

W. T. SAIN.

DREDGE.

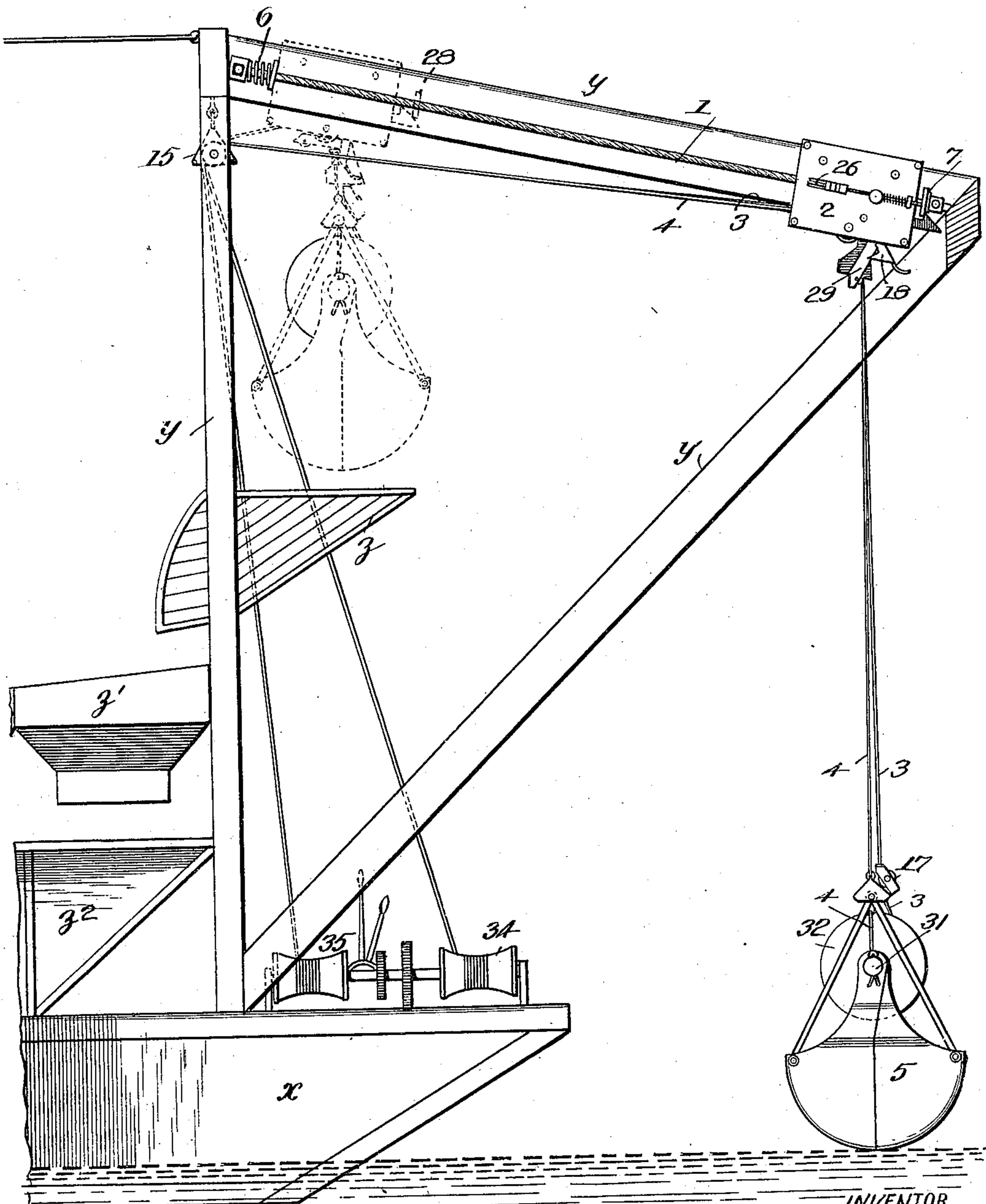
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Patented Feb. 7, 1911.

3 SHEETS—SHEET 1.

983,772.

Fig. 1.



WITNESSES

H. C. Barry  
Amos W. Hart

INVENTOR

WILLIAM T. SAIN

BY *Munn & Co.*

ATTORNEYS

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3 SHEETS—SHEET 2.

