

Jan. 19, 1926.

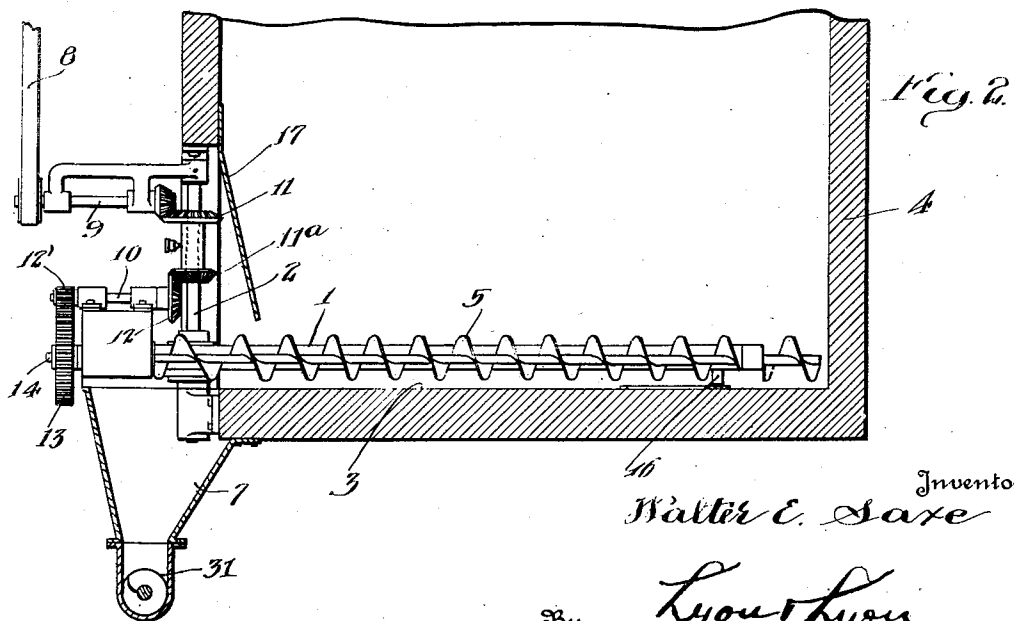
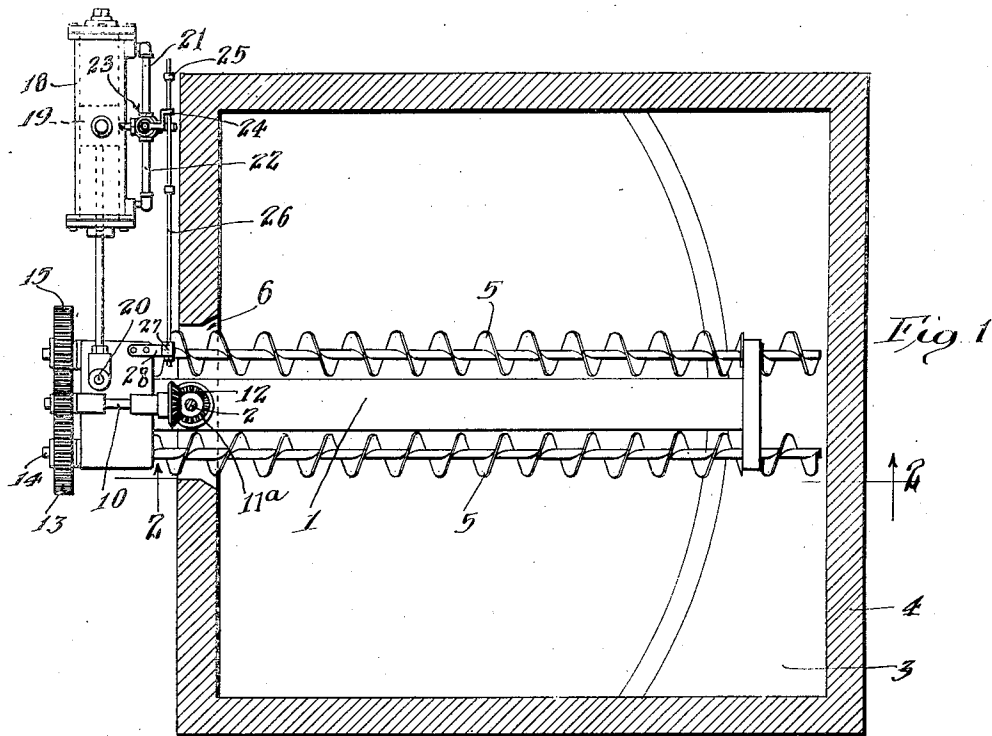
1,570,085

