

No. 627,217.

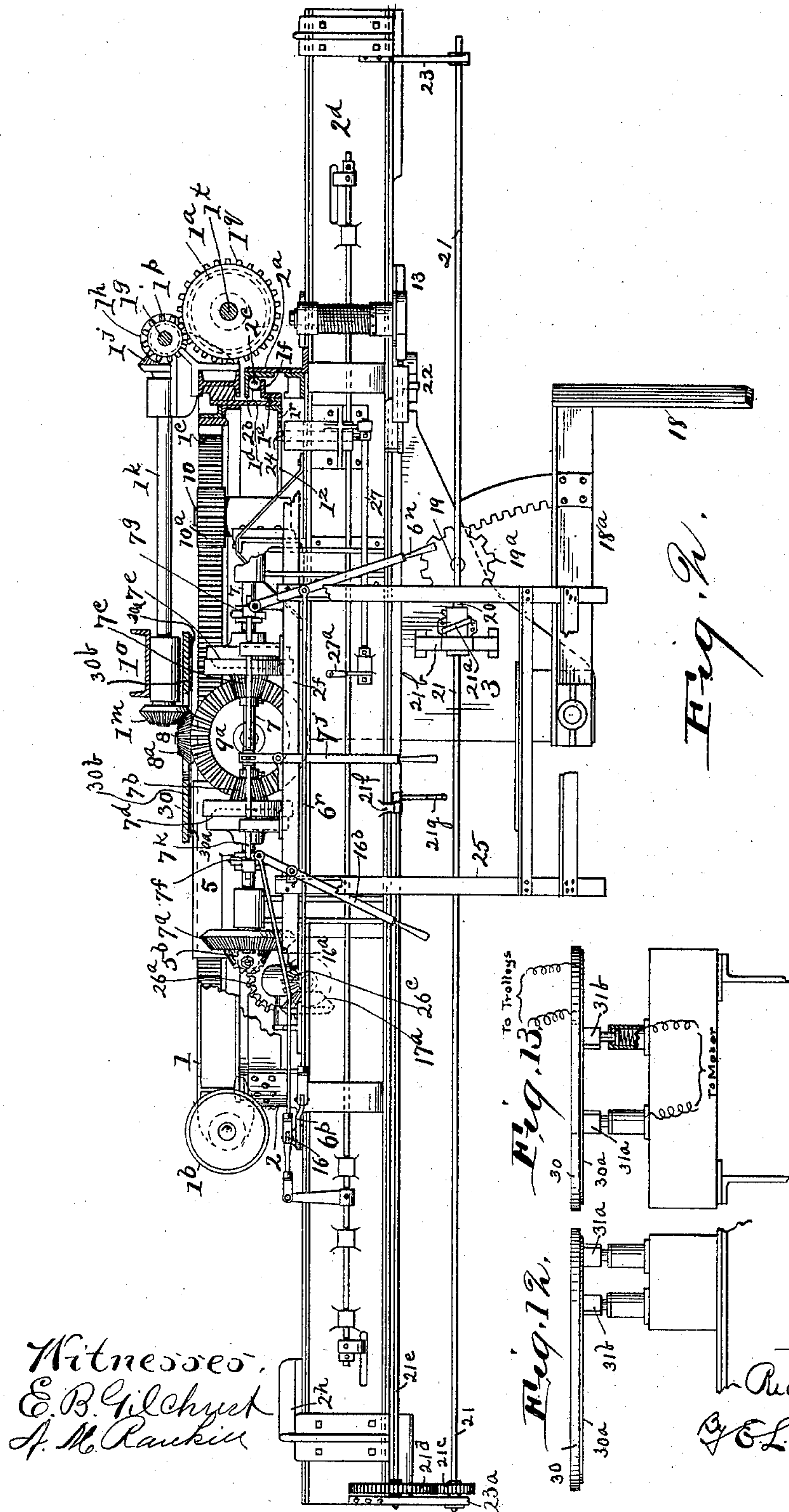
Patented June 20, 1899.

R. THEW.
VESSEL TRIMMER.

(Application filed Jan. 29, 1897.)

(No Model.)

5 Sheets—Sheet 2.



Witnessed:
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5 Sheets—Sheet 3.

