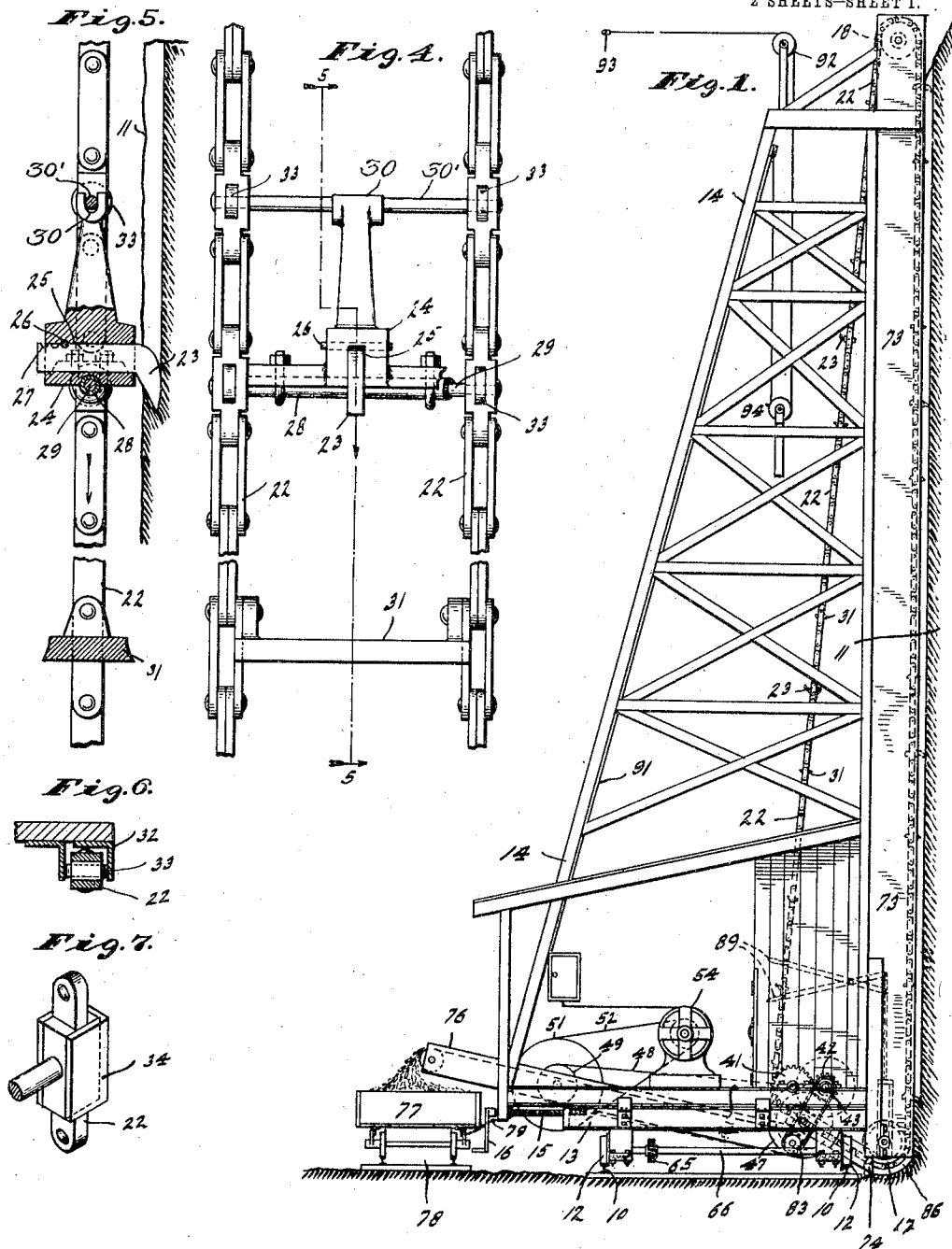


J. M. POWELL.
SHALE PLANER AND EXCAVATOR.
APPLICATION FILED AUG. 5, 1912.

1,083,558.

Patented Jan. 6, 1914.

