

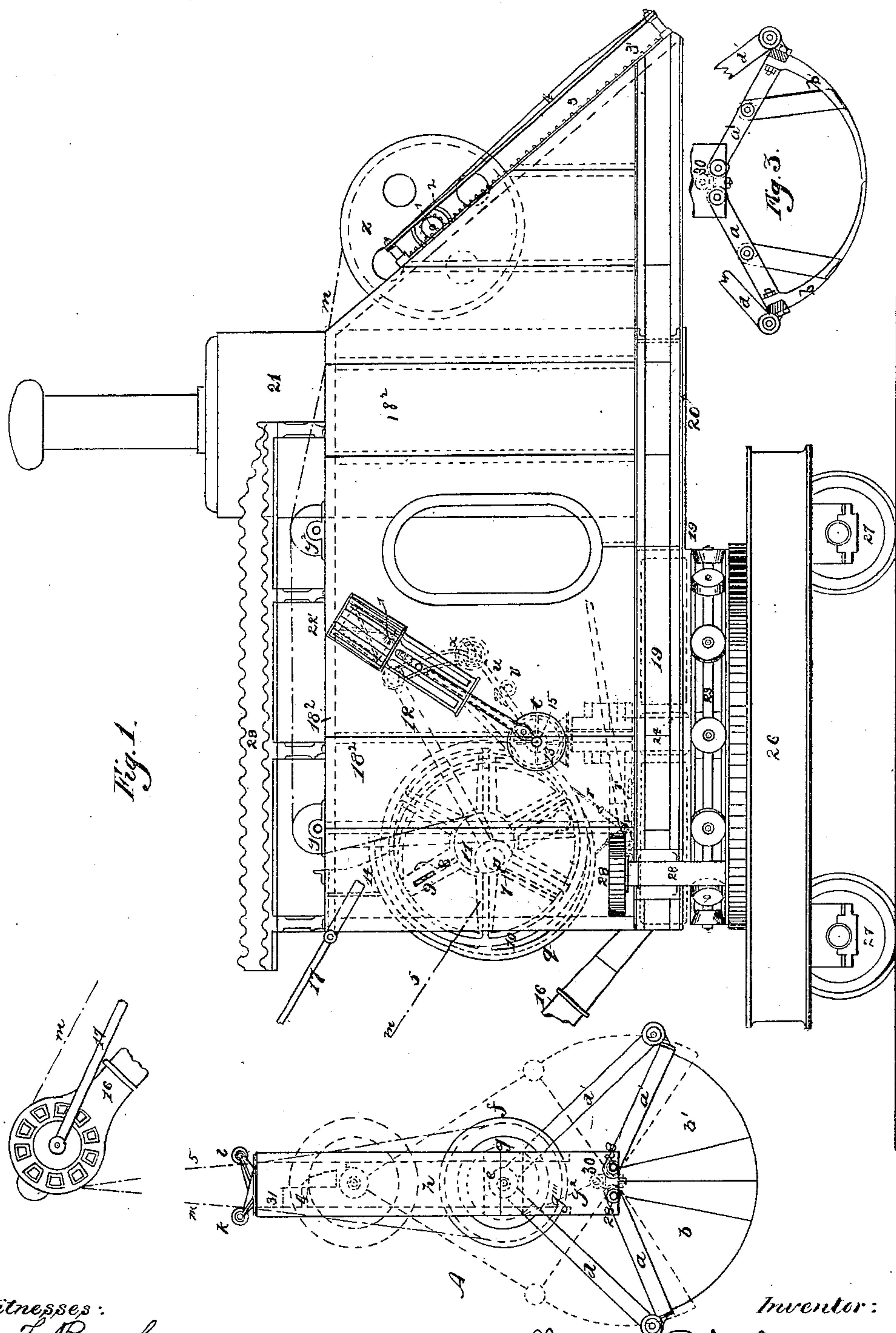
(No Model.)

3 Sheets—Sheet 1.

C. W. MACLEAN.

COUNTERBALANCE ATTACHMENT TO GRAB OPERATING MECHANISM.
No. 270,598.

Patented Jan. 16, 1883.



Witnesses:
M. F. Boyle.
H. A. Johnstone.

