July 10, 1945. J. A. BRADLEY 2,379,876

EXCAVATING EQUIPMENT

Filed June 21, 1944 3 Sheets-Sheet 1

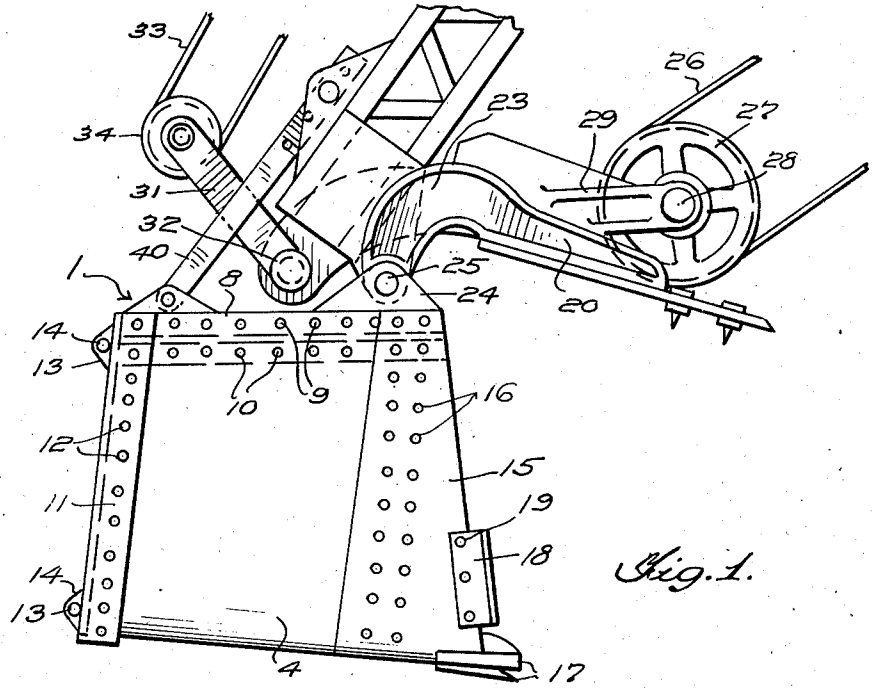


Fig. 1.

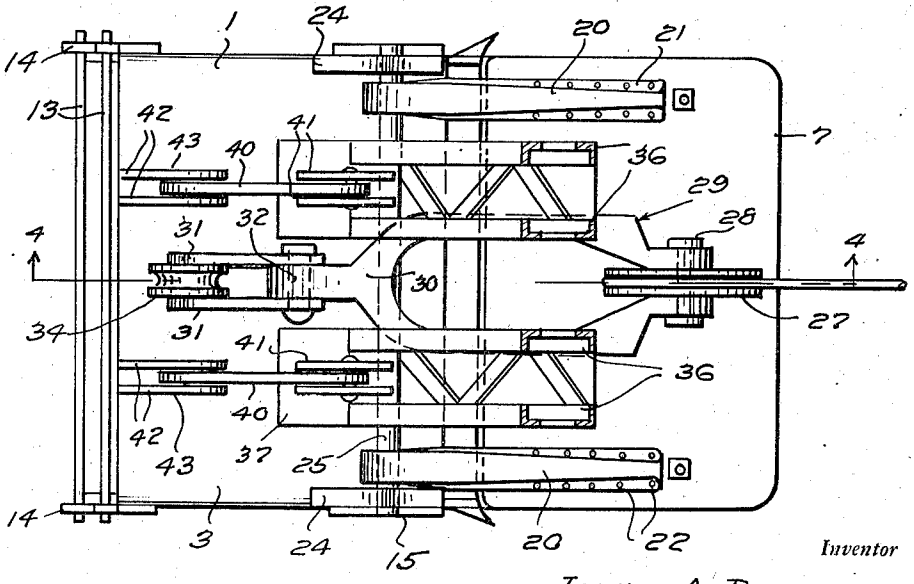


Fig. 2.

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Filed June 21, 1944 3 Sheets-Sheet 2