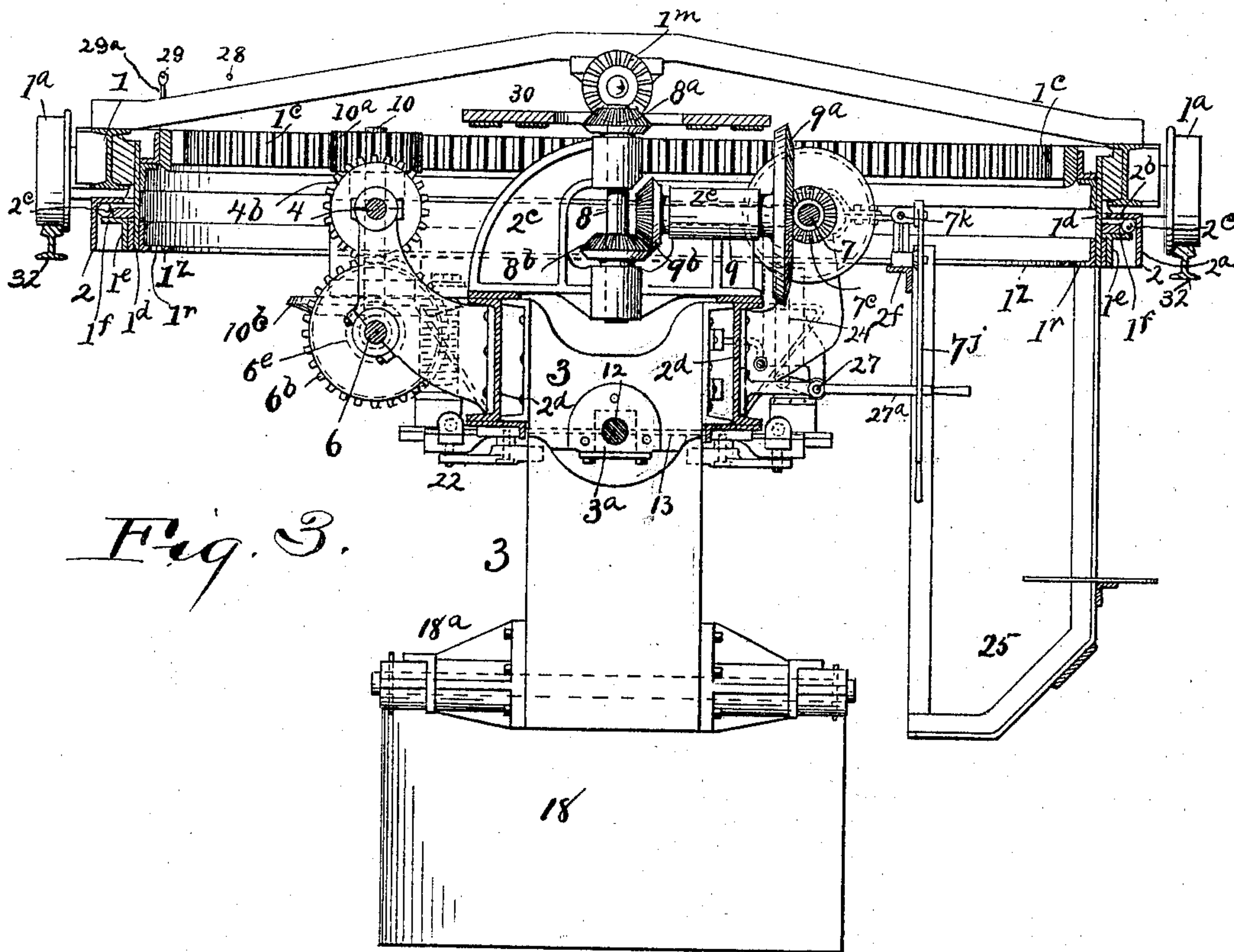


Fig. 3.