Fig. 2

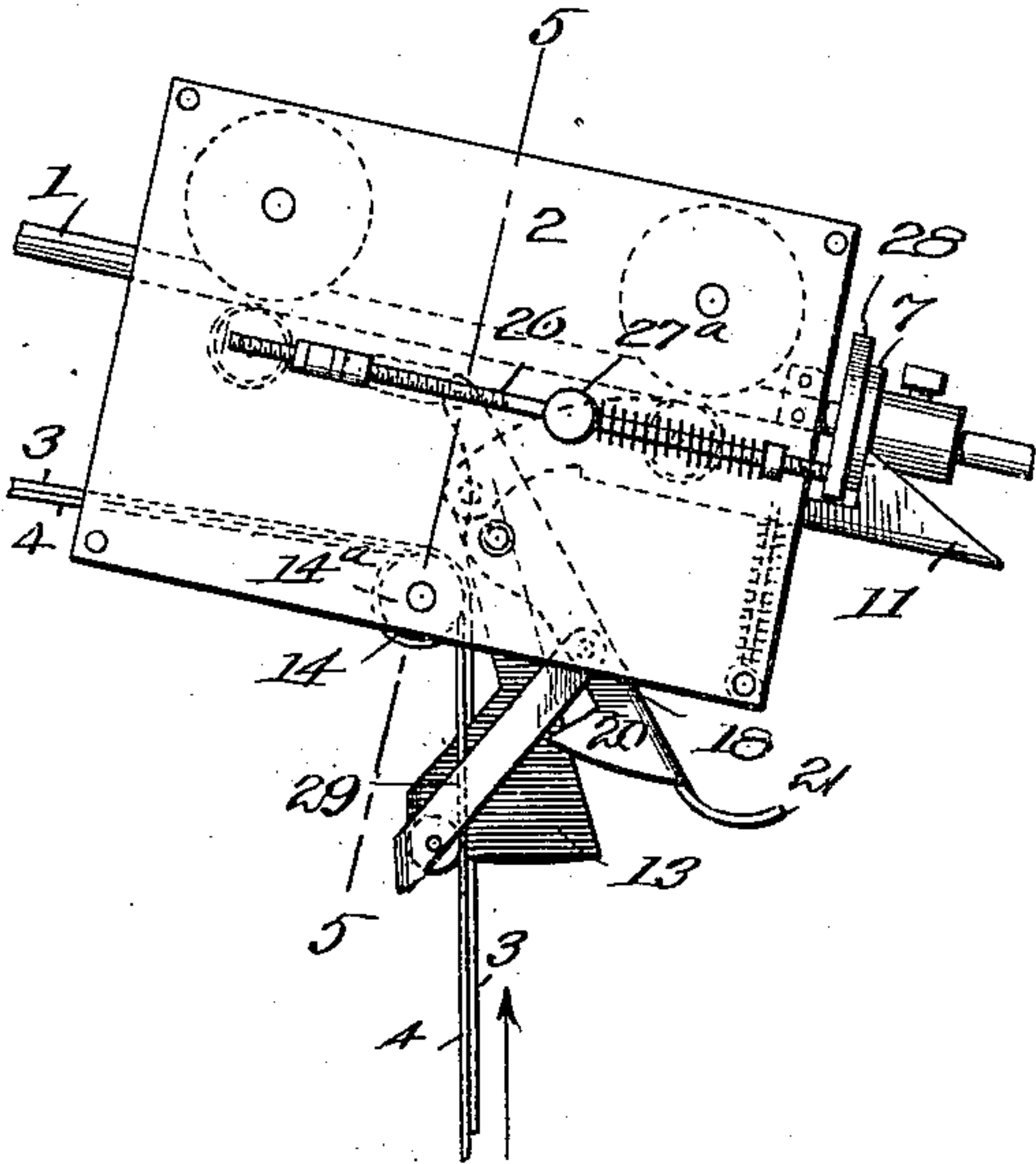


Fig. 3

