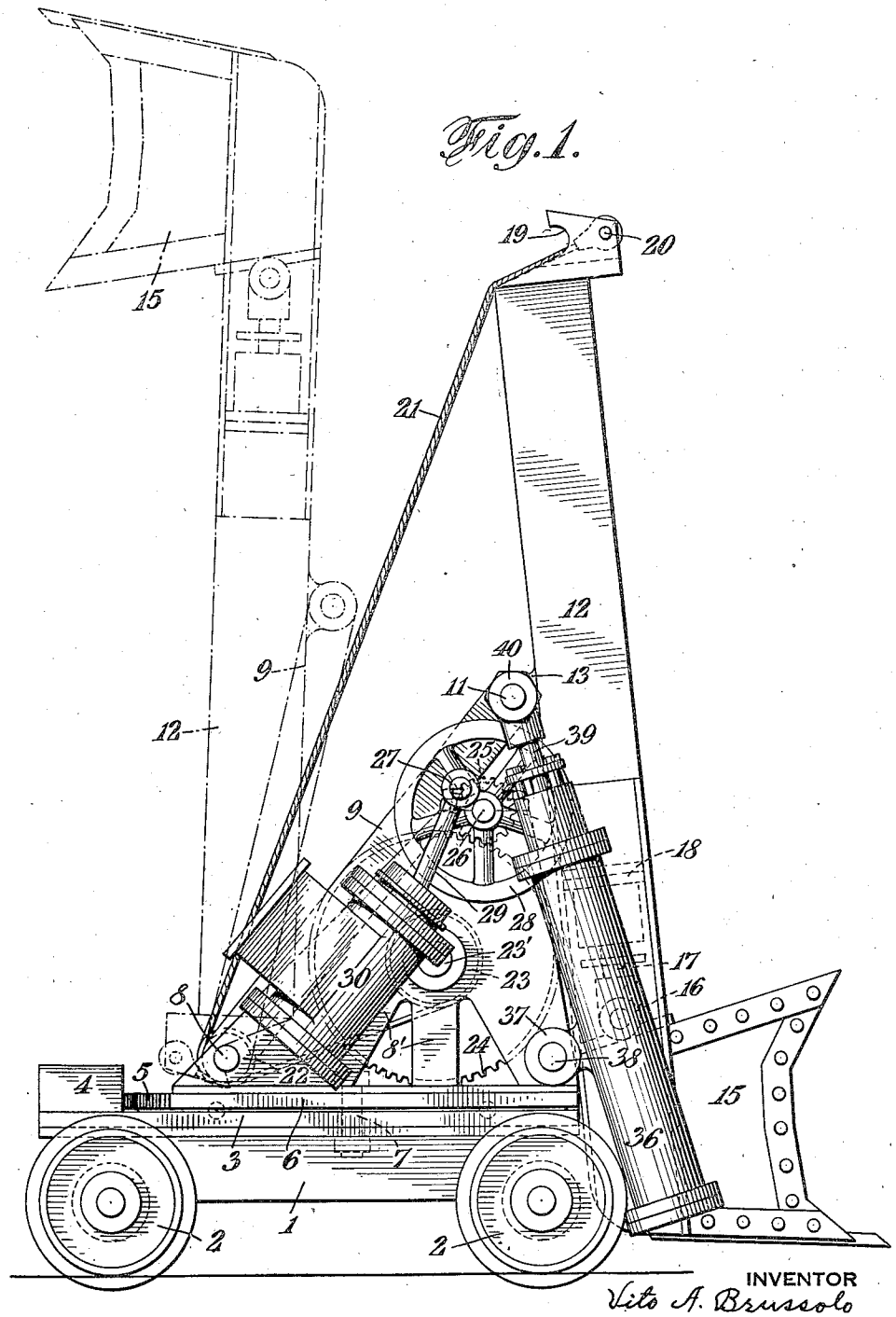
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MIDGET MECHANICAL SHOVEL

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Fig. 1.



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Fig. 2.