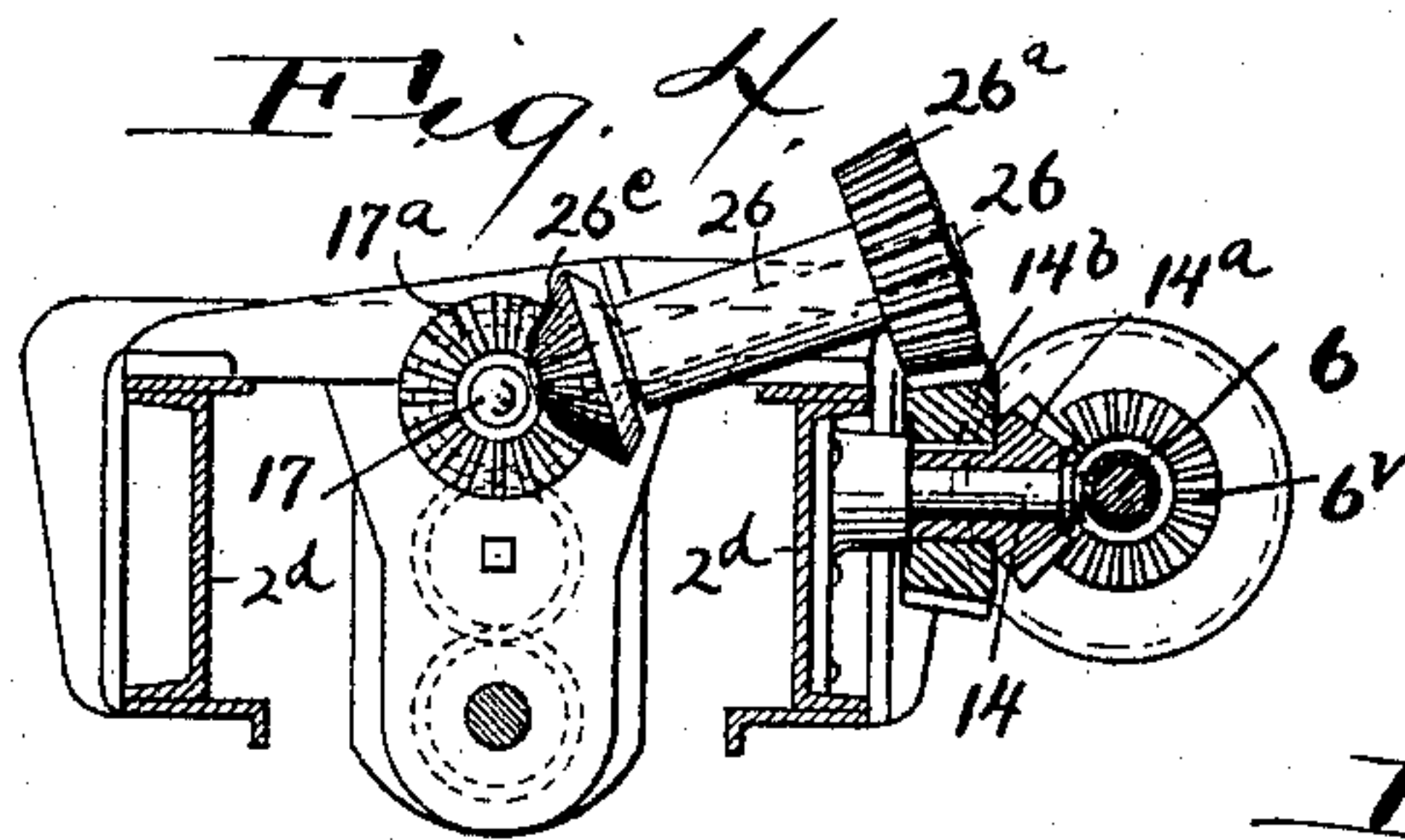


Fig. 4.