Inventor:
Charles W. Maclean
by his attorney
T. S. Peterson

3 Sheets—Sheet 2.

COUNTERBALANCE ATTACHMENT TO GRAB OPERATING MECHANISM.
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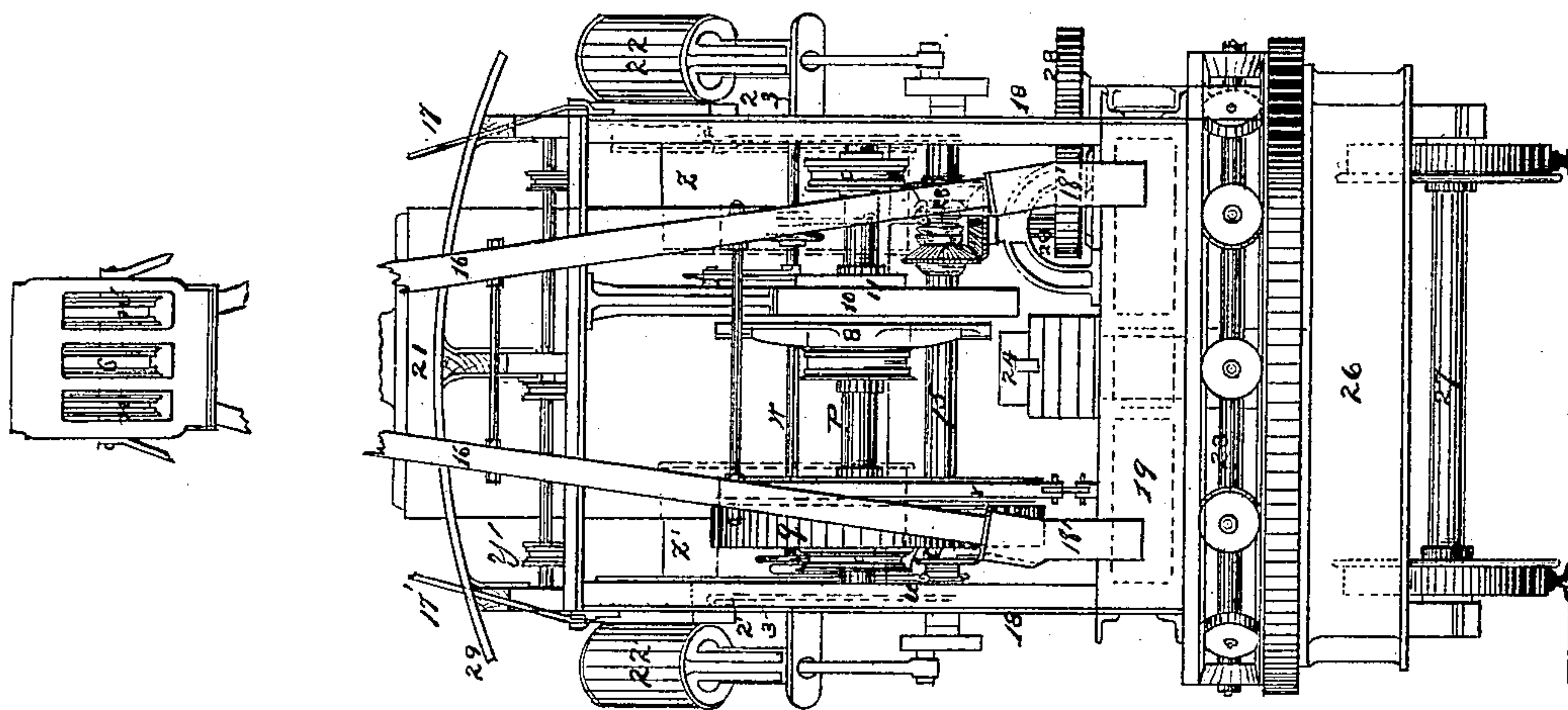


Fig. 4:

