

Nov. 24, 1931.

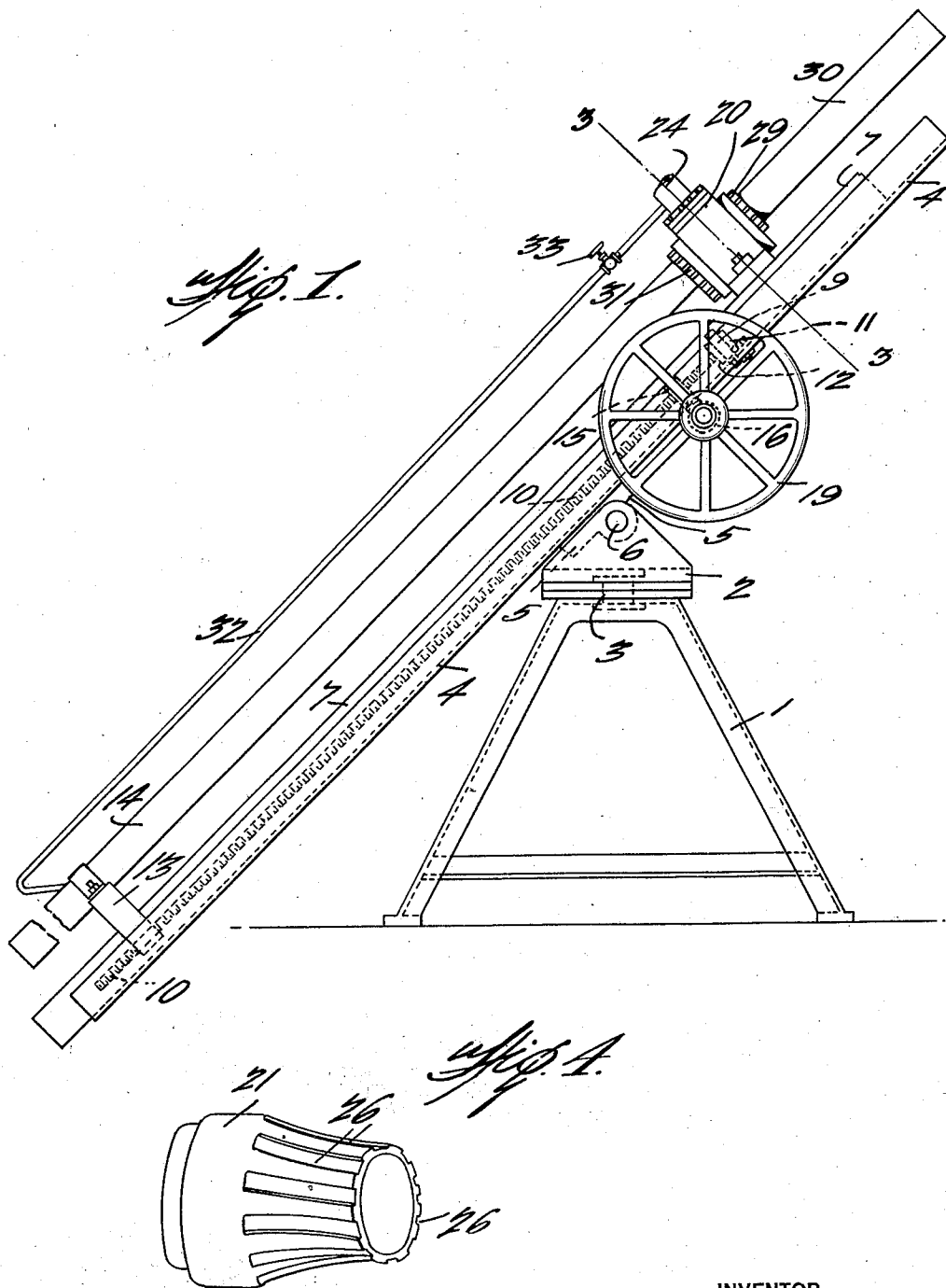
C. B. THOMPSON

1,833,341

SAND ELEVATOR

Filed July 30, 1930

2 Sheets-Sheet 1



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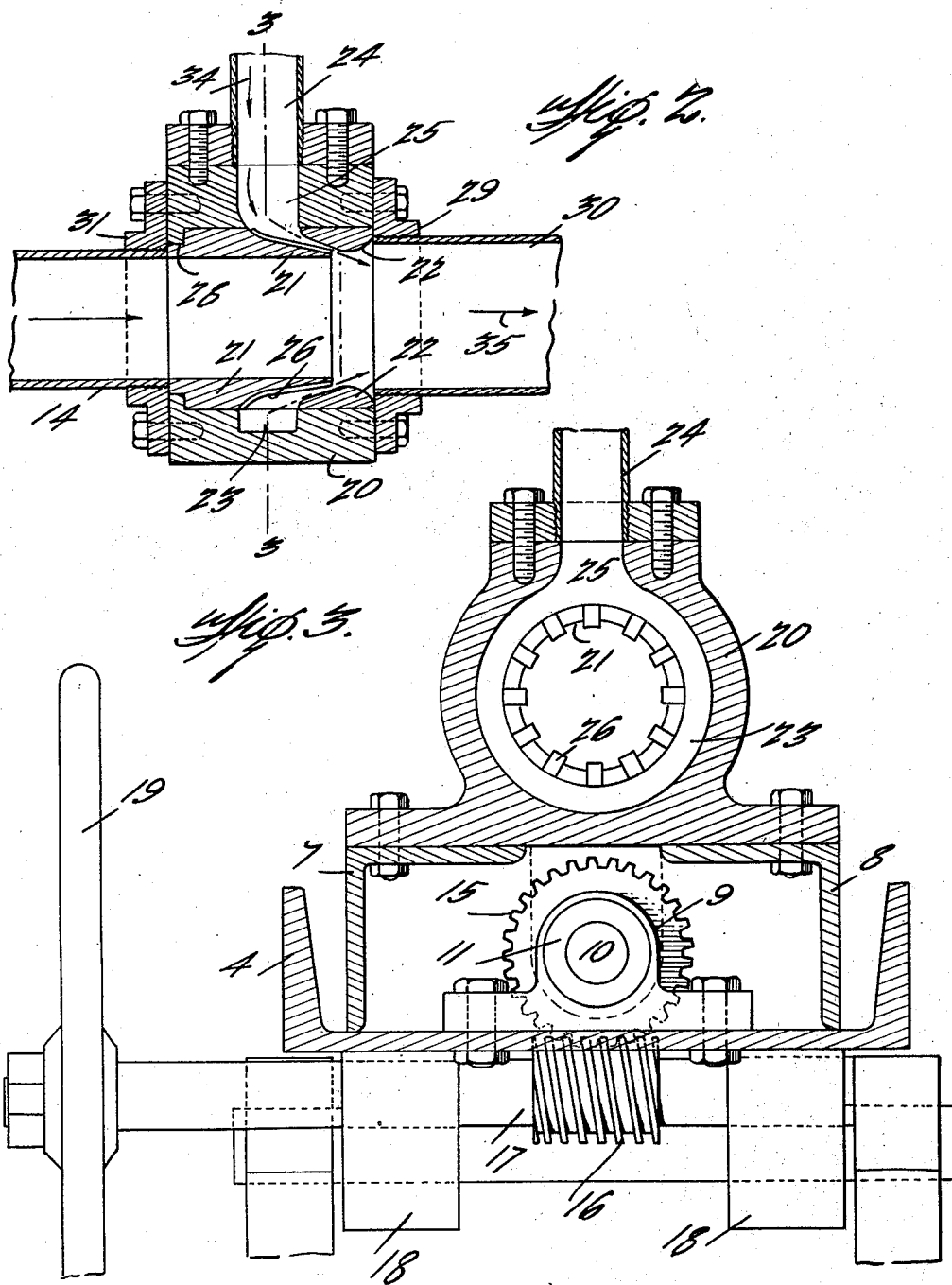
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UNITED STATES PATENT OFFICE

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SAND ELEVATOR

Application filed July 30, 1930. Serial No. 471,786.

This invention relates to improvements in elevators for lifting sand from the bottom of rivers, etc., and discharging it any place desired. The machine of my invention may be used wherever work of this kind is to be done, but the following description is of the type used in mining.

Elevators of this type have depended entirely upon the amount of vacuum that could be created for lifting the sand in one end and discharging it from the other end of the machine. In machines of this class, a very great amount of air has been heretofore required and the amount of sand lifted is thereby limited, due to the discharge pipe being almost filled to capacity with the operating air, which forms a handicap in the conveyance of much sand, and especially in forcing it to any great distance.

In my improved type of elevator, a very small amount of air is used under great pressure, and the intake and discharge pipe relatively large. In my invention a low vacuum is produced which is just enough to readily carry the sand to the discharge nozzle. I have also provided a special base for mounting the machine whereby it can be rotated, tilted and the operating mechanism moved longitudinally on its track.

I accomplish these and other objects by the peculiar arrangement and combination of the parts, as will be more clearly shown in the following specification, shown in the accompanying drawings and finally pointed out in the appended claims.

In the drawings:—

Figure 1 is a side elevation of the machine.

Figure 2 is a longitudinal cross section of the nozzle.

Figure 3 is an enlarged section taken upon the line 3—3 of Figure 1.

Figure 4 is a perspective of the nozzle alone.

Referring now more particularly to the drawings, 1 indicates the base of the machine upon which is mounted a turntable on a pivot stud 3. 4 is a channel member tiltably mounted or provided with brackets 5 which are pivotally mounted on the turntable 2 by means of a pintle 6 which allows the channel

member to be tilted to any angle desired. In the channel 4 are slidably mounted angle supports 7 and 8 carrying a nozzle mechanism with its intake in the discharge pipe.