W. E. SAXE

EXCAVATOR

Filed Jan. 31 , 1925

2 Sheets-Sheet 1



46
Inventor
Walter E. Saxe

Walter E. Saxe

Lyons & Lyons

Attorneys

Jan. 19, 1926.

1,570,085

W. E. SAXE

EXCAVATOR

Filed Jan. 31, 1925

2 Sheets-Sheet 2

Fig. 3

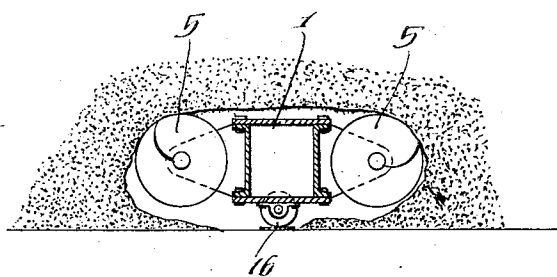
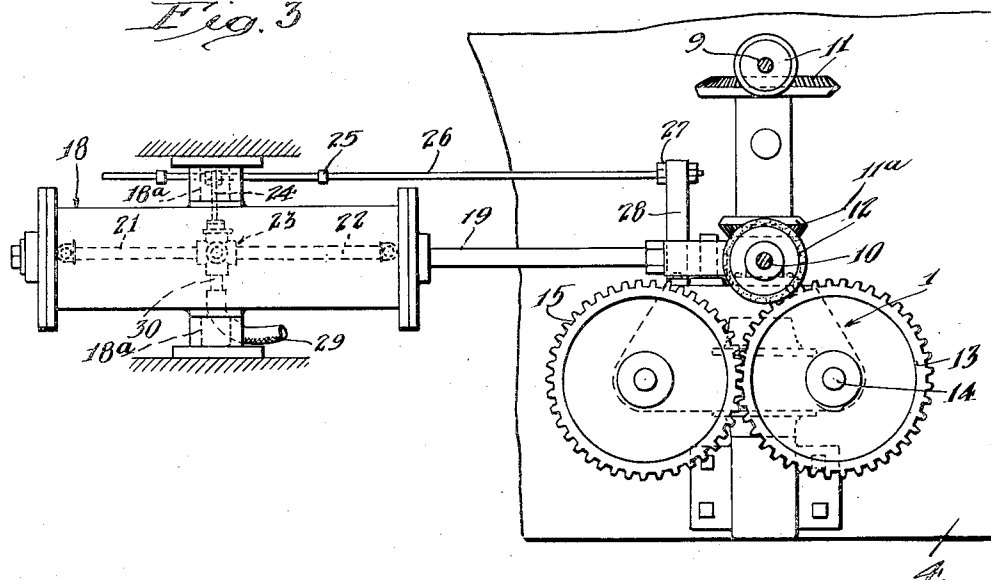


Fig. 4

Inventor

Walter E. Saxe

By

Lyon & Lyon

Attorneys

UNITED STATES PATENT OFFICE.

WALTER E. SAXE, OF LOS ANGELES, CALIFORNIA.

EXCAVATOR.

Application filed January 31, 1925. Serial No. 6,001.

To all whom it may concern:

Be it known that I, WALTER E. SAXE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Excavator, of which the following is a specification.

This invention relates to an excavating device for removing material. Although the invention is capable of being applied in many situations where material must be removed, for the purpose of illustration I have described it as applied to an excavator for removing material from a bin. The general object of the invention is to provide a bodily movable conveyor device which is guided in a path through or under the material which is to be removed; also to provide means for automatically advancing the conveyor device, but merely sufficiently to maintain it in contact with the material.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient excavator.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawings:

Fig. 1 is a plan of my excavator, illustrating the same as applied to a bin which is shown in horizontal section.