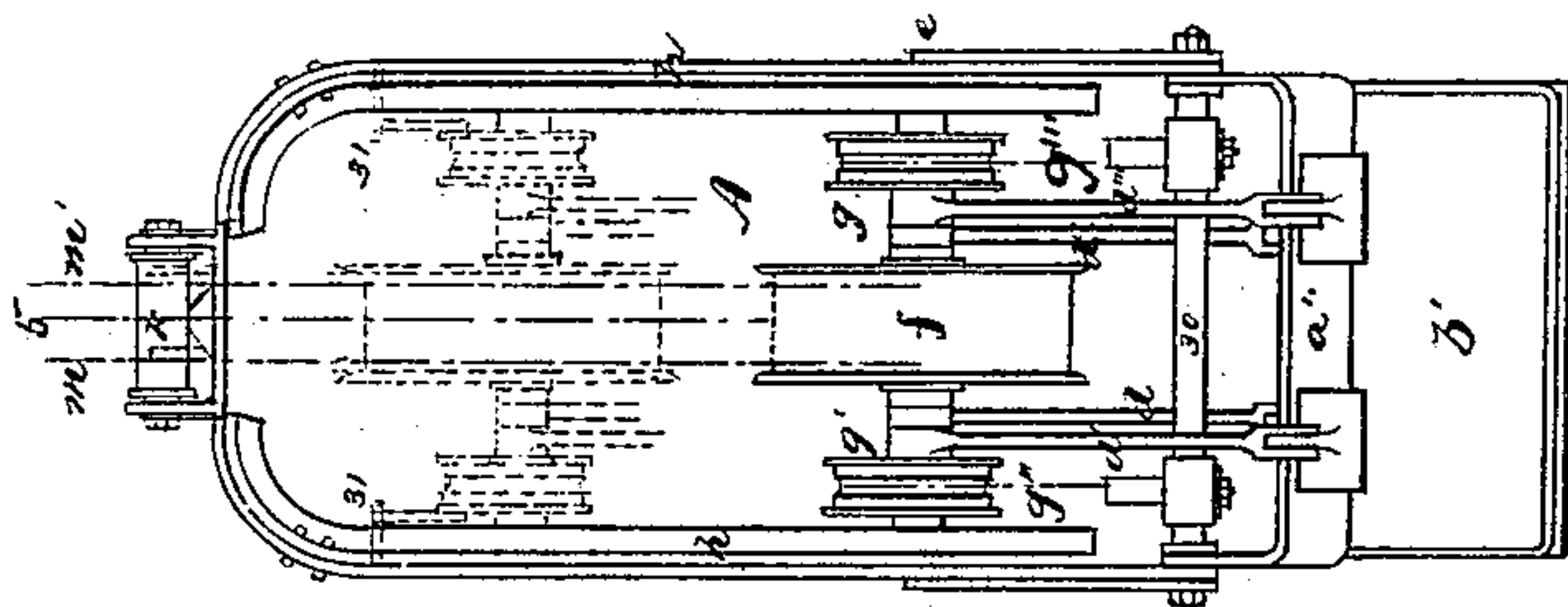


Fig. 2.

Inventor :

B. E. D. Stafford.
J. Livingston Seymour

Charles W. Mackean
by his attorney,
J. D. Stetson

(No Model.)

