

the upper cylinder is located adjacent to the rear end of its respective cylinder and its supporting bearings indicated at 32 are positioned in upper rearward extensions 33 of the side plates 10 adapting the upper cylinder 25 to a substantially horizontal position at all times in ordinary use and thus minimizing its swing so as to avoid projection thereof to any appreciable extent and at any time above the upper ends of the side plates.

The cylinders 25 and 27 have pistons 34 and 35 and piston rods 36 and 37, the forward ends of the latter of which project through the forward ends of the cylinders and between the rigidly trussed parallel side bars 38 of the dipper arm generally indicated at 39.

The forward end of rod 36 is connected to the dipper arm adjacent to its upper end by a transverse pivot pin 40 while the forward end of piston rod 37 is connected by a transverse pivot pin 41 to the dipper arm intermediate the ends of the latter and but slightly above the dipper bucket 42 which is rigidly mounted at the lower end of the dipper arm between the lower flared portions 43 of the side bars 38. This dipper bucket is open at its forward side and has a rear hinged gate or door 44 whose trip release and control may be of the ordinary type and is not here illustrated as it forms no part of our present invention.

The fluid supply pipe 21 leading to the motor 20 and which also has branches 45 and 46 leading to the cylinders 25 and 27 through valves 47 and 48 controlled by certain of the hand levers 24, is preferably supplied from a pipe 49 extending upwardly through the supporting base 12 and the lower platform 11, axially of and rotatable with the latter, whose lower end may be conveniently attached by a flexible hose and the like to a suitable source of pressure supply.

It is obvious from the above that by the manipulation of its respective hand lever 24, the motor 20 will be supplied with pressure to effect rotation of the vertical shaft 19 in a desired direction whereby the engagement of the pinion 18 with the ring gear 17 will rotate the revolving frame between various positions indicated in dotted lines in Figure 4 and in any such positions it is obvious the operator seated on the seat 29 retains full control of the several levers for their manipulation both to effect movement of the revolving frame and the cylinder pistons 34 and 35.

The action of the shovel in operation is somewhat similar to that of a man shoveling and the bucket 42 may be first dipped upon forward movement of the piston rod 36 during which movement the dipper arm 39 pivots on the forward end of the piston rod 37. Then by forward movement of the piston rod 37 the dipper bucket is carried for-

wardly so as to scoop up its load and at the same time swing upwardly as it pivots on the forward end of the piston rod 36. These movements are respectively illustrated by the dotted line positions 39^a and 39^b of Figure 1 and it is obvious that the loaded bucket may, when it has been shifted upwardly to approximately the plane of the upper cylinder 25, be shifted forwardly over the point at which the material is to be dumped, for instance over a mine car, with but very slight pivotal movement or inclination of the upper cylinder 25.

Inclination of both cylinders is indeed minimized so that they may be arranged close to one another and their operation in practice with but slight variation from the horizontal reduces to a minimum the head room required for the proper operation of the machine so as to adapt itself for use within tunnels, mine drifts and the like where those of the ordinary type could not be used.

The rigid connection of the dipper bucket with the dipper arm avoids the necessity of first grounding the bucket and thus does away with practically all waste of time, the operation as the result being capable of being carried out speedily and effectively for the purposes previously described.

We claim:

1. A shoveling machine including a rotatable support having spaced uprights, upper and lower cylinders between said uprights and pivotally connected thereto intermediate the ends of the cylinders, pistons in said cylinders, rods extending from said pistons forwardly through said cylinders, and a dipper arm having a rigid bucket at its lower end and having pivotal connections at its opposite end and at a point intermediate its ends, with the forward ends of said piston rods.

2. A shoveling machine including a rotatable support having spaced uprights, upper and lower cylinders between said uprights and pivotally connected thereto intermediate the ends of the cylinders, pistons in said cylinders, rods extending from said pistons forwardly through said cylinders, and a dipper arm having a rigid bucket at its lower end and having pivotal connections at its opposite end and at a point intermediate its ends, with the forward ends of said piston rods, the upper cylinder having its supporting pivot adjacent to the rear end thereof and the lower cylinder having its supporting pivot adjacent to the center thereof.

3. A shoveling machine including spaced side plates having upper rearward extensions, an upper cylinder pivotally supported between the said rearward extensions at a point adjacent to the rear end of the cylinder, a lower cylinder pivoted to said up-

rights at a point intermediate its ends adjacent to its center, pistons in said cylinders, rods connected at their rear ends to said pistons and having their forward ends projecting forwardly through the cylinders, a dipper bucket, and a dipper arm to the lower end of which the bucket is rigidly connected, having its upper end pivotally connected to the forward end of the rod of the upper cylinder and having a pivotal connection intermediate its ends and adjacent to the bucket, with the forward end of the piston rod of the lower cylinder.

In testimony whereof we have affixed our signatures.

WILLIAM COLE.
JAMES GOUDIE.