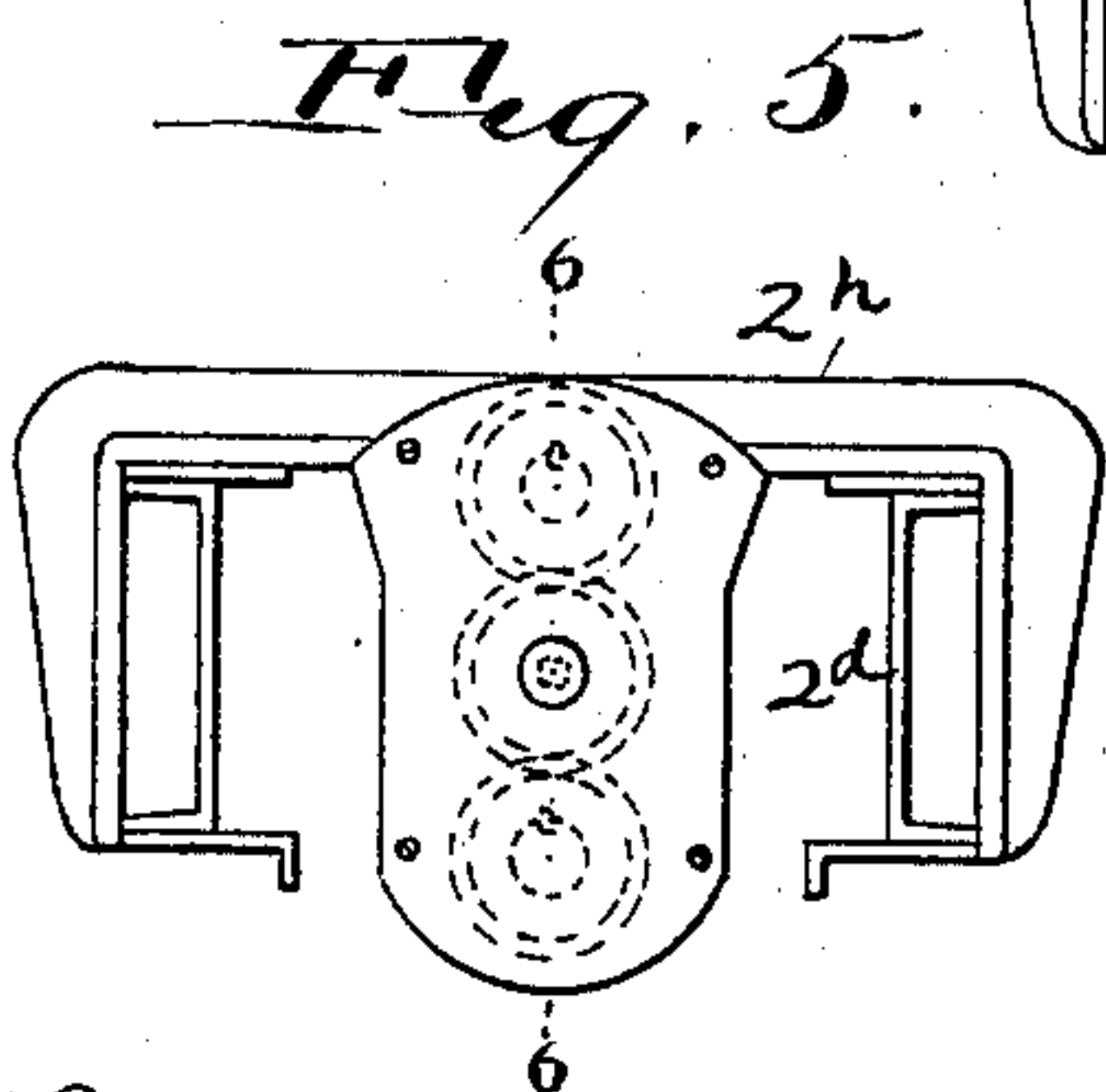


Fig. 5.