3 Sheets—Sheet 3.

C. W. MACLEAN.

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Fig. 5

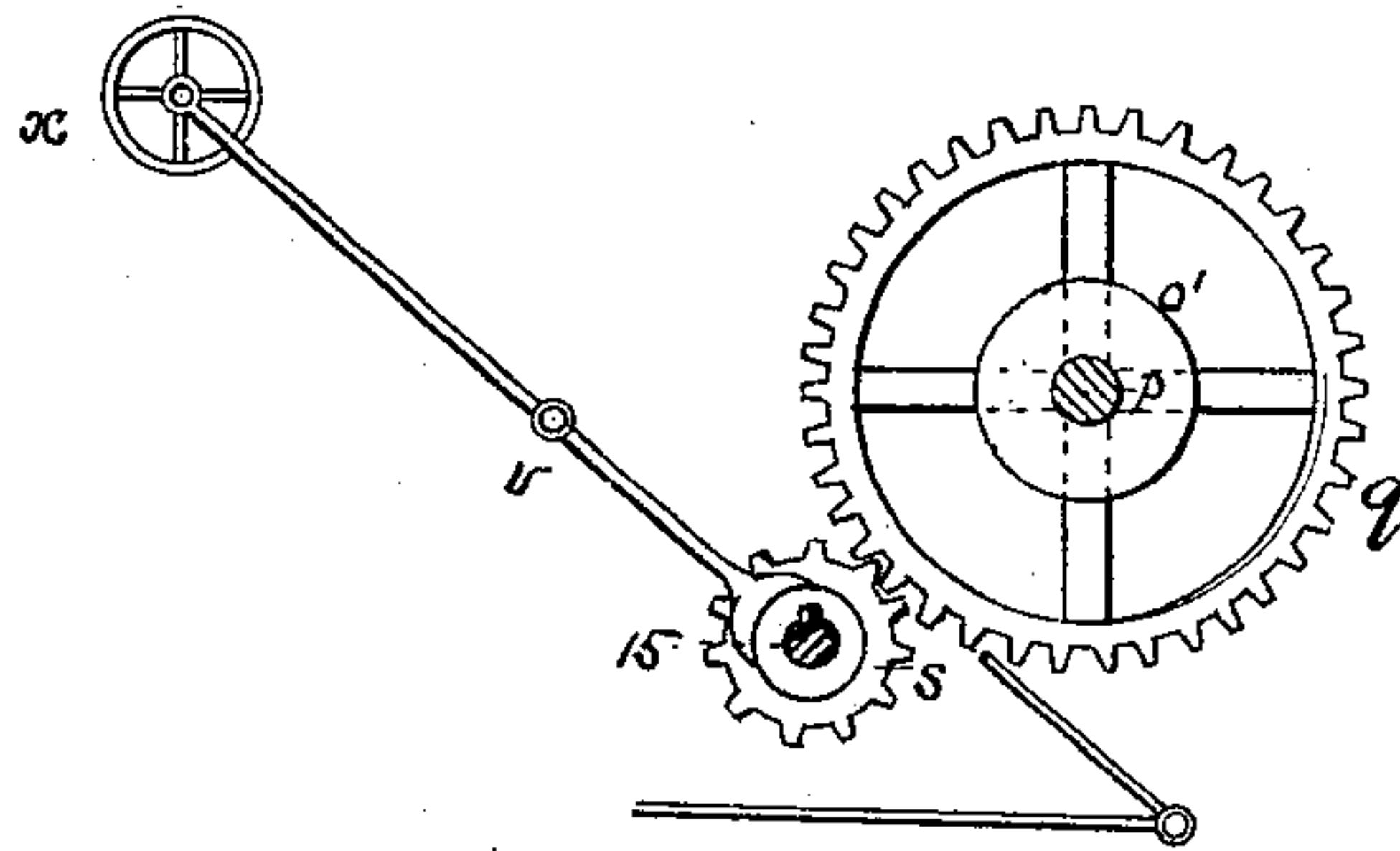


Fig. 6

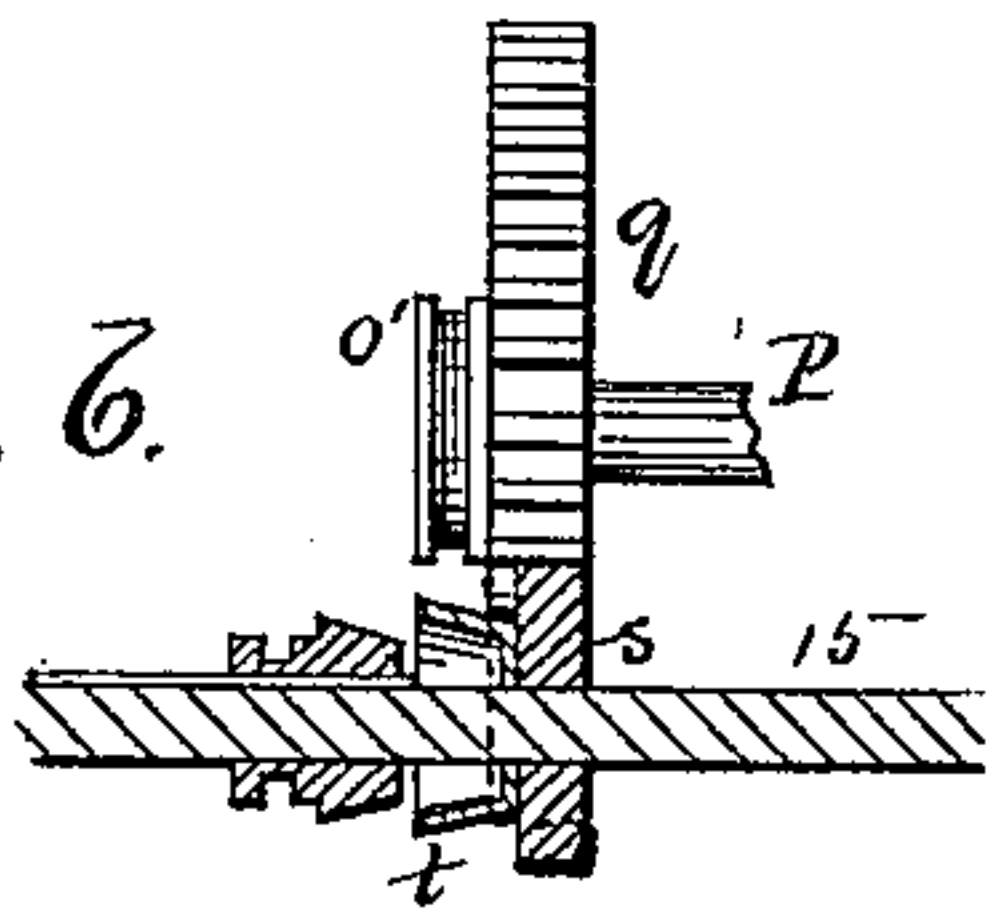