2 SHEETS—SHEET 1.



Witnesses
Frank A. Fable
May Hayden

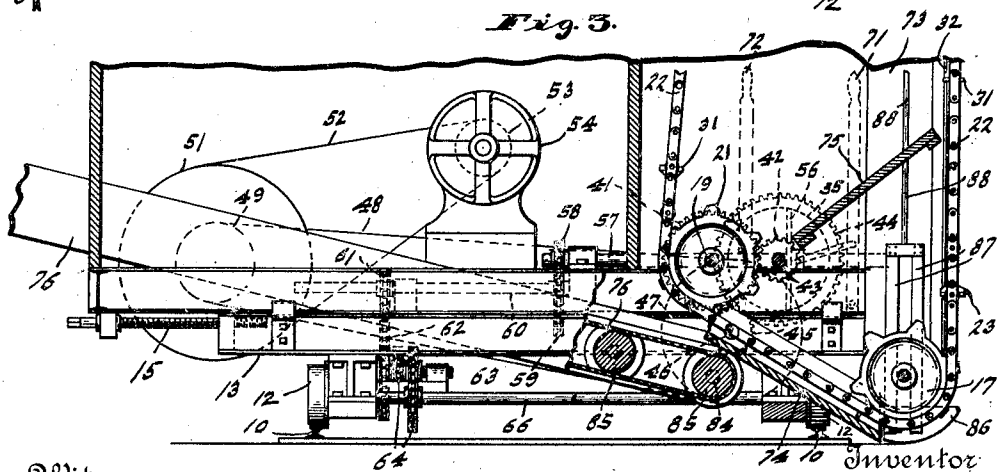
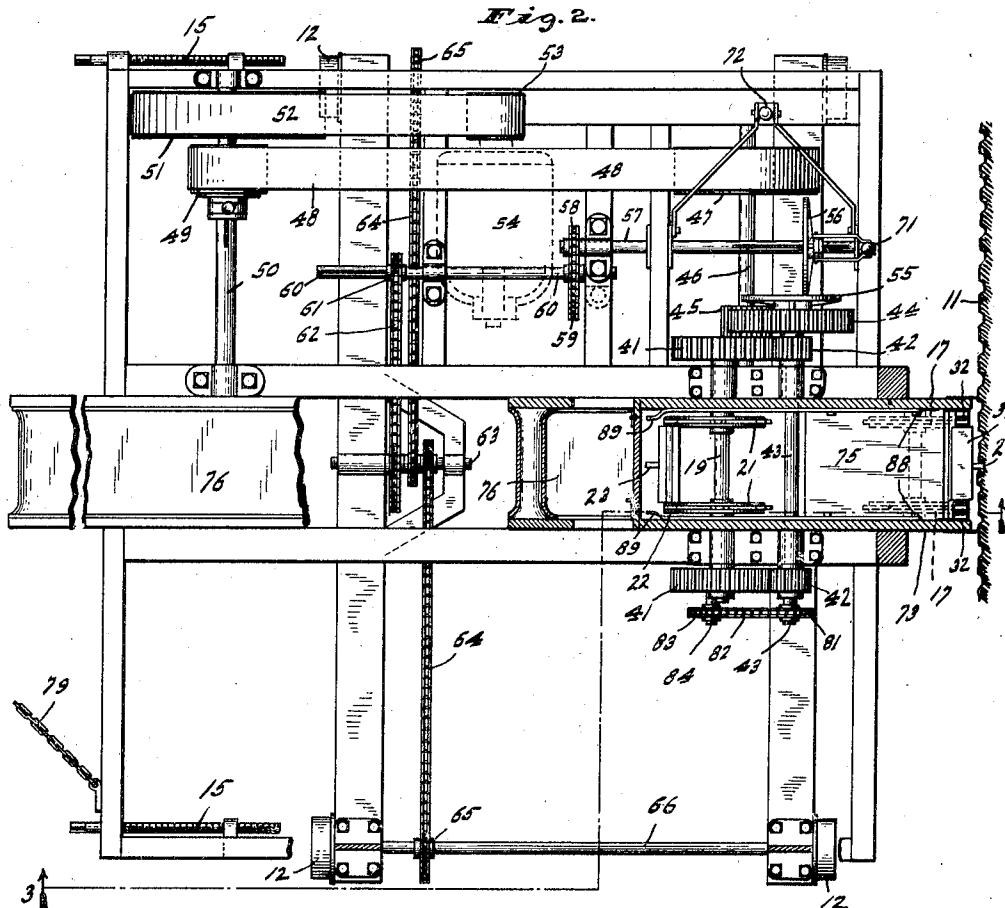
Inventor
Joseph M. Powell,
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UNITED STATES PATENT OFFICE.

JOSEPH M. POWELL, OF BROOKLYN, INDIANA.

SHALE PLANER AND EXCAVATOR.