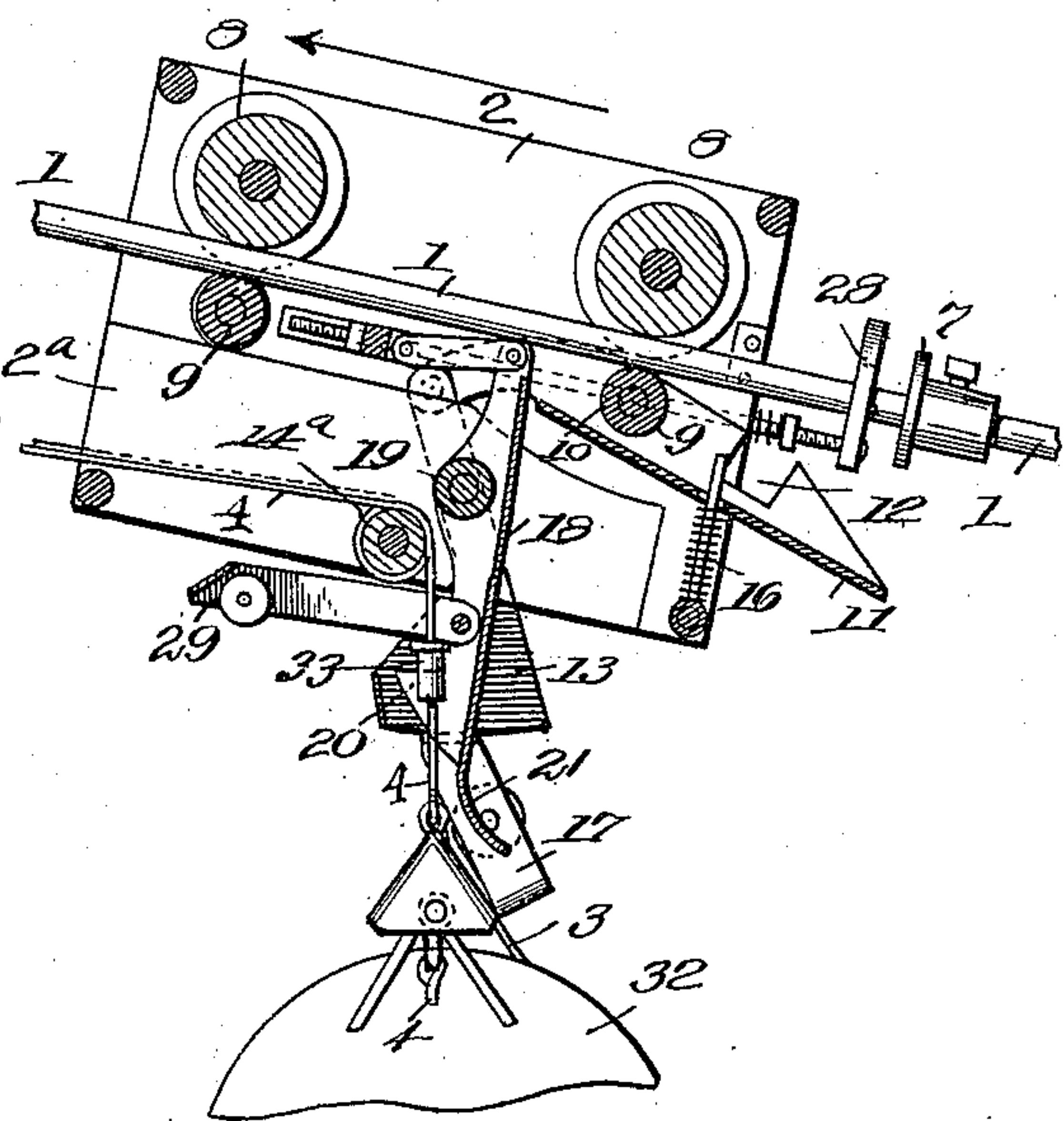


Fig. 4