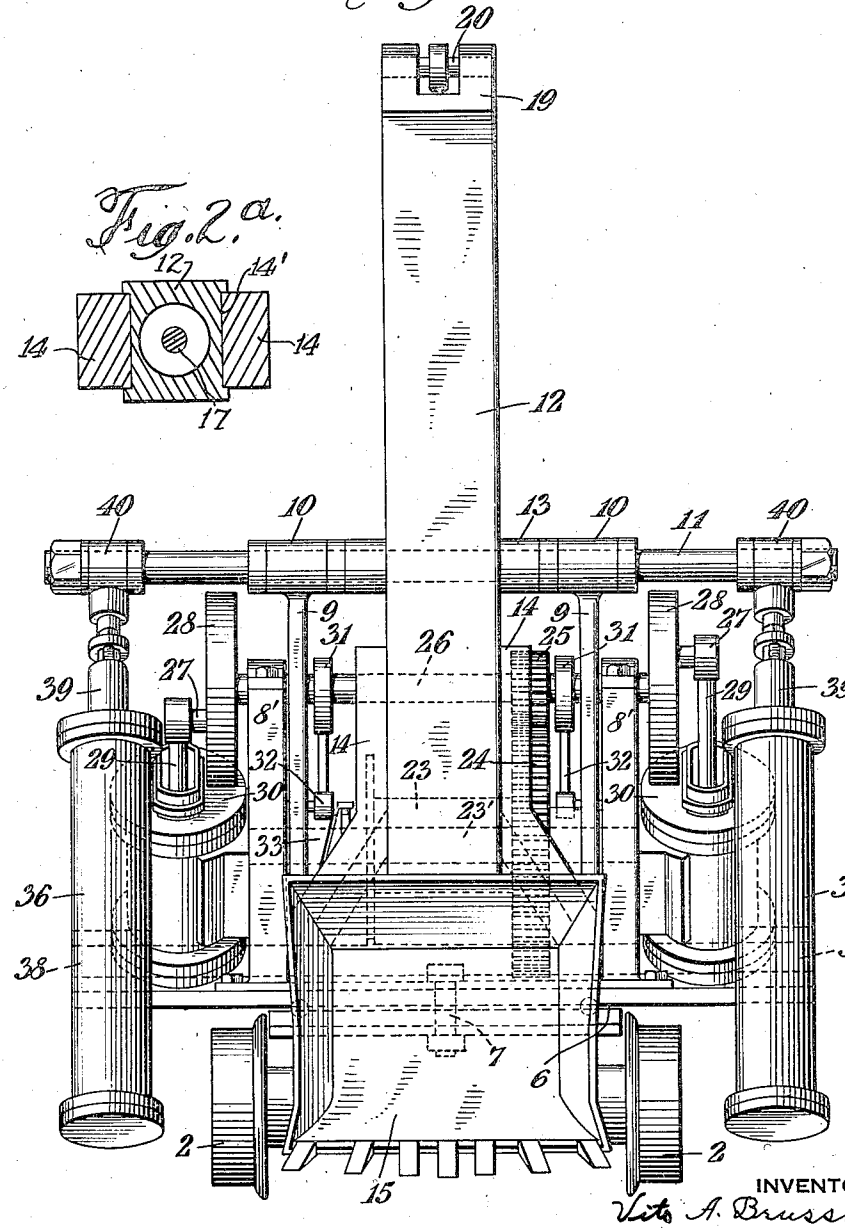


Fig. 2a.

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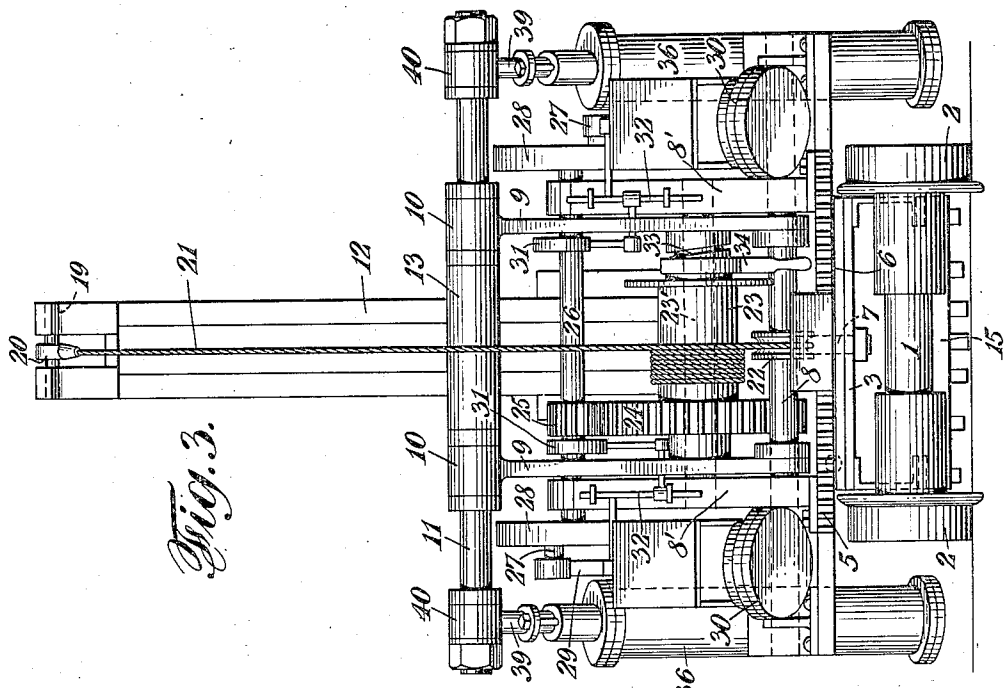