1,083,558.

Specification of Letters Patent.

Patented Jan. 6, 1914.

Application filed August 5, 1912. Serial No. 713,243.

To all whom it may concern:

Be it known that I, JOSEPH M. POWELL, a citizen of the United States, residing at Brooklyn, in the county of Morgan and State of Indiana, have invented a new and useful Shale Planer and Excavator, of which the following is a specification.

In the manufacture of brick, drain tile, etc., natural deposits of clay, shale, etc., are used as a basis for the plastic. Such natural deposits vary in quality quite materially from top to bottom so that it is often desirable, and in many cases absolutely essential for economical use, to mix the materials coming from different portions of the deposit. Heretofore such deposits have been worked out in comparatively shallow depths either by hand mining or by the use of steam shovels, etc., and much labor has been required in producing proper mixtures of the material.

The object of my present invention has been to produce an apparatus capable of cutting the entire vertical face of a clay or shale bank under such conditions that a thorough and substantially uniform mixture of the deposit may be automatically produced, the apparatus in operation taking the place of a very considerable number of laborers.

The accompanying drawings illustrate my invention.

Figure 1 is a side elevation of the apparatus in operative position; Fig. 2 an enlarged plan in partial horizontal section; Fig. 3 a fragmentary vertical section on the line 3—3 of Fig. 2; Fig. 4 a fragmentary detail of the cutter chain; Fig. 5 a section on the line 5—5 of Fig. 4; Fig. 6 a fragmentary detail of one side of the cutter chain and its adjacent guideway; and Fig. 7 a fragmentary detail of a modified wearing shoe for the cutter chain.

In the drawings, 10 indicates a track which is laid upon the ground at the bottom of the bank 11 and parallel with its vertical face. Mounted upon the track 10 are the wheels 12 of a carriage 13 and mounted upon the carriage 13 is a main frame or tower 14 which is slidably mounted upon the frame 13 transversely of the track 10. The transverse adjustment of the tower 14

upon the carriage 13 is obtained by means of a temper-screw 15 provided with a hand crank 16.

Arranged at the lower inner corner of the tower 14 is a pair of idler sprockets 17 and vertically above these sprockets, at the upper end of the tower, is a pair of idler sprockets 18. Mounted in suitable bearings at the lower end of the tower 14 is a shaft 19 which carries a pair of driving sprockets 21 which are arranged in the vertical planes of the sprockets 17 and 18, and over the three sets of sprockets is passed the cutter chain 22. Any one of a number of kinds of cutters may be attached to cutter chain 22, depending upon the particular character of the deposit which is to be mined; but for ordinary clay or shale deposit I find it advisable to use comparatively narrow cutter bits 23 each of which may be mounted in a holder 24 having a transverse opening 25 for the reception of the bit, said bit being held in any one of its possible positions by means of a cross pin 26 taking into one or the other of notches 27 formed in the bit. Holder 24 embodies a tube or pipe 28 adapted to receive a cross pin 29 connecting the pair of link belts forming the chain 22. Holder 24 at its rear end is provided with a notch or seat 30 which is adapted to receive the adjacent cross pin 30'. Both preceding and following each cutter 23 I arrange a scraper 31 the purpose of which will appear.

The vertical face of the tower 14 is provided with two vertical guides 32 for the reception and support of the active portions of chain 22, and said chain is provided at suitable points with wearing members to co-operate with the guides, such wearing members being anti-friction rollers 33, as shown in Fig. 4, or sliding shoes 34, as shown in Fig. 7. Shaft 19 carries gears 41, 41 at its opposite ends, and these gears mesh with gears 42, 42 carried by shaft 43. Shaft 43 carries gear 44 which meshes with gear 45 carried by shaft 46 which also carries a belt pulley 47 connected by belt 48 with a clutch pulley 49 carried by shaft 50. Shaft 50 carries pulley 51 which is connected by a belt 52 with pulley 53 carried by the main shaft of motor 54. It is of course to be understood

that the particular train of gearing and belting is merely typical, as indicating some suitable driving connection between the motive power and the cutter chain by means of which it may be driven at a speed suitable to the material being operated upon.