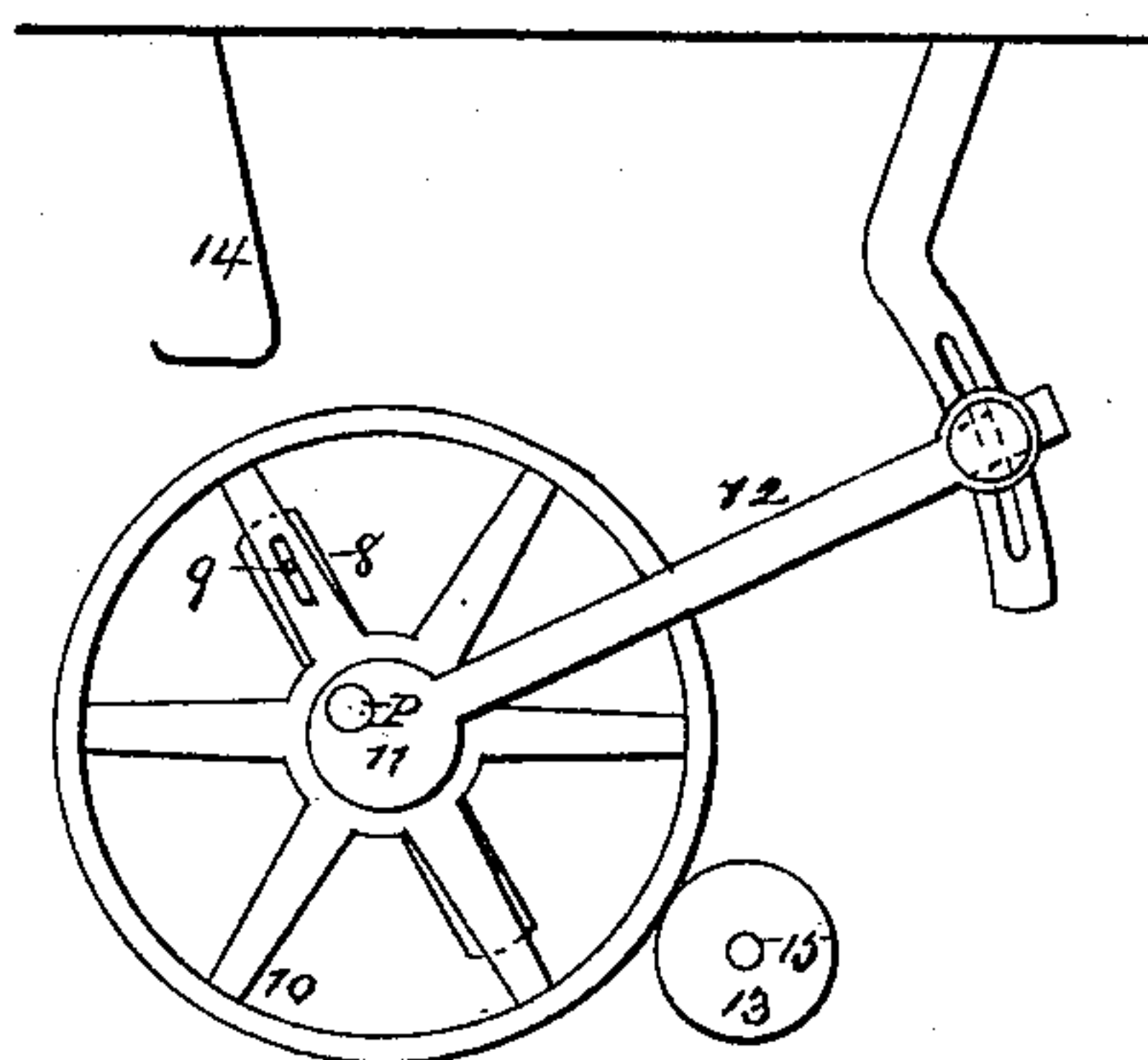


Fig. 7



Attest:
Oakland Boyle
Charles C. Stetson

Inventor:
Charles W. Maclean
By his attorney
Thomas D. Stetson

UNITED STATES PATENT OFFICE.