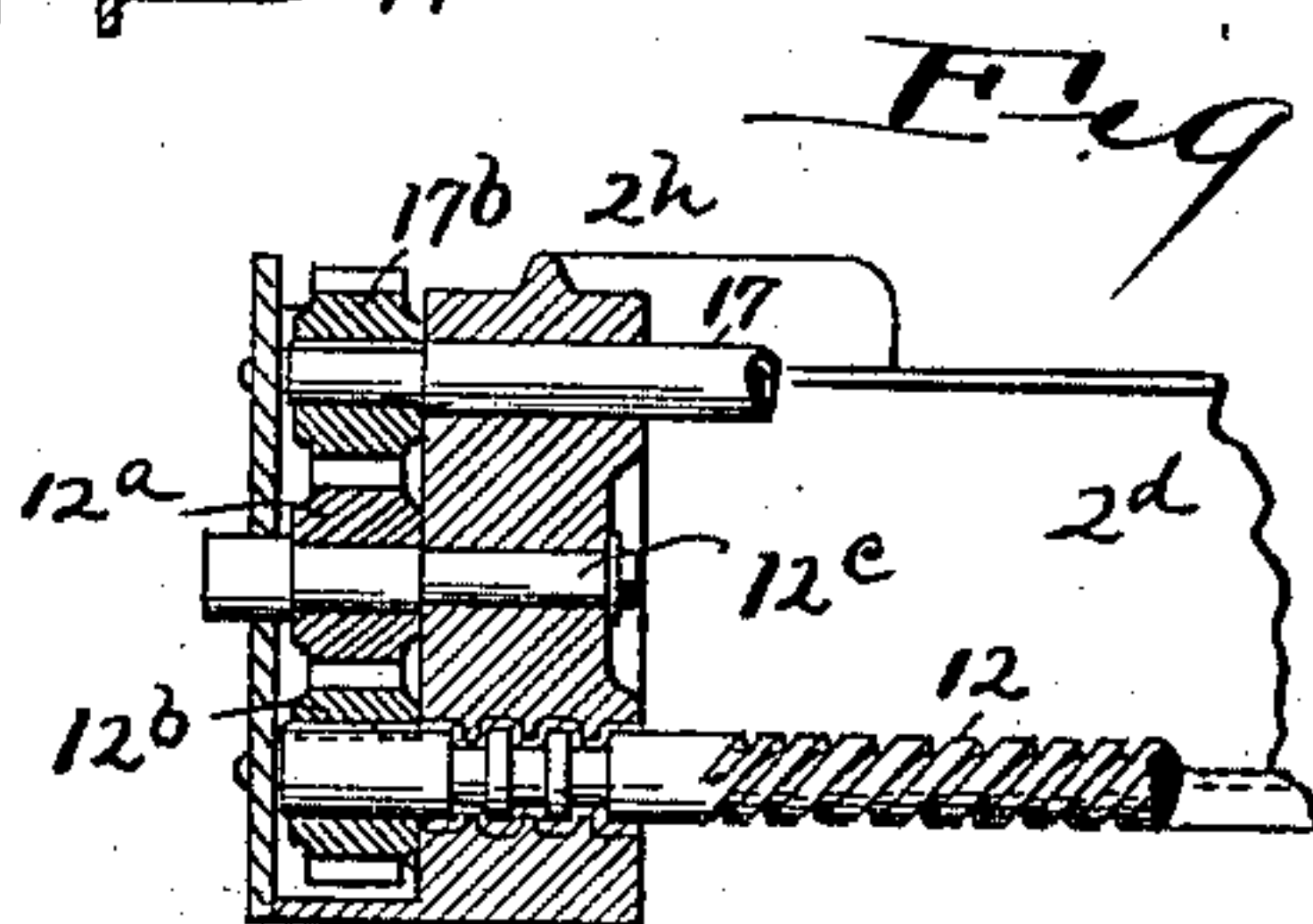


Fig. 6.