The shaft 43 carries a friction disk 55 which coöperates with an adjustable friction disk 56 splined upon a shaft 57 connected by gears 58 and 59 with a shaft 60 upon which is splined a sprocket wheel 61 connected by a sprocket chain 62 to a countershaft 63. Countershaft 63 carries a pair of sprocket wheels from which run two chains 64, 64 in opposite directions to sprockets 65, 65 carried by axles 66, 66 to which the traction wheels 12 of the carriage 13 are secured, the arrangement being such that the traction wheels 12 may be driven at any desired speed in either direction so as to transport the entire apparatus horizontally parallel with the working face of the bank 11. The friction disk 56 may be adjusted relative to disk 55 by an ordinary adjusting lever 71 the details of which are too well known to require description. Similarly, the disk 56 may be moved into or out of operative engagement with disk 55 by an ordinary and well known operating lever 72.

The active portion of the cutter chain, between the wheels 17 and 18, is arranged within a vertically placed, U-shaped trough or chute, 73 which, at its lower end, is provided with an upwardly inclined bottom trough 74 which is arranged parallel with that portion of the cutter chain which extends between the wheels 17 and 21. Arranged above the trough 74 is a downwardly inclined plate 75 upon which the larger portion of the mined material will fall and from which it will slide onto the receiving end of an endless delivery belt 76 which is extended from the outboard edge of the tower 14 in such position that a tram car 77 may be placed beneath the delivery end of the belt. This tram car traverses a track 78 which is held parallel with track 10 and the car is drawn along with the apparatus by means of a chain or other suitable detachable connection 79. Shaft 43 carries a sprocket wheel 81 which is connected by chain 82 with a sprocket wheel 83 carried by a shaft 84 which carries one of the rollers 85 upon which the endless belt 76 is mounted. Adjacent the outside of each sprocket wheel 17 I arrange a vertically adjustable shoe 86 which is carried at the lower ends by a pair of rods 87 connected by a rod 88 with a controlling lever 89 (see dotted lines in Fig. 1) the arrangement being such that these shoes may be independently raised and lowered.

When the motor 54 is an electric motor, I provide a suitable feed wire which passes

over the support 92 at the top of the tower and is provided with a suitable trolley 93 which contacts with a wire which may be arranged along the top of the bank. It is convenient, with such an arrangement, to provide the feed wire with sufficient slack to permit the placing of a weighted pulley block 94 in the bight of the slack.

The operation is as follows:—Tracks 10 and 78 being held adjacent the bank 11 in the manner indicated in Fig. 1, the tower is adjusted transversely of the carriage 13 until the cutters 23 project a sufficient distance into the vertical face of the bank 11, whereupon the apparatus is put in motion and the cutters move downwardly across the face of the bank 11 and at the same time the carriage 13 is advanced slowly along the track 10. Comparatively narrow and thin shavings of mud or shale are thus cut from the face of the bank and, as several cutters are simultaneously in operation at different heights of the bank, it will be apparent that the cuttings will fall in a substantially uniform mixture upon platform 75 and be delivered by carrier 76 to the car 77. The material which gets below the platform 75 is carried by the scrapers 31 up the trough and delivered to the carrier 76. During the advance of the apparatus along track 10 that shoe 86 which is advanced will be raised while the rearward shoe 86 will be in its lowest possible position thus carrying along the cuttings which may have fallen that low so that they will be gathered up by the scrapers and delivered to the carrier.

I prefer to make the cutters 23 comparatively narrow because it is quite common to find stones embedded in the clay or shale, and if the cutters are narrow no difficulty is experienced in breaking up such harder material.

After the entire apparatus has traversed a sufficient length of the bank the wheel 56 is shifted to the opposite side of the center of wheel 55 and the operation is repeated with the carriage 13 moving in the opposite direction. From time to time, as the need arises, the tower is moved transversely of the carriage 13 toward the face of the bank.

I claim as my invention:

A machine for comminuting and mixing material from the face of a bank, comprising a transportable carriage, a tower mounted upon said carriage, means by which said tower may be bodily adjusted transversely of the carriage, an endless carrier mounted upon the tower in position to have substantially vertical movement thereon, a plurality of comparatively narrow cutters carried by the endless carrier and capable of simultaneous operation from top to bottom upon the face of the bank, means for driving said carrier, means coördinated with the carrier

driving means for simultaneously driving the carriage parallel with the face of the bank, and means arranged in the lower end of the tower for receiving and delivering
5 the comminuted and mixed material.

In witness whereof, I, have hereunto set my hand and seal at Indianapolis, Indiana,

this 3rd day of August, A. D. one thousand nine hundred and twelve.

JOSEPH M. POWELL. [L. s.]

Witnesses:

ARTHUR M. HOOD,
FRANK A. FAHLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