CHARLES W. MACLEAN, OF MELBOURNE, VICTORIA.

COUNTERBALANCE ATTACHMENT TO GRAB-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 270,598, dated January 16, 1883.

Application filed March 11, 1882. (No model.) Patented in Victoria August 11, 1881, No. 3,057.

To all whom it may concern:

Be it known that I, CHARLES WILLIAM MACLEAN, of the city of Melbourne, in the British Colony of Victoria, engineer, have invented certain new and useful Improvements in Self-Acting Grabs for Dredging-Machines, and in the Devices used for Operating the Same, of which the following is a specification.

My invention relates to the mechanism through which the grappling portion of the grab receives the necessary motions for opening and closing, hoisting and lowering. I employ counterbalance-barrels supported on pinions running in racks at the back of the frame, instead of the ordinary counterbalance-weight.

The accompanying drawings form a part of this specification and illustrate the invention.

Figure 1 is a side view of the dredging-machine with my grab and counterbalance-barrel attached. Fig. 2 is a front view of the grab. Fig. 3 is a side view of the lower portion of the same. Fig. 4 shows a front view of the dredging-machine. (In Figs. 1 and 4 the jib-arms 16 are shown broken to accommodate the views to the space on the sheets.) Figs. 5, 6, and 7 are details, which will be hereinafter referred to.

Similar letters and figures of reference indicate corresponding parts in all the views.

A is the grabbing device. It is composed of the frame *h*, which has a race or way on the inside, in which slides the moving shaft of the grab mechanism. At the top of the frame guide-rollers *k l* are provided, between which the operating-chains pass. Near the top of the ways, on the interior of the sides of the frame, are provided stops 31 for limiting the ascension of the moving shaft.

a a' are pivoted jaws, turning upon fixed centers 28.

b b' are half-buckets, as shown in Fig. 2, or forks, as shown in Fig. 3, which take hold upon the material to be taken up. These parts *b b'* are secured to the jaws *a a'*, respectively.

d d' d'' d''' are links which connect the jaws with a traveling and rotating shaft, *e*, which moves in the ways in the frame *h*. A central pulley, *f*, of considerable size, is secured to the shaft *e*. Near the ends of the shaft two warping-pulleys, *g g'*, are attached thereto. Warp-

ing-chains *g'' g'''* are each secured at one end to their respective pulleys *g g'* and at the other to the fixed pivot 30, located at that point in the frame where the jaws swing. It is evident that by elevating or depressing the shaft *e* the jaws will be opened or closed. This operation is performed by means of the mechanism about to be described.

The hoisting-chains *m m'* are secured to the pulley *f*, and wound in the same direction. From the pulley *f* they are led up between the guide-rollers *k l*, over the jib-pulleys *n n'*, (see Fig. 4,) thence down to the hoisting-pulleys *o o'*, which they encircle on the shaft *p* of the machine. Thence the chains run up over the loose pulleys *y y' y''*, and are attached to the counterbalance-drums *Z Z'*. The shaft *p* is fitted with a driving-wheel, *q*, which is stopped by a brake, *r*. The wheel *q* is operated from the engine-shaft 15 by means of a gear, *s*, loose upon the shaft 15, and caused to transmit motion by means of the cone-clutch *t*, (see Figs. 5 and 6,) which is operated by the lever *u*, (see Figs. 1 and 5,) pivoted at *v*, and moved in one direction or the other by means of the nut and hand-wheel *x*, which works on a transverse screw-rod. By this means the hoisting-chains are operated at will.

The counterbalance-barrels *Z Z'*, to which the inner ends of the chains *m m'* are respectively attached, are mounted upon the shaft 1, which is supplied with pinions 2 2', gearing into the inclined racks 3 3'. The racks are provided with guards 4 4', to keep the shaft in place and the pinion in gear with the rack. As the chains are drawn in to elevate and open the jaws *a a'* the barrels *Z Z'* descend the incline and roll up the chains, as they are kept revolving continually during their descent and ascent by the action of the pinions. When the chains are to be given off again the barrels revolve in the opposite direction and ascend the inclined rack to unroll and give off the chains. This insures a perfect action of the chains. It assists in hoisting them and offers no resistance to the lowering of the grab.