Fig. 2 is a vertical section taken substantially on the line 2—2 of Fig. 1 and further illustrating details of the construction.

Fig. 3 is a front elevation of the apparatus showing a portion of the wall of the bin broken away, and particularly illustrating the means for holding the conveyor in contact with the material being excavated.

Fig. 4 is a vertical section of a diagrammatic nature, taken substantially at right angles to the carrier or boom on which the conveyor device is mounted; this view particularly illustrates the manner in which the device maintains contact with the material.

In practicing the invention, I provide a conveyor device which is bodily movable, for which purpose it is mounted upon a carrier which supports it, and this carrier is guided in a path passing through or under

the material which is to be excavated. According to my invention, I maintain a slight pressure upon the carrier, merely sufficient to maintain the conveyor device in contact with the material, and in this way I supply a sufficient quantity of the material to the conveyor device to enable it to operate efficiently without spending unnecessary energy in forcing the conveyor device through the mass of the material. In other words, I provide a construction whereby the conveyor device slowly "eats its way" through the material. This control apparatus operates in such a way that when the conveyor device reaches the limit of its movement in one direction, its movement will be reversed or changed in such a way that it will be able to maintain contact with the material being excavated.

I shall now describe the invention as applied to a carrier in the form of a boom, operating within the bin. This boom or carrier 1 is supported on a pivot shaft 2 and extends across the floor 3 of the bin 4. On this carrier or boom the conveyor device is mounted. This conveyor device may be of any common construction, but in the present instance I provide two conveyor screws 5 located on opposite sides of the carrier or boom 1. The pivot shaft 2 is set in the opening 6 in the wall of the bin so that the excavated material passes through the opening and may be received in the hopper 7 (see Fig. 2).

Any suitable means may be provided for actuating the conveyor device. In the present instance this is accomplished by driving it from a belt 8 which drives a shaft 9, and this shaft operates to drive a horizontal countershaft 10 through bevel gears 11 and 11^a carried on a sleeve loose on the shaft 2; the gear 11^a meshes with a gear 12 on shaft 10 to drive it. The countershaft 10 carries a pinion 12' meshing with a gear 13 which is carried by the shaft 14 of one of the conveyor screws. This gear 13 meshes with another gear 15 of the same diameter, which is carried rigidly on the shaft of the other conveyor screw. These conveyor screws will therefore rotate in opposite directions, and one should be a right hand screw and the other a left hand screw so that they will cooperate to draw material through the opening 6. If desired, the outer end of the

boom 1 may be supported on a roller 16 which rolls on the floor of the bin (see Fig. 4).

In order to keep the material within the bin out of contact with the gearing, I provide an apron 17 which acts as a guard for this purpose.

Any suitable means may be provided for developing a force for moving the conveyor bodily to maintain it in contact with the material which it is removing. In the present instance, I provide a fluid actuated cylinder 18 having a piston 19 which is connected by a pivot 20 to the end of the boom which projects out beyond the opening 6. The ends of this cylinder are supplied with fluid or liquid under pressure by pipes 21 and 22, the admission to which is controlled by a four-way cock 23. This cock is operated by a lever 24 (see Fig. 3) and this lever is automatically controlled. For this purpose, the handle of this lever is disposed between two collars 25 near the end of a drag link 26, the other end of the drag link being attached at 27 to the upper end of an arm or post 28 which projects up from the boom. The force exerted by the liquid or fluid in the cylinder 18 is not sufficient to move the boom rapidly to and fro. The force exerted is merely sufficient to hold the conveyor device up against the material so that the conveyor slowly eats its way through the same.

Fig. 4 illustrates the manner in which the apparatus will operate to cut an arch under the material, and when this arch is sufficiently wide it will collapse; and the material above the excavator will descend upon it.

One of the advantages of my invention is that it requires only a very small amount of power to hold the conveyor device of the excavator up against the material; however, when the limit of movement in one direction is reached, the lateral movement of the excavator will operate the lever 24 and throw it over to a reversing position, which will reverse the flow of the liquid or fluid to the cylinder and reverse the piston. The cylinder 18 oscillates on vertical trunnions 18^a.