Fig. 3.

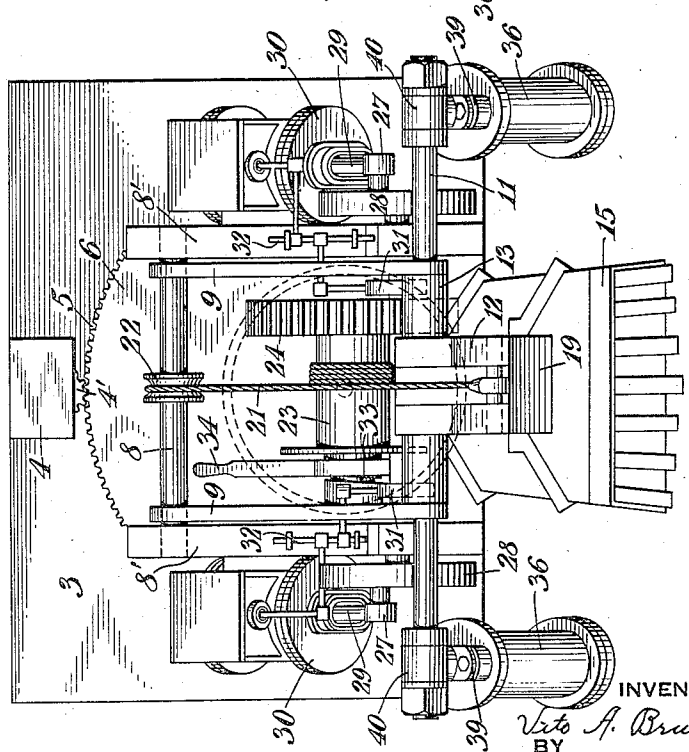


Fig. 4.

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UNITED STATES PATENT OFFICE

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MIDGET MECHANICAL SHOVEL

Application filed January 20, 1931. Serial No. 509,914.

This invention relates to a power-operated shovel that may be mounted upon a truck and operated by fluid under compression, such as compressed air, to load and unload the same. The shovel is mounted upon a revolving frame or turn-table and is supported upon a pivoted support so that the shovel may be loaded and unloaded by movement of the shovel in a single plane, or the shovel may be turned into different positions for unloading it.

The invention will be understood from the description in connection with the accompanying drawings in which Fig. 1 is a side elevation of an illustrative embodiment of the invention; Fig. 2 is a front view; Fig. 2*a* is a section through one of the parts; Fig. 3 is a rear view and Fig. 4 is a plan view of the same.

In the drawings reference character 1 indicates a truck that is provided with wheels 2. A stationary platform 3 is provided upon the truck and a motor 4 is mounted on the platform and is provided with a pinion 4′ that meshes with the gear 5 along the periphery of a turn-table 6 that revolves around a vertical king bolt 7 on the platform 3.

A horizontal shaft 8 is journalled in bearings in the side frames 8′ fixed on the turn-table 6. Rods 9 are pivoted at their lower ends on the shaft 8 and are provided at their upper ends with journals 10 in which the shaft 11 is journalled, this shaft being parallel to the shaft 8.