The lowering-chain 5 is secured to the pulley *f* and wound round it in a direction opposite to that of the chains *m m'*. From this pulley

it passes up between the guide-pulleys $k\ l$ to the central jib-pulley, 6, thence down to the barrel 7 on the shaft p . This barrel is loose upon the shaft p , and is provided with a carrier, 8, having a pin, 9, projecting into a slot in the friction driving-wheel 10. This wheel 10 runs free on a loose eccentric, 11, which is turned in one direction or the other (see Fig. 7) to throw the wheel 10 into or out of contact with the wheel 13 on the engine-shaft 15. By means of this mechanism the barrel 7 is operated at will. When the wheel 10 is thrown out of contact with the engine-shaft wheel 13 it comes against a brake, 14, and is stopped. The eccentric 11 is operated by a hand-lever, 12, which may be secured in a position to give greater or less frictional contactor to entirely throw the parts out of gear.

The jib-pulleys $n\ n'$ 6 are held in the head supported on the outer end of the jib-arms 16. These arms are tied to the frame by braces 17 17', and rest in sockets 18 18' on the frame.

From the engine-cylinders 22 22' power is derived to drive the shaft 15 and operate the machine.

20 is the water-tank, and 21 the boiler.

The platform of the machine is provided with a roller-path, 19, which turns upon a set of rollers known as "Sneaton's ring," as at 23. It revolves about a center post, 24. A lower roller-track is provided on the truck 26.

Power to operate the machine and cause it to turn, as just described, is transmitted through the gearing shown at 28, or in any other suitable way.

The machine is inclosed by the side plates, 18², and roof 29.

When the grab is resting in the position shown in dotted lines in Fig. 4 upon the material to be lifted with the jaws open, it is closed by drawing upon the hoisting-chains $m\ m'$, which, being wound round the pulley f , cause the warping-pulleys $g\ g'$ to revolve and wind up the chains $g''\ g'''$, thus drawing down the shaft e . This, acting through the links $d\ d'\ d''\ d'''$, closes the grab. During this time the lowering-chain 5, being free, is given off to accommodate the depression of the shaft e . The pulling upon the hoisting-chains $m\ m'$ being continued after the jaws are closed, the grab, with its load held securely by the closed jaws and buckets or forks $b\ b'$, is lifted to the desired height, the machine turned in the direc-

tion desired, and the load dumped. During all the taking in of the hoisting-chains the barrels $Z\ Z'$ descend the incline and revolve to take in the slack. In dumping the load the opening and lowering chain is drawn upon. It lifts the shaft e in the frame h , unwinds the warping-chains, and opens the grab. When the grab is dumped it remains suspended by both the hoisting-chains $m\ m'$ and the opening-chain 5. The chains $m\ m'$ are always acted on by the barrels $Z\ Z'$, and all the brakes being off the grab will descend easily and quietly.

It will be understood that the chains are operated at will by the gearing above described.

The action of the counterbalance-barrels is such as to assist in the operations rather than retard, as the counterbalance-weight does in other machines. The action of the barrels is steady and regular. That of the weight is spasmodic and uncertain.

The grab can be raised either in an open or closed position in consequence of the arrangement of the chains and barrels. Both the hoisting-chains $m\ m'$ and the opening-chain 5 unite in sustaining the weight of the grab, either when loaded or after it is dumped.

Having thus described my invention, what I desire to claim and secure by Letters Patent is—

1. In a dredging-machine or grab, a traveling shaft working vertically in guides in the framing, in combination with the opening and closing chains attached thereto, and with warping-chains connecting the traveling shaft with the fixed jaw-pivot, and with counterbalance-barrels attached to the rear end of the opening and closing chains and working in inclined ways, substantially as set forth.

2. In a dredging machine or grab, the combination, with the hoisting-chains, of the counterbalance-barrels $Z\ Z'$, substantially as set forth.

3. In a dredging-machine, the combination, with an elevating means for the grab, of the counterbalance-barrels $Z\ Z'$, provided with the pinions 2 2', and with the inclined rack 3 3', substantially as set forth.

C. W. MACLEAN.

Witnesses:

EDWD. WATERS,
W. S. BAYSTON.