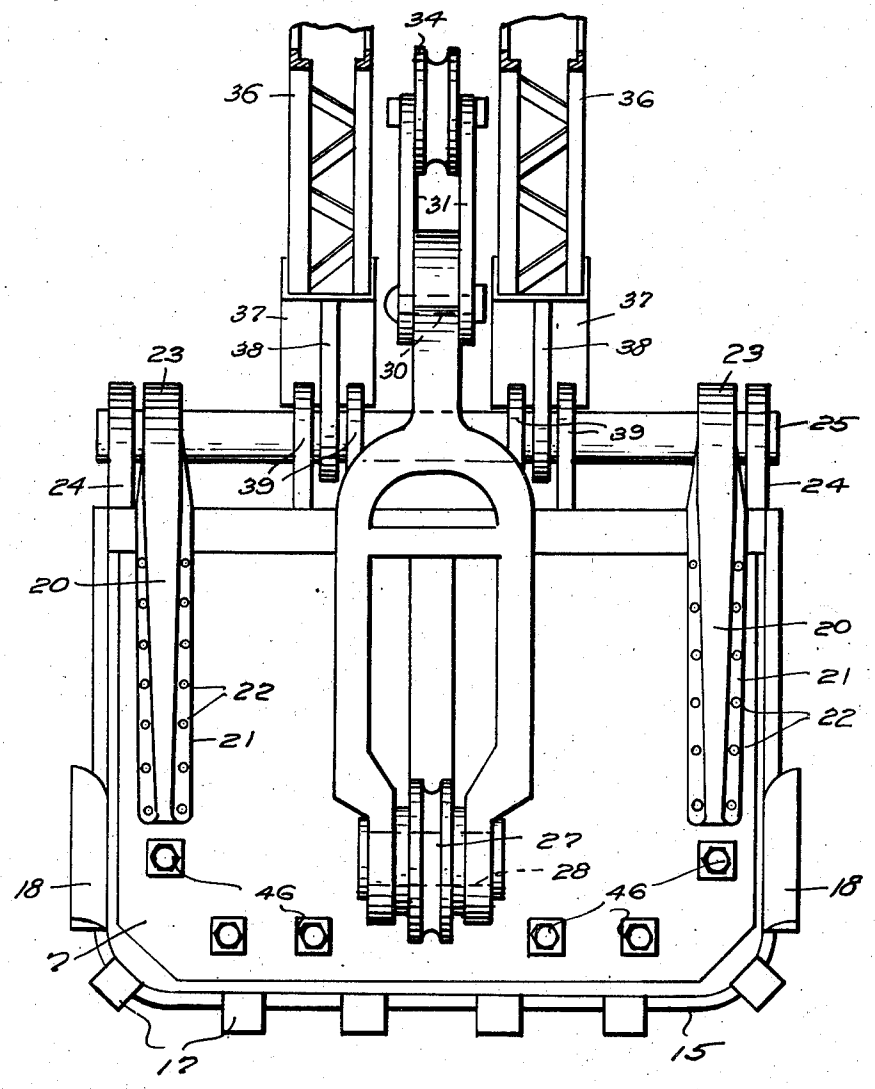


Fig. 3.