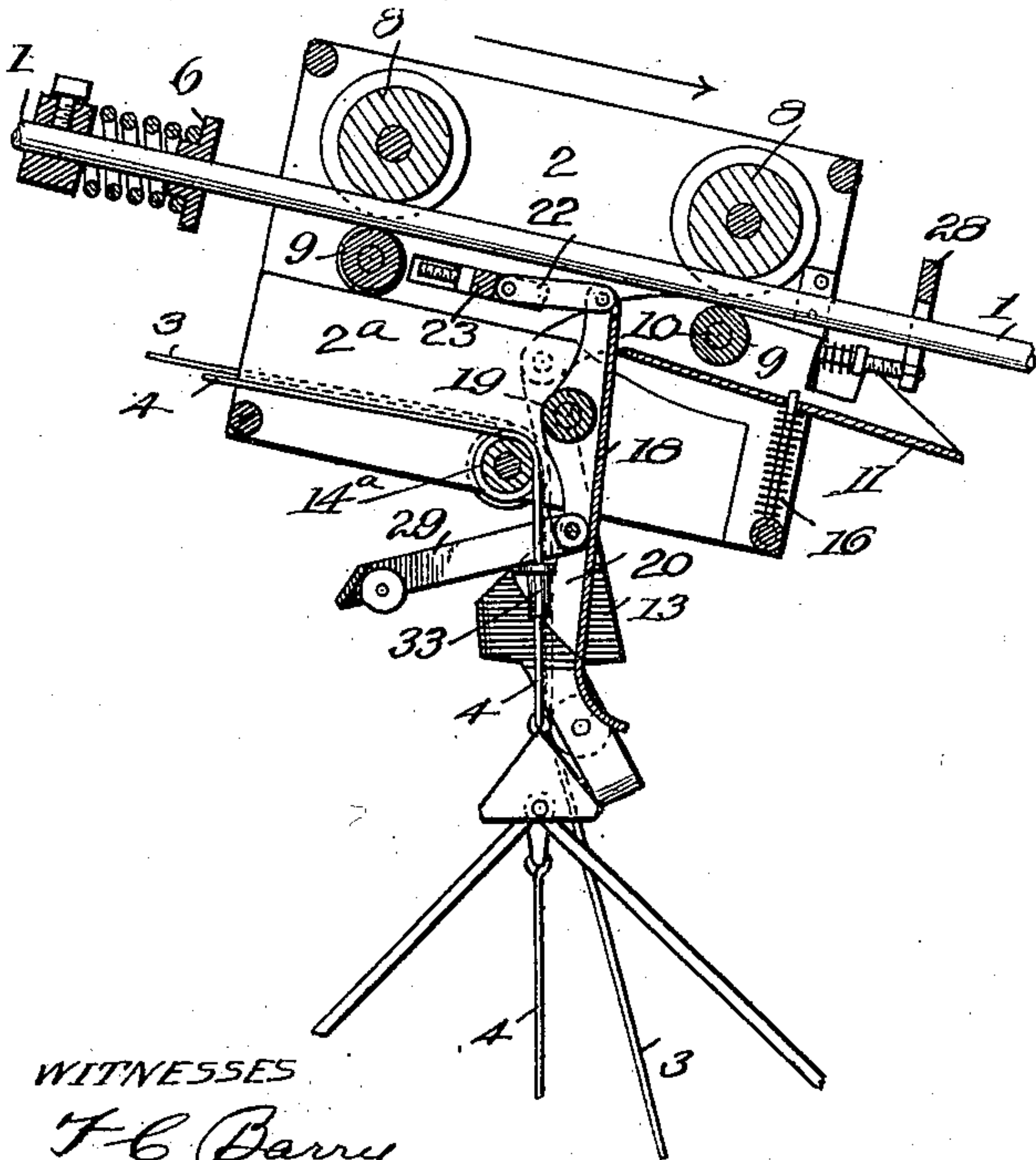
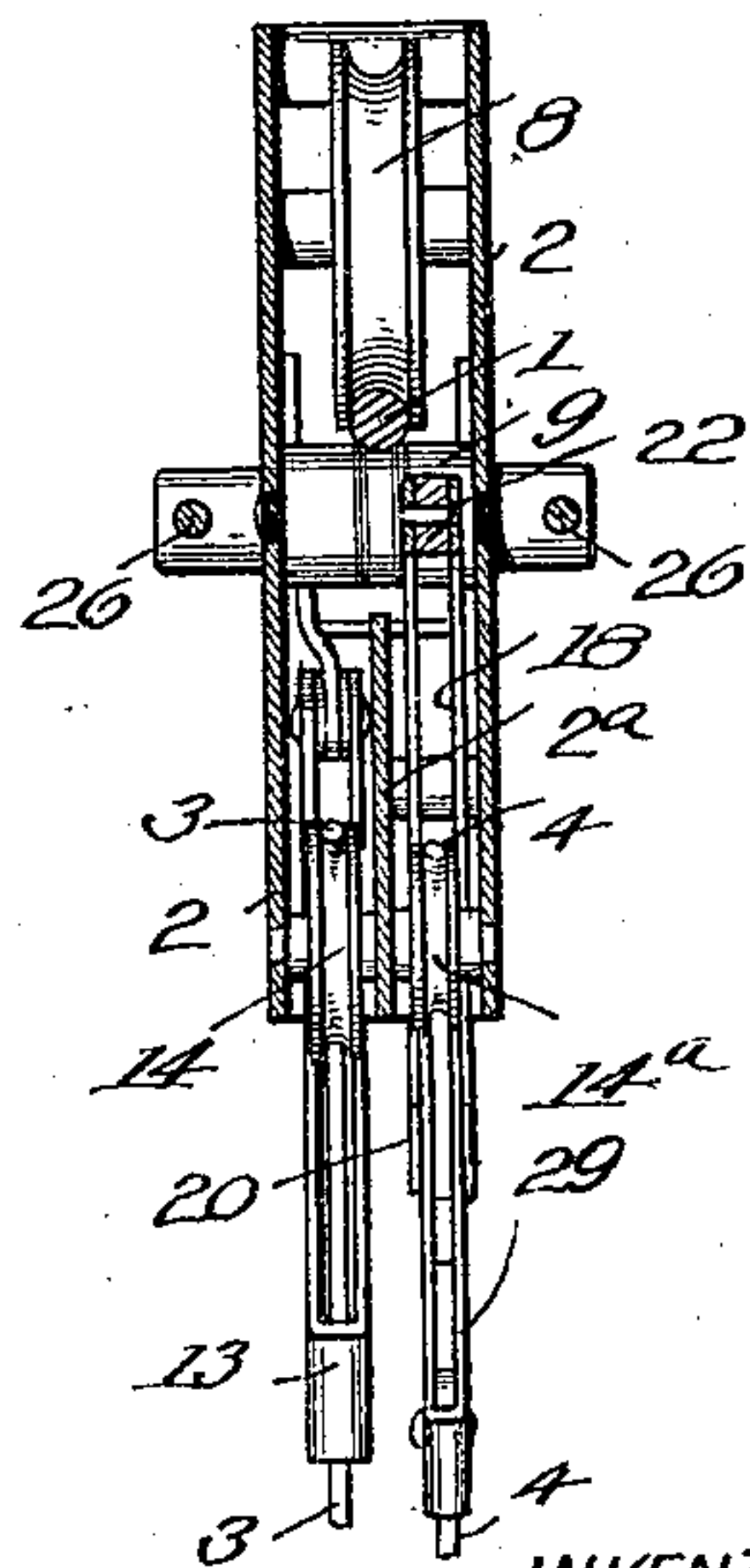