In order to maintain connection with the four-way cock, I provide a flexible hose 29 which is connected to the end of the inlet pipe 30, which leads the fluid or water under pressure into the apparatus.

If desired, the lower end of the hopper 7 may deliver the material into a horizontal conveyor device 31 which may carry the material off to any point desired.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited in the practice of the invention, nor in the

claims, to the particular embodiment set forth.

What I claim is:—

1. In a bin excavator the combination of a bin with an opening in its side wall, a boom and a conveyor device carried by the boom pivoted substantially at the opening, means for actuating the conveyor device, a hopper for receiving the material from the conveyor device, and automatic means for swinging the boom to and fro.

2. In a bin excavator, the combination of a bin having an opening in its side wall near the bottom of the bin, a boom pivotally mounted in the opening and extending out over the floor of the bin, a conveyor device carried by the boom, means for actuating the conveyor device to carry material through the opening, and automatic means for swinging the boom to and fro.

3. In an excavator for operating upon material, the combination of a bodily movable conveyor device, means for driving the conveyor device to carry off the material, and fluid-pressure actuated means for exerting just sufficient force upon the conveyor device to maintain it in contact with the material to keep the same supplied with the material.

4. In an excavator for operating upon material, the combination of a laterally movable conveyor device, means for actuating the conveyor device to remove the material, and fluid-pressure actuated means for exerting a force upon the conveyor device merely sufficient to maintain the same pressed against the material, whereby the conveyor device will be continuously supplied with material with a minimum amount of lateral movement of the conveyor.

5. In an excavator, to operate upon a piled material, the combination of a pivotally mounted boom, a conveyor device mounted on the boom to remove the material, means for actuating the conveyor device to remove the material, a fluid operated cylinder having a piston connected with the boom to swing the same to and fro, a valve for controlling the flow of the fluid to the cylinder, and automatic means for controlling the valve to swing the boom to and fro.

6. In an excavator to operate upon a piled material, the combination of a movable carrier, a conveyor device mounted on the carrier, and mechanical means for developing a force and applying the same to the carrier only sufficient to maintain the conveyor device in contact with the material.

7. In an excavator, the combination of a laterally movable conveyor device, means for actuating the same to withdraw the material being excavated, a cylinder having a fluid operated piston connected with the

conveyor device and operating to exert just sufficient force upon the conveyor device to maintain it in operative contact with the material being excavated.

5 8. In an excavator, the combination of a conveyor device mounted to travel bodily in a lateral direction to and fro, means for actuating the same to withdraw material, a cylinder having a fluid operated piston connected with the conveyor device and operating to exert just sufficient force upon the conveyor device to maintain the same against the material being excavated, and automatic means for reversing the force exerted by the piston upon the conveyor at the end of its lateral travel in either direction.

9. In a bin excavator, the combination of a bin having a side wall with an opening through it, a substantially vertical shaft at said opening, a conveyor device pivotally mounted on said shaft and capable of swinging to and fro in the bin, said conveyor device including a pair of conveyor screws disposed respectively on opposite sides of the vertical shaft and extending through the opening so as to withdraw material from the bin through the opening.

10. In a bin excavator, the combination

of a bin having a side wall with an opening through it, a substantially vertical shaft at said opening, a conveyor device pivotally mounted on said shaft and capable of swinging to and fro in the bin, said conveyor device including a pair of conveyor screws disposed respectively on opposite sides of the vertical shaft and extending through the opening so as to withdraw material from the bin through the opening, and means for moving the conveyor device to and fro within the bin.

11. In a bin excavator, the combination of a bin having a side wall with an opening in it, a vertical shaft disposed in the opening, a conveyor device having a boom pivotally mounted on said shaft to swing to and fro within the bin, a pair of conveyor screws carried by the boom on opposite sides of the vertical shaft and extending through the opening so as to withdraw material from the bin, a cylinder with a fluid operated piston connected with the boom and operating to exert just sufficient force upon the boom to maintain the same against the material being excavated.

Signed at Los Angeles, Calif. this 20th day of Jan. 1925.

WALTER E. SAXE.