A cylinder 12, which may have its outside rectangular in cross section, as shown in Fig. 2*a*, is provided with an elongated transverse hollow lug 13 through which the shaft 11 extends, thus pivoting the cylinder 12 upon the shaft 11. Extensions 14 slidable in grooves 14′ are provided along the lower portion of the cylinder 12 to serve as supports, upon which the shovel or digging element 15 is supported and can be moved back and forth. The shovel 15 is provided with a lug 16 that is connected by means of the piston rod 17 to the piston 18 inside the cylinder 12. The cylinder 12 is of a well known type in which fluid such as air under compression can be admitted to opposite ends thereof for moving the piston 18 back and forth, thus moving the shovel 15 longitudinally into different positions along the supports 14. The means for admitting the fluid to the cylinder 12 have been omitted to avoid confusion of the drawings, as this is well known in the art. The upper end of the cylinder 12 is provided with a head 19 having a recess to fit upon the shaft 8, as will be explained below. The head 19 is provided with a cross pin 20 to which the end of a cable 21 is attached. The cable 21 passes around a sheave 22 on the shaft 8 and thence around a drum 23 on a shaft 23′ journalled in the side plates 8′. A gear 24 is rigidly connected to the shaft 23′ and is driven by a pinion 25 mounted on the shaft 26 that is journalled in bearings at the upper portions of the side plates 8′. Crank pins 27 are connected to flywheels 28 on the shaft 26 and piston rods 29 connect the crank pins 27 to the pistons in the cylinders 30 that can be operated in the well-known manner by fluid under compression, such as air admitted to opposite ends of the pistons, thus driving the shaft 26. The cylinders 30 are mounted in fixed positions upon the side frames 8′. The shaft 26 carries cams 31 for operating the mechanisms 32 for admitting fluid to opposite ends of the cylinders 30.

A clutch 33 is provided on the shaft 23′ and is operated by the handle 34 for connecting the drum 23 to the driving mechanism.

Two cylinders 36, each provided with a lug 37, are pivoted on a shaft 38 supported by the side frames 8′. The cylinders 36 are provided with pistons that may be reciprocated similar to the way the pistons in the cylinders 12 and 30 are reciprocated. The pistons in the cylinders 36 are connected by the piston rods 39 and journals 40 to the shaft 11.

The operation is as follows:

The device is brought near the material, such as a rock pile, for example, that is to be loaded upon a truck or the like, with the parts in the position indicated by solid lines in Fig. 1. Air is admitted to the cylinders 30, thus driving the shaft 26, pinion 25, gear 24 and drum 23 when the clutch 33 is operated. This causes the cable 21 to be wound

upon the drum 23 drawing the upper end of the cylinder 12 in Fig. 1 anti-clockwise around the shaft 11 as a pivot, thus forcing the shovel 15 into the mass of material that is to be loaded. At the same time air may be admitted to the upper end of the cylinder 12, thus pushing or crowding the shovel 15 into the mass of material. The winding of the cable 21 is continued until the recess in the head 19 fits over the shaft 8 whereupon the cylinder 12 is approximately parallel to the rods 9.

Air is then admitted to the lower ends of the cylinders 36, thus moving the pivot shaft 11 through an arc of a circle whose center is the shaft 8. The dotted line position of the rods 9 and cylinder 12 in Fig. 1 indicates a position into which the shovel 15 has been carried after it has been loaded. The truck upon which the material is to be loaded may be placed behind the device on the side opposite the pile of material that is being loaded and a slightly further movement of the cylinder 12 than that shown in dotted lines in Fig. 1 will cause the material to slide out of the shovel 15 onto the truck. However, the truck may be placed alongside of the device and after the shovel is loaded the turn-table 6 may be turned by means of the motor 4 to direct the cylinder 12 over the truck when the cylinder is turned to the unloading position.

I claim:

1. In combination, a shovel, a pivoted cylinder carrying said shovel and means for loading and unloading said shovel by moving it in a single vertical plane, said means comprising a flexible tension member connected to said cylinder on the other side of the pivot from said shovel.

2. In combination, a shovel, an elongated support for said shovel pivoted at a single point, said shovel being mounted at one end of said support, means connected to the other end of said support to turn it about its pivot, means comprising a cylinder and piston for moving said shovel longitudinally of said support and means for moving the pivot for said support through an arc of a circle.

3. In combination, a turntable, a pivoted cylinder carried by said turntable, a cable attached to said cylinder and adapted to turn it about its pivot, a shovel carried by said cylinder, and means for moving said pivot through an arc of a circle.

4. In combination, a turntable, a pivoted cylinder carried by said turntable, a cable attached to said cylinder and adapted to turn it about its pivot, a shovel carried by said cylinder, and a piston and cylinder for moving said pivot through an arc of a circle.

5. In combination, a turntable, a cylinder, a rod pivoted to said turntable and cylinder, a cable attached to said cylinder and adapted to turn it about its pivot, a shovel carried by said cylinder, and means for moving said pivot through an arc of a circle.

6. In combination, a turntable, a pivoted cylinder carried by said turntable, a cable attached to said cylinder, means on said turntable for winding up said cable to turn said cylinder about its pivot, a shovel carried by said cylinder, and means for moving said pivot through an arc of a circle.

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