Fig. 5



WITNESSES

F. C. Barry  
Amos Hart

INVENTOR  
WILLIAM T. SAIN

BY Munn & Co.

ATTORNEYS

W. T. SAIN.

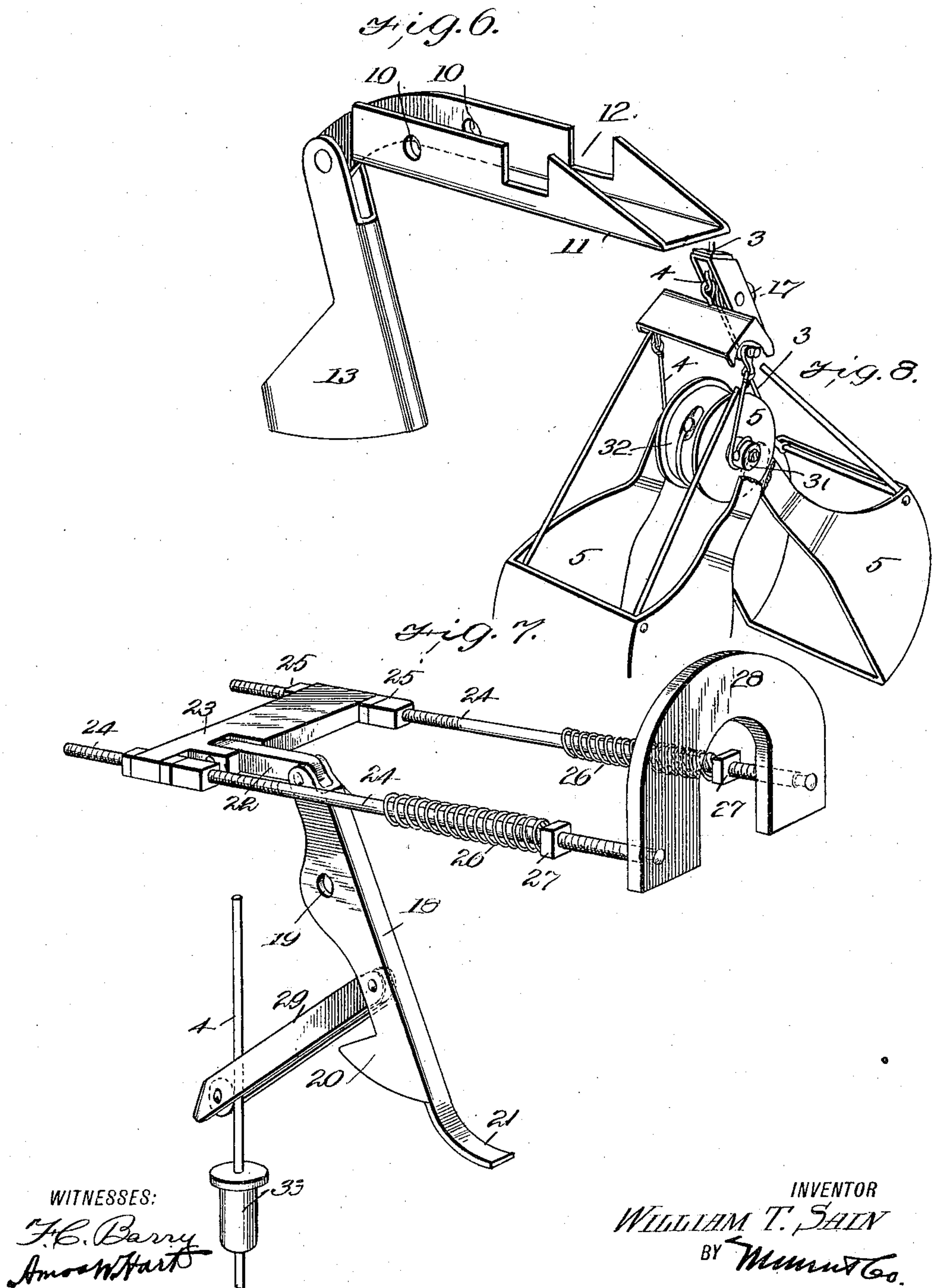
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3 SHEETS—SHEET 3.