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EXCAVATING EQUIPMENT

Filed June 21, 1944 3 Sheets-Sheet 3

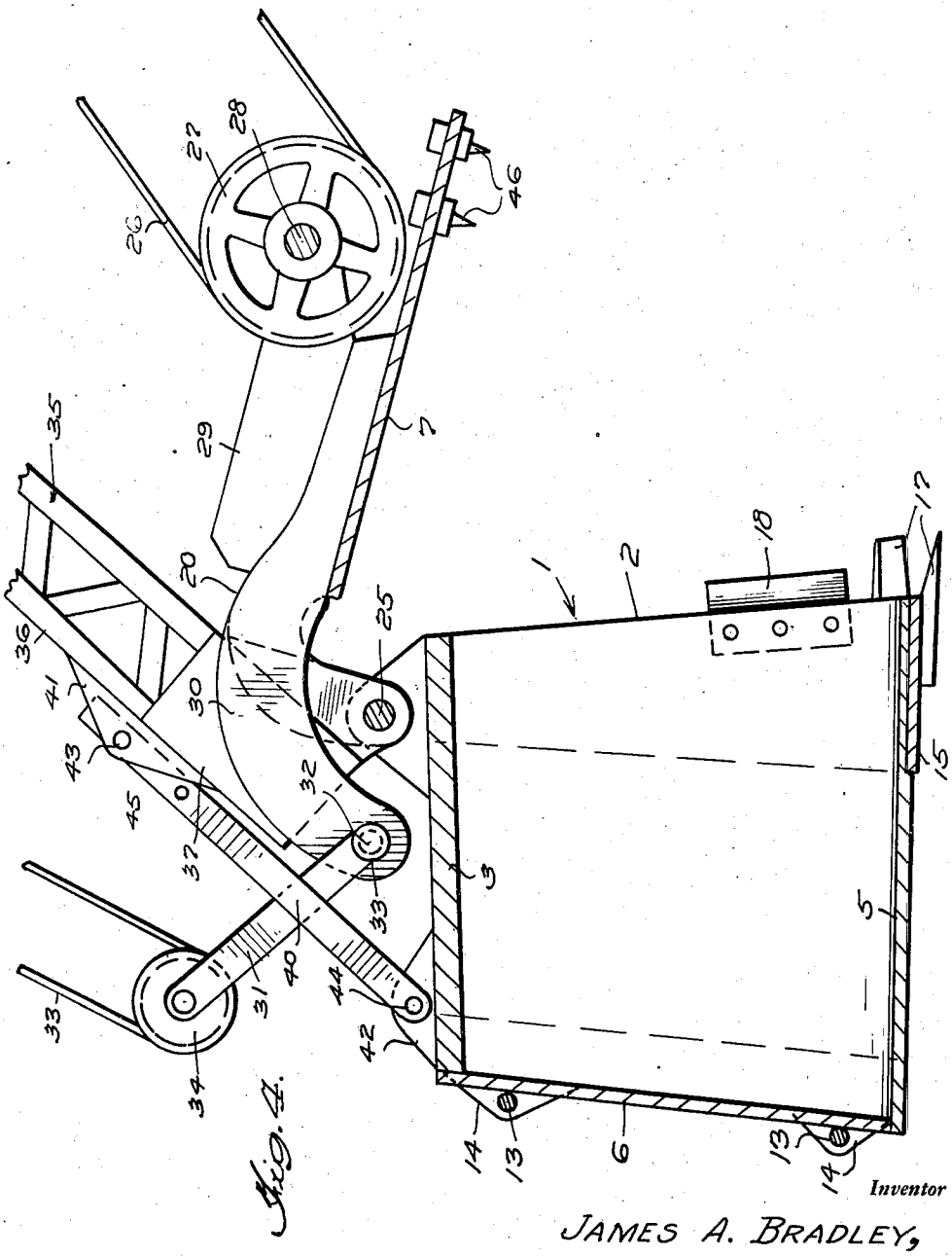


Fig. 4.

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Patented July 10, 1945

2,379,876

UNITED STATES PATENT OFFICE

2,379,876

EXCAVATING EQUIPMENT

James A. Bradley, Pittsburgh, Pa., assignor to The United Sales Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Application June 21, 1944, Serial No. 541,315

3 Claims. (Cl. 214—146)

My invention relates to improvements in excavating equipment of the type embodying a dipper, or scoop, and a dipper stick.

Among the important objects of my invention are to provide a dipper and dipper stick equipment in which powerful down pressure by the dipper stick may be utilized in digging, the power exerted in hoisting the load may be utilized to a maximum degree to maintain the dipper closed in hoisting, so that spilling from the dipper is positively prevented, the dipper is adequately reinforced against stresses and strain and wear, and adapted to cut with proper clearance so as to further obviate wear on the different parts, and to carry large stones and rocks to the dumping location without the same slipping from the dipper.

Other and subordinate objects are also comprehended by my invention, all of which, together with the precise nature of my improvements, will be readily understood when the succeeding description and claims are read with reference to the drawings accompanying and forming a part of this specification.

In said drawings:

Figure 1 is a view in side elevation of my improved dipper equipment in its preferred embodiment, with the door open,

Figure 2 is a view in top plan,

Figure 3 is a view in front elevation with the door closed,

Figure 4 is a view in longitudinal section taken on the line 4—4 of Figure 2.

Referring to the drawings by numerals, my improved excavating equipment, as illustrated, comprises a dipper, or scoop, 1 which, generally speaking, is of rectangular form in vertical section with an open front side facing rearwardly as compared with the usual arrangement. The dipper, or scoop, 1 comprises a top plate 3, side plates 4, a bottom plate 5, a back gate 6 and a plate-like door 7 for opening and closing the open side 2. Horizontal reinforcing bars 8 extend along the top side edges of the dipper 1 and are riveted, as at 9, to the top plate 3 and, as at 10, to the side plates 4. Similar vertical reinforcing plates 11 extend along the rear edges of the side plates 4 and are riveted thereto and to the plates 8 and to the side edges of the bottom plate 5, as at 12. The back gate 6 rests on the bottom plate 5 and is held in place by a pair of upper and lower transversely extending rods 13 having the ends thereof detachably attached in any suitable manner in pairs of apertured lugs 14 extending from the back side edges of the side plates 4.

A right angled, cast yoke 15 is provided at said open side of the dipper 1 to extend along and under the bottom plate 5 and upwardly along the side plates 4 with its rear edge flush with the front edges of said plates to form a wear lip, said yoke being riveted, as at 16, to said plates and to the bars 8 and the plate 3. Suitable dipper teeth 17 extend forwardly from the bottom portion of the yoke 15 for the usual purpose. Above the dipper teeth 17, and closely adjacent thereto, vertically elongated side cutter teeth 18 are riveted, as at 19, to the sides of said yoke 15 to extend rearwardly and present vertical cutting edges.