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Fig. 7.

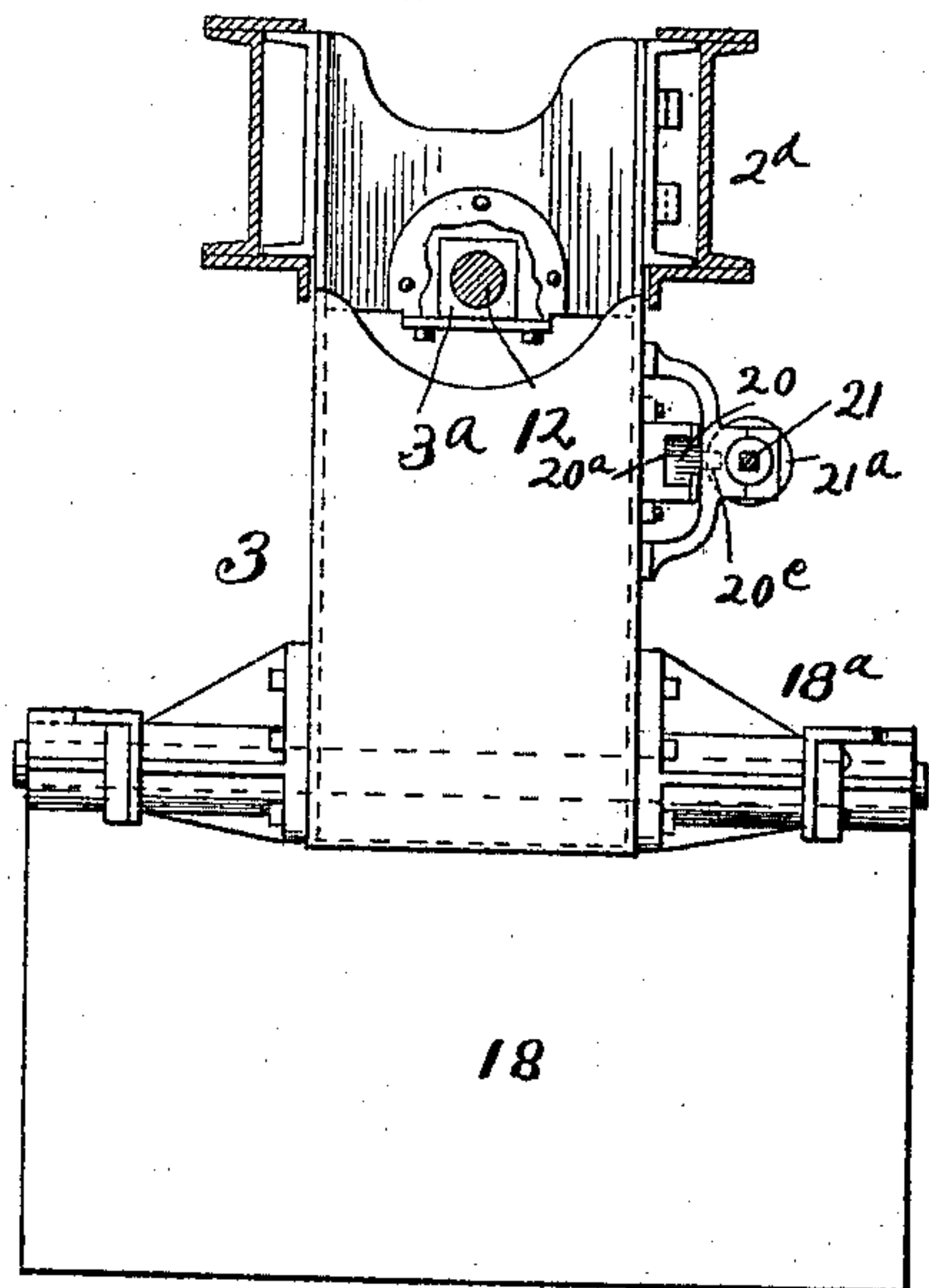


Fig. 8.