WITNESSES:

*F. B. Barry*  
*Amos Hart*

INVENTOR

*WILLIAM T. SAIN*

BY *Mumford & Co.*

ATTORNEYS



# UNITED STATES PATENT OFFICE.

WILLIAM T. SAIN, OF SEATTLE, WASHINGTON.

DREDGE.

983,772.

Specification of Letters Patent.

Patented Feb. 7, 1911.

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*To all whom it may concern:*

Be it known that I, WILLIAM T. SAIN, a citizen of the United States, and a resident of Seattle, in the county of King and State of Washington, have invented certain Improvements in Dredges, of which the following is a specification.

My invention is an improvement in that class of dredges in which a clam-shell, or other form of, bucket is lowered and raised by a cable connecting with a carriage adapted to travel back and forth on a rope, cable, or other form of track.

My invention pertains particularly to devices connected with the carriage for temporarily locking it automatically at one end of the track, and for releasing it automatically when the bucket is raised; also to means connected with the carriage for supporting the bucket while dumping, and traveling back on the track.

The invention also includes other features as will be hereinafter described.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the entire apparatus, including a clam-shell bucket. Fig. 2 is a side view of the carriage locked in position at the lower end of the cable or track. Fig. 3 is a section of the carriage showing the same unlocked or released. Fig. 4 is a sectional view of the carriage showing the tripping cable supporting the bucket while the carriage travels back to the loading or original position. Fig. 5 is a vertical transverse section of the carriage and its attachments. Fig. 6 is a perspective view of the main latch or locking device, together with the trip bar attached to its inner end. Fig. 7 is a perspective view illustrating the bucket-carrying devices and the spring buffer operatively connected therewith. Fig. 8 is a perspective view of the bucket attachments.

In Fig. 1 is shown one end of a barge  $x$  provided with a framework  $y$  in which a cable 1 is arranged at a downward inclination and whereon a carriage 2 is adapted to travel, the same being operatively connected by means of cables 3 and 4 with a bucket 5, which, in this instance, is of the clam-shell form. A spring stop or buffer 6 is arranged at the upper end of the cable or track, and a fixed stop or buffer 7 is located at the lower end of the same. It is to be under-

stood that I may employ any form of track suitable for the purpose and that it may be arranged in any suitable manner and on any other form of structure which convenience or necessity may dictate. On the barge  $x$  a hopper  $z$  is provided into which the bucket may discharge, and said hopper serves to convey the sand, gravel, or other material raised by the bucket into a spout  $z'$  from which it discharges into a bin  $z^2$ . These features, however, constitute no part of my present invention.