The door 7 is hinged for upward opening movement as follows: A pair of side bars 20 with side flanges 21 are riveted, as at 22, to the top of the door 7 to extend along opposite side edges thereof past the upper edge of said door and which terminates in a pair of apertured goose neck rear ends 23 interposed between a pair of upstanding apertured ears 24 on the top plate 3 and formed integrally with said top plate adjacent the front edge of the same. A cross shaft 25 extending through said ends 23 and ears 24 forms therewith a hinge connection between said door 7 and said top plate 3.

The door 7 is designed to be opened by a pull cable 26 trained around a pull sheave 27 and inclined forwardly of the digger 1 for suitable connection to a cable operating mechanism, not shown. The sheave 27 is mounted on a short shaft 28 extending crosswise of the door 7 through the rear ends of a cast yoke 29 extending along the top of the door 7 in the vertical center thereof.

The cast yoke 29 forms part of door closing means and is provided with a goose-neck extension 30 projecting past the upper edge of the door and the described hinge connection and which terminates in a free end to which a pair of lifting bars 31 are swingably connected at one end thereof by a cross pin 32. A hoisting cable 33 is trained around a sheave 34 rotatably mounted between the other ends of said bars 31, the cable being designed for operation by the usual means not shown.

The dipper stick 35 comprises a pair of side, skeleton frame sections 36 provided with lower end cap castings 37 formed with depending bearing ears 38 through which the shaft 25 extends and whereby the dipper 1 is swingably mounted on said dipper stick 35. Pairs of apertured guide ears 39 upstanding from the top plate 3 upon opposite sides of the bearing ears 38, and through which said shaft 25 also extends, prevents side play of the dipper stick 35 relative to the dipper

1, and vice versa, and also brace said shaft 25 against flexing. The guide ears 39 are also formed integrally with the top plate 3. The dipper stick 35 inclines from the top plate 3 forwardly and upwardly, being held in such position by a pair of similarly inclined, overlying, brace bars 40 having the opposite ends thereof interposed between pairs of keeper ears 41 upstanding from the tops of the frame sections 36, and similar pairs of ears 42 rising from the top plate 3 adjacent the rear end of the latter. The ends of the bars 40 are secured to said pairs of ears by pins 43 and 44. The brace bars 40 are provided with longitudinally spaced apertures, as at 45, for selective insertion of the pins 43 therein so that the dipper may be adjusted about the shaft 25 to tilt the same at different angles relative to the dipper stick 35, whereby the angle at which the teeth 17 will cut, or dig, may be varied to suit operating requirements.

The door 7 may be provided, on its inner face, and adjacent the bottom edge thereof, with suitable pick point teeth 46, the function of which is to prevent rocks from slipping out of the dipper when the latter is tilted out of horizontal position and the door 7 is being closed.

The operation of the described invention will be readily understood. The dipper stick 35, because of the described arrangement of the dipper 1 thereon, may be swung downwardly and forwardly to cause the dipper to dig, and then swung in the reverse direction, by means of the hoisting cable 34, to elevate and incline the dipper 1 rearwardly and upwardly so that the same will dump. During swinging of the dipper stick 35 rearwardly and upwardly, the pull of the hoisting cable 34 acts to swing the door 7 shut on its hinge connection to the dipper 1 and to maintain said door in tightly shut position. Obviously, the door 7 will be shut as the dipper 1 begins to rise. The manner in which the door 7 is opened has already been described.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly, the invention, as described, is susceptible of modification without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the appended claims.

What I claim is:

1. In combination, a dipper stick, a dipper depending therefrom and having a door hinged at one edge to the top of the dipper for downward swinging to close said side, means to elevate said stick and dipper operative to close said door as an incident to initial elevation of said stick and dipper comprising a yoke on said door having an end extending across the axis of said hinge, a sheave on said end of the yoke, and a pull cable trained around said sheave, and means to open said door comprising a second sheave on the other end of said yoke, and a pull cable trained around the second sheave.

2. In combination, a dipper stick comprising a pair of side sections spaced apart and provided with end cap members having depending bearing ears, a dipper having a top provided at one edge with upstanding ears between which said bearings ears are interposed, a shaft extending through said ears and thereby swingably suspending said dipper for adjustment about said shaft, a door for said dipper swingably mounted on said shaft, a yoke on said door having a lever forming arm swingable between said side sections, a sheave on said arm, and a pull cable trained around said sheave for operation between said side sections, and means to adjust said dipper about said shaft into different set positions.

3. A dipper for use on a dipper stick comprising top, side and bottom plates, respectively, and an open front, a reinforcing yoke at said front of the dipper extending under said bottom plate and upwardly along said side plates and riveted thereto, said yoke forming a digging lip, dipper teeth extending from the yoke at the bottom and sides of the same, a door for said front hinged to the top, and having pick point teeth on the inner face thereof.

JAMES A. BRADLEY.