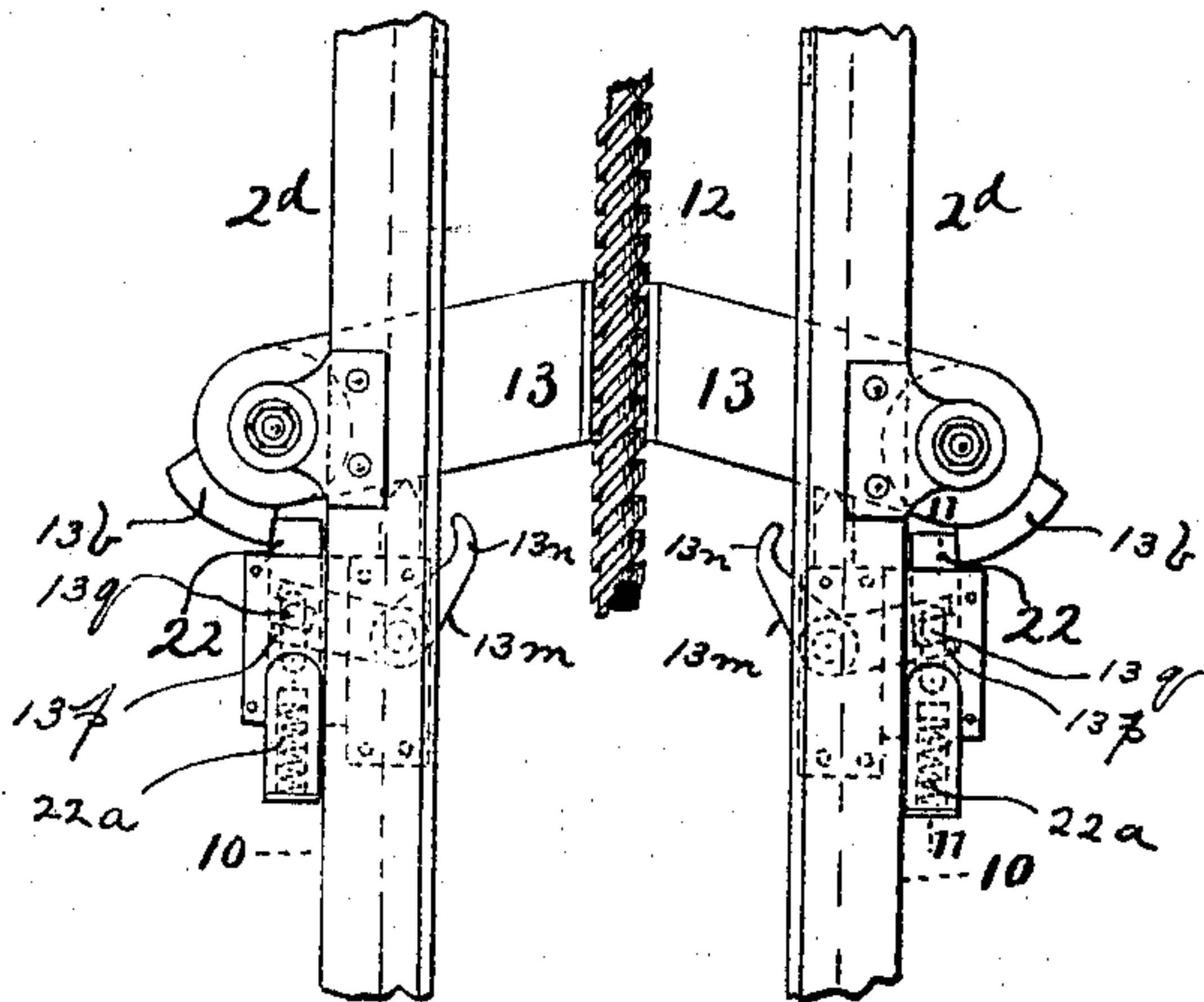
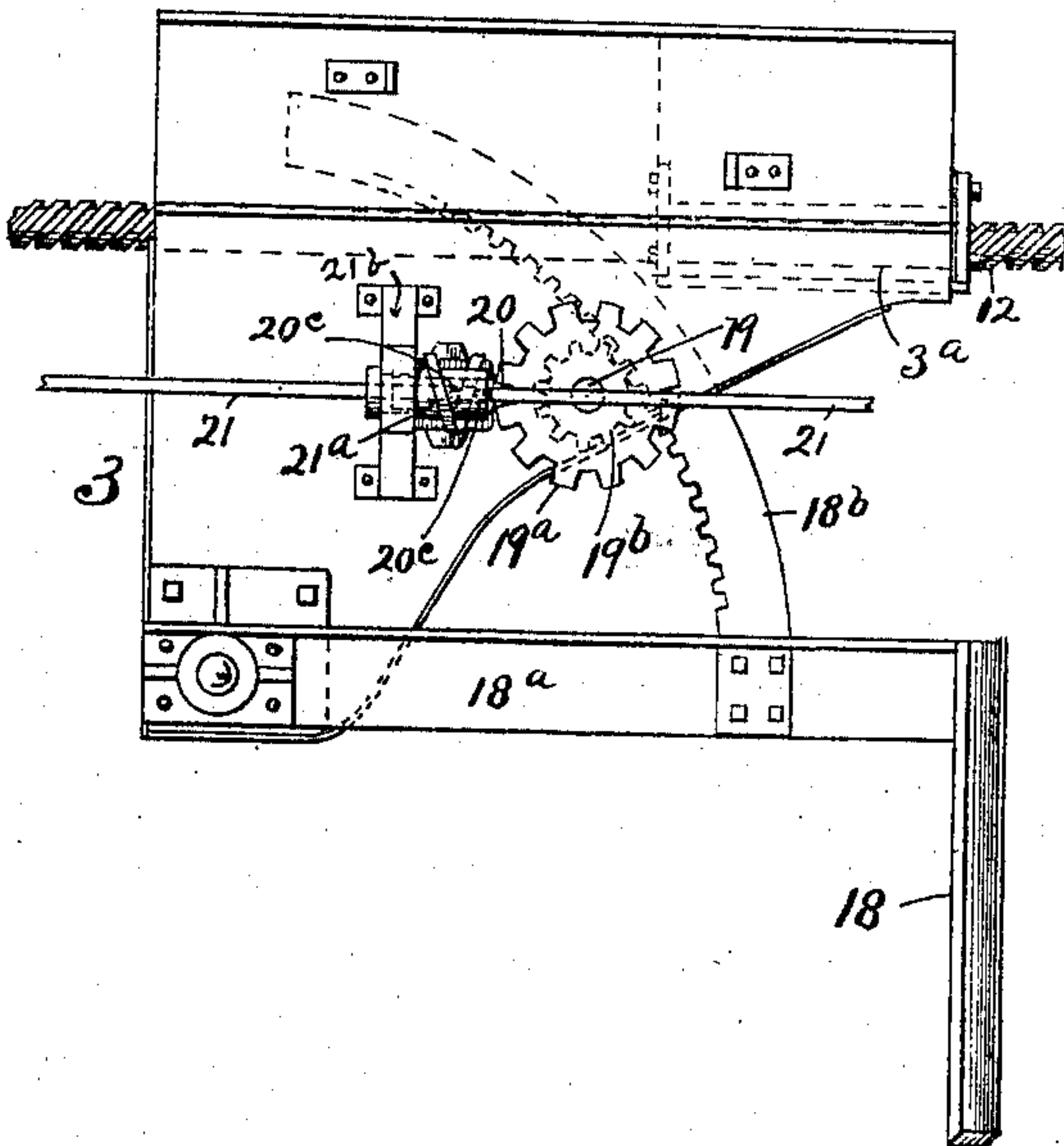