The carriage 2, which is shown relatively enlarged beyond its normal proportions, is composed of a frame formed of two parallel side plates connected at the corners by means of cross-bolts. In the upper portion of the carriage there are arranged two grooved sheaves, or rollers, 8 which run on the cable or track 1, and directly below them, on the under side of the cable, are two smaller rollers 9, which serve to hold the upper sheaves 8 on the track. In the lower end of the carriage 2 there is pivoted at 10 a device 11, which is in the nature of a latch, its outer end being sloped or pointed to adapt it to run up on the flange of the stop or buffer 7. It is also provided with a notch 12 which the flange of the stop enters, as shown in Figs. 1 and 2, whereby the carriage is locked to the stop. The inner end of the latch 11 is extended beyond its pivot 10—see especially Fig. 6—and a trip device 13 is pivoted to and pendent therefrom. This is constructed hollow to adapt it to serve as a guide for the bucket-hoisting rope 3, which passes through it, then over a sheave or pulley—see Fig. 5—and thence to and over a lead block 15 arranged adjacent to the upper stop or buffer 6. A spiral spring 16—see Figs. 3 and 4—is arranged under the outer portion of the latch 11 and is applied to a guide-pin in such manner as to press the latch upward so as to hold it normally in the position indicated in Fig. 2, or, in other words, in position for automatic engagement with the flange of the stop 7. It will now be apparent, that when the bucket 5 is raised, the attachment 17 thereof will strike the lower end of the trip 13, whereby the inner end of the latch 11 will be raised and consequently its outer end lowered, as shown in Fig. 3, whereby it will be automatically released from engagement with the stop 7;



thus, the carriage being unlocked or released, is left free to travel up the cable or track 1, as will be further described.

Within the carriage 2 and in the lower middle portion of the same, there is pivoted a device 18 which serves as a bucket-carrier or supporter while the bucket is being dumped, and also while it is traveling back from the dumping position down to the loading position. The device 18, which is pivoted at 19, is in the nature of a bar provided on the rear side with shoulders 20—see especially Fig. 7—and its lower end 21 is curved forward as shown. Its upper end is extended above its pivot 19 and connected by a link 22 with a cross-bar 23, which connects two parallel screw-threaded rods 24—see especially Fig. 7. These rods are arranged on the outside of the carriage frame 2 and the cross-head extends through longitudinal slots in the side plates, as will be readily perceived. Nuts 25 are applied to the threaded rods 24 and serve for adjusting the position of the cross-bar 23 thereon. Spiral springs 26 are applied to the rods, and they may also be adjusted to vary their tension by means of nuts 27. Their inner ends abut stops 27<sup>a</sup> fixed on the sides of the carriage and serving also as guides for the rods. The forward ends of the screw-rods 24 are secured to a U-shaped plate 28, which straddles the track 1 and is adapted for contact with the stop or buffer 7. When the load of the bucket has been dumped and the carriage is returning to the loading position, the parts assume the position shown in Fig. 4, the bucket-carrier 18 being then in practically vertical position; but when the latch 11 engages the stop 7, the buffer plate 28 strikes it at the same time and pushes back the cross-bar 23 against the tension of the springs 26, and the cross-bar, through its connection with the bucket-carrier 20, throws the latter into the forwardly inclined position indicated in Figs. 2 and 7, by which the bucket is automatically released, as will be further described. A pulley or roller may be applied to the pivot 19 of the bucket carrier 18, to relieve friction in case the rope should come in contact with it.

A rope guard and guide 29 consisting of a slotted bar is pivoted to the bucket-carrier 18, at a point just above its shoulders 20, and the same is provided at each end with a roller to relieve friction on the tripping rope 4 that passes through it. Both the hoisting and tripping ropes 3 and 4 pass over pulleys 14 and 14<sup>a</sup> arranged in the lower portion of the carriage adjacent to the bucket carrier 18—see Fig. 5.

The axle or shaft 31—see Fig. 1—whereon the jaws of the clam-shell bucket 5 swing, serves also as the journal of a heavy flanged roller 32, and the hoisting rope 3 passes

around this roller, while other ropes are wound around its hub and connected with the upper portion of the bucket frame. The tripping rope 4 is connected with the head of the frame and has no connection with the aforesaid roller. If the bucket be supported by the tripping rope 4 and the hoisting rope be released, the weight of the roller 32 will cause it to descend and thus carry down the axle or shaft 31 of the jaws of the bucket so that it will be opened. It is in this position that the bucket descends into the water or to the material which is to be removed.