Near the upper end of channel 4 is supported a bracket 9 (Figure 1 and Figure 3). Through this bracket passes the upper or plain end of a screw rod 10 which is provided with collars 11 and 12 to prevent it from moving longitudinally. The lower or threaded portion of the screw passes through a bracket 13 which is secured to angle supports 7 and 8 and in which is clamped the intake pipe 14. A worm gear 15 mounted for rotative, non-axial movement is mounted on and has threaded connection with the screw rod 10. This worm gear is actuated by a worm 16 which is secured to a shaft 17 which is supported on channel member 4 by means of brackets 18. Shaft 17 is provided with a hand wheel 19 (see Figure 1 and Figure 3), conveniently operable to provide that screw 10 will be rotated due to worm 16 and worm gear 15, which will thus cause bracket 13 to move along the screw, carrying with it the angle supports 7 and 8. Near the upper end of angle supports 7 and 8 (Figure 1) is attached a housing 20 bored longitudinally to receive a nozzle 21 and a ring 22, which will be described later. In the center of housing 20 is a circular chamber 23 surrounding the nozzle 21. This circular chamber communicates with an air pipe 24 by means of passage 25.

The nozzle 21 (see Figures 2, 3 and 4) is provided with a series of shallow grooves, as indicated at 26. Pressed firmly over the end of this nozzle a ring 22 is mounted. The nozzle and the ring 22 are mounted in the bore of the housing 20 by first inserting the nozzle from the right hand end (see Figure 2) till it presses against the shoulder 28, and then inserting the ring 22 and firmly clamping them in place by means of flange 29 in which is secured a discharge pipe 30. To the other end of the housing 20 is secured a flange 31 into which is screwed the intake pipe 14. In case of a low vacuum or a rather long lift, means are provided for boosting the sand to the nozzle by means of a by-pipe 32

(Figure 1) provided with a valve 33, the delivery end of which enters the pipe 14, as shown.

The method of operation is as follows:

- 5 The air intake 24 is connected to any source of air under great pressure. The air passes to the nozzle, as indicated by arrows 34, through the shallow grooves 26, where it is broken up and attains a very great velocity
- 10 as it passes into discharge pipe 30, as indicated by arrows 35. The sand, as it is lifted up through intake pipe 14, the lower end of which is placed in the river bed or other source of supply, passes through the center of
- 15 the nozzle 21, where it strikes the high velocity stream of air which greatly accelerates its speed and can force it for very great distance. This invention has been found under repeated actual practice to deliver greater
- 20 quantities of sand than has heretofore been accomplished by other known methods and at less expenditure of energy.

It will be quite apparent from the above construction that the channel member in

- 25 which the suction pipe, discharge pipe and nozzle mechanism are mounted is capable of rotative movement and adjustment at any angle in the plane of rotation, while the channel supports carrying the various pipes
- 30 and operative parts are longitudinally adjustable at will.

I claim:—

1. In a sand elevator, a channel member mounted for angular adjustability about vertical and horizontal axes, angle supports adjustable longitudinally of the channel member, a suction pipe carried by the angle supports, and a nozzle for air under pressure forming part of the suction pipe and directing the air under pressure in the direction of
- 40 desired flow of sand.

2. In a sand elevator, a channel member mounted for angular adjustability about vertical and horizontal axes, angle supports adjustable longitudinally of the channel member, a suction pipe carried by the angle supports, and a nozzle for air under pressure forming part of the suction pipe and directing the air under pressure in the direction of
- 50 desired flow of sand, said nozzle including an annular member formed with a series of longitudinally ranging air channels in the outer surface thereof.

3. A sand elevator including a channel member mounted for angular adjustability about vertical and horizontal axes, angle supports adjustable longitudinally of said member, a pipe carried by and movable with the supports, a nozzle arranged in the pipe and
- 60 open to a source of air under pressure, said nozzle being exteriorly formed with a plurality of longitudinally ranging, shallow, air receiving channels, and a ring overlying the delivery end of the channels to confine the
- 65 air blast.

4. A sand elevator including a channel member mounted for angular adjustability about vertical and horizontal axes, angle supports longitudinally adjustable in the channel member, a suction pipe carried by the supports, means arranged in the suction pipe and open to a source of air under pressure for directing such air under pressure into the suction pipe into a plurality of independent intensified air streams in the direction of movement of the material.

5. In a sand elevator, a pipe through which the sand is directed from a point of deposit to a point of discharge, a casting arranged in and forming a continuation of said pipe, said casting being formed with a channel concentric with the pipe and open to a source of air under pressure, and a nozzle arranged in the casting and having an interior diameter corresponding to that of the pipe, the exterior of the surface of the nozzle being formed with a series of longitudinally ranging, inwardly inclined, shallow channels open to said concentric channel.

6. In a sand elevator, a pipe through which the sand is directed from a point of deposit to a point of discharge, a casting arranged in and forming a continuation of said pipe, said casting being formed with a channel concentric with the pipe and open to a source of air under pressure, a nozzle arranged in the casting and having an interior diameter corresponding to that of the pipe, the exterior of the surface of the nozzle being formed with a series of longitudinally ranging, inwardly inclined, shallow channels open to said concentric channel, and a directing ring overlying the delivery ends of the longitudinally ranging channels of the nozzle.

In testimony whereof I affix my signature.
CHARLES B. THOMPSON.