Fig. 9.

Fig. 10.

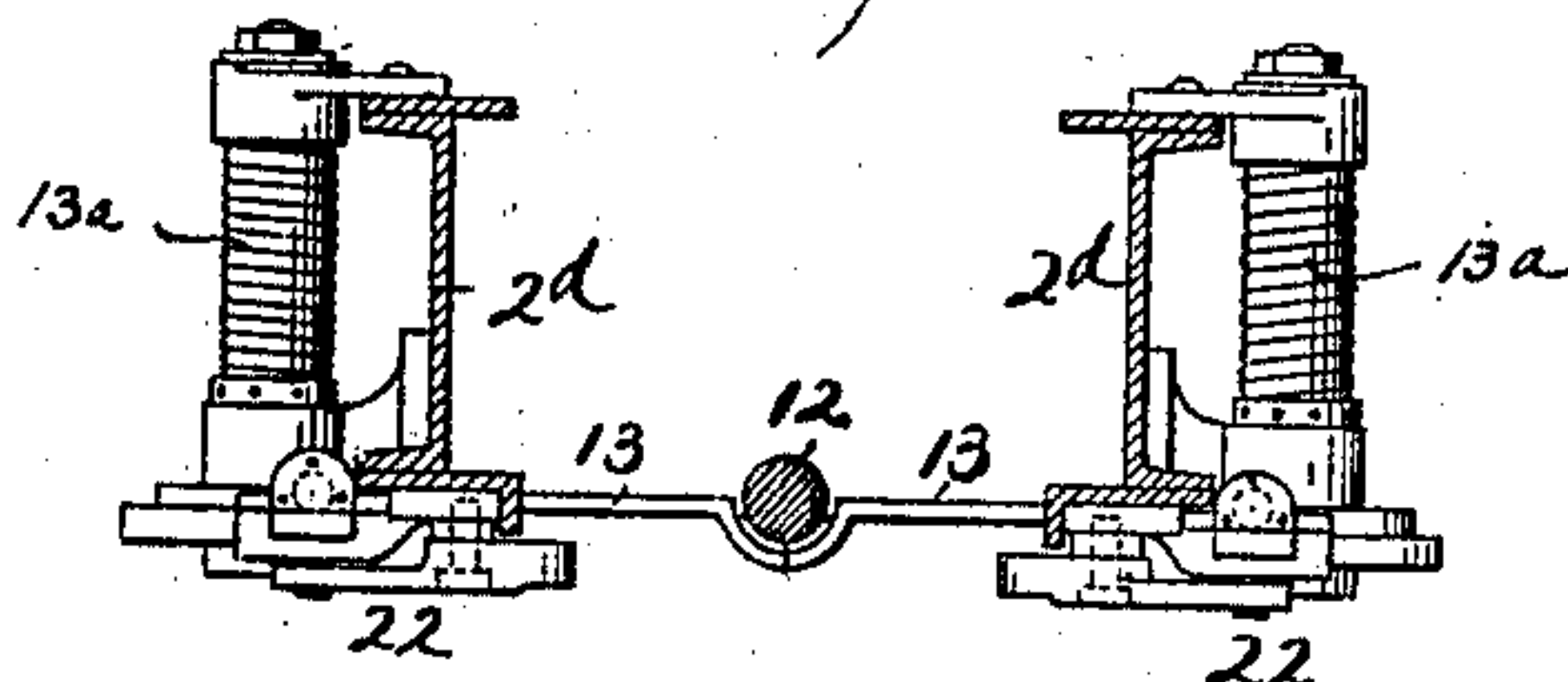
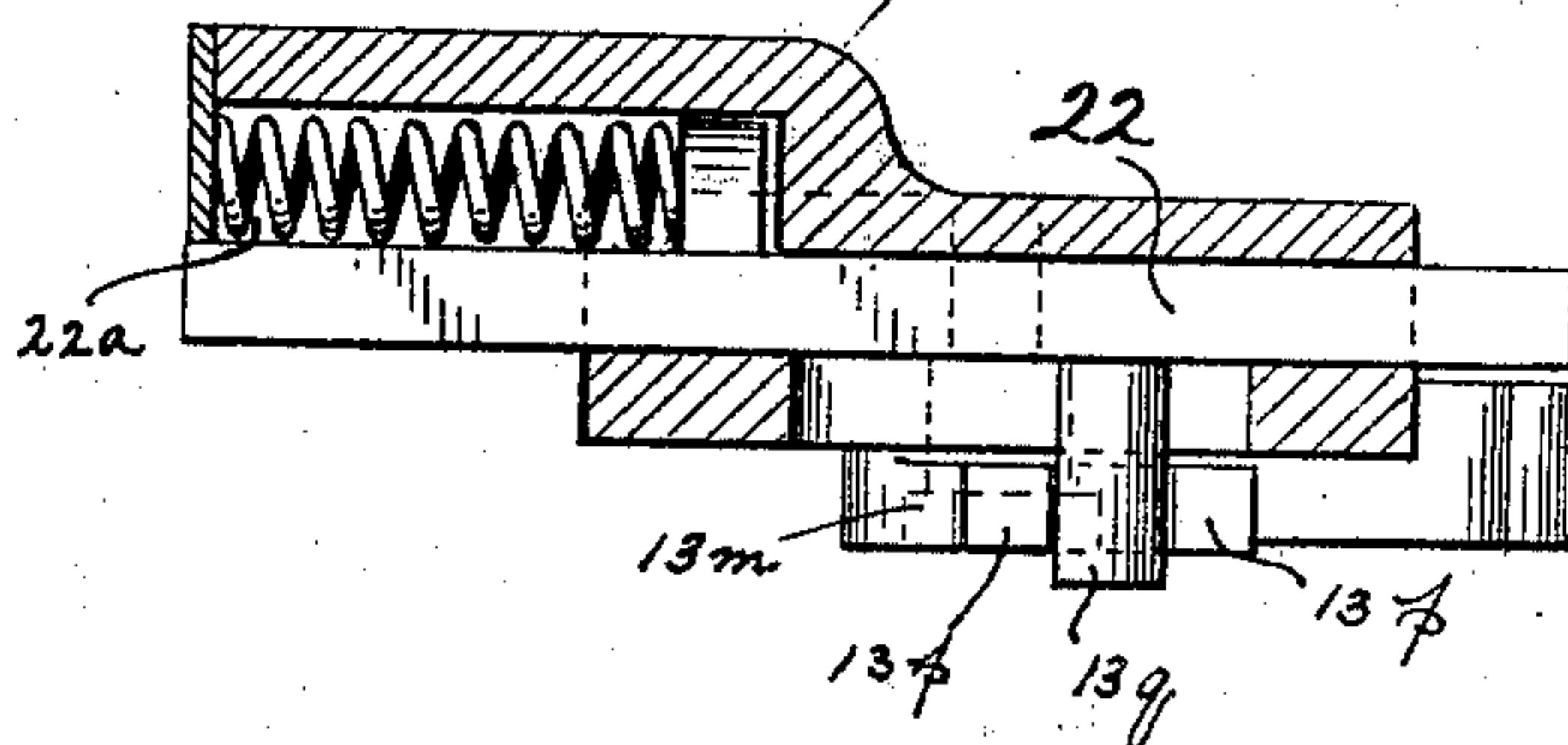


Fig. 11.



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