Let it be supposed that the carriage is to be locked with the lower stop 7, as shown in Fig. 1; then by hauling on the hoisting rope 3 until the wheel 32 is raised sufficiently to cause the jaws of the bucket to close, tension is next applied to both ropes 3 and 4 together, and the bucket is raised. It will be understood that at this time the parts are in the position indicated in Fig. 2. When the bucket is raised high enough to bring the head of its frame in contact with the trip bar 13, the latch 11 will be released from the stop 7, and, traction on the ropes being continued, the carriage, carrying the bucket with it, will be hauled up the cable or track 1 until it strikes the spring buffer 6. Then, tension on the ropes being relaxed, a device 33, attached to the tripping rope 4, descends and rests upon the shoulders 20 of the bucket-carrying bar 18. This device is in the nature of a cylinder having a flanged head, the body of the cylinder being adapted to pass between the shoulders 20 and the flange being wide enough to engage and rest upon them. The bucket being thus supported by the carrier 18, which is at this time in a vertical position as in Fig. 4, and the hoisting rope being further relaxed, the flanged wheel 32 rotates and descends so as to open the bucket, and thus cause its load to be discharged. Tension on the tripping rope being next released, the carriage is no longer held at the upper end of the track 1 and descends by gravity, as indicated by arrow in Fig. 4, the device 33 still holding the empty bucket supported close to the carrier 18. It will be observed that the said support for the bucket can be operated only when the bar 18 is practically vertical. When the carriage reaches the lower end of the cable, the latch 11 engages the stop 7, and thus the parts are thrown into the position indicated in Fig. 2. That is to say, the spring buffer 28, through its connection with the screw-rods 24 forces the cross-bar 23 back, and thus the bucket-carrier 18 is thrown into the forwardly inclined position indicated in Figs. 2 and 7, and consequently the device 33 slides automatically off the shoulders 20 of the bucket-carrier 18, so



that the bucket is left free to descend for another load.

By reference to Fig. 3, where the bucket is shown raised, it will be seen that the device 33 before referred to is in contact with and supports the slotted guide 29; but when tension on the tripping rope 4 is relieved, the guide 29 descends to the position indicated in Fig. 4, and rests upon the flanged head of the device 33, whereby it assists to some degree in holding the said device engaged with the shoulders 20 of the carrier 18. The curved lower end 21 of the bucket-carrier 18 comes in contact with the head of the bucket frame when the latter is elevated, as will be understood by reference to Fig. 3. It has no other function.

As shown in Fig. 5, a thin plate 2<sup>a</sup> is arranged midway between, and parallel to, the sides of the carriage frame 2, and serves as a partition separating the hoisting and tripping ropes and their pulleys from each other, so that there is no liability of interference of the ropes.

It is to be understood that the ropes 3 and 4 will be connected with suitable means for winding them on and releasing them. In this instance, drums 34 and 35 are shown arranged on the bow of the barge for this purpose.

What I claim is:—

1. The combination, with a downwardly inclined track and a stop thereon, of a carriage traveling on the track, a latch pivoted in the carriage, a pendent bar having its lower end shouldered and adapted when held in a vertical position for carrying a bucket while the carriage travels back to the loading position, of a spring buffer slidable in the carriage and adapted for contact with the said stop, and a link connecting the upper end of the bucket-carrying bar with the rear extension of the buffer, whereby when the carriage reaches the lower limit of its travel the bucket is automatically released, substantially as described.

2. The combination, with a downwardly inclined track and a stop thereon, of a carriage traveling on the track, a bucket, a trip rope connected therewith and passing through the carriage, a pivoted bar adapted to engage the trip rope for temporarily supporting the bucket during the return move-

ment of the carriage, and a spring trip and buffer attachment comprising a plate for striking the stop, screw-threaded rods connected with said plate, a cross-bar connecting the rods, nuts applied to the threaded portions of the rods, and springs interposed between the nuts and fixed portions of the carriage frame, substantially as described.

3. The combination, with a downwardly inclined track and a stop thereon, of a carriage adapted to travel on the track, a pivoted latch adapted to automatically engage the stop, a trip bar pendent from the inner end of the latch and adapted when the bucket is raised for contact therewith, whereby the latch is tripped when the carriage is released, a hoisting rope for raising the bucket, a trip rope also connected with the bucket, a bucket-supporting bar pivoted in the carriage and adapted for temporary engagement with the trip rope, a movable buffer attachment operatively connected with the bucket-supporting bar for throwing it in position to release the bucket at the limit of the return movement of the carriage, and a slotted guide pivoted to such bar and through which the trip rope passes, substantially as described.

4. The combination, with a downwardly inclined track and a stop fixed thereon, of a carriage adapted to travel on the track, a latch pivoted in the carriage and automatically engaging the stop, a bar pivoted to and pendent from the inner end of the latch, a bucket and a hoisting rope passing through the carriage, the arrangement being such that when the bucket is raised it comes in contact with said bar and trips the latch, thus releasing the carriage, a bucket-supporting bar pivoted in the carriage and provided with shoulders, a trip rope attached to the bucket and having a device for engagement with said shoulders, a spring buffer attachment arranged on the carriage and operatively connected with the bucket-carrying bar, and a slotted guide pivoted to the latter and provided with rollers to relieve friction with the trip rope, substantially as described.

WILLIAM T. SAIN.

Witnesses:

R. S. BLOSS,  
S. H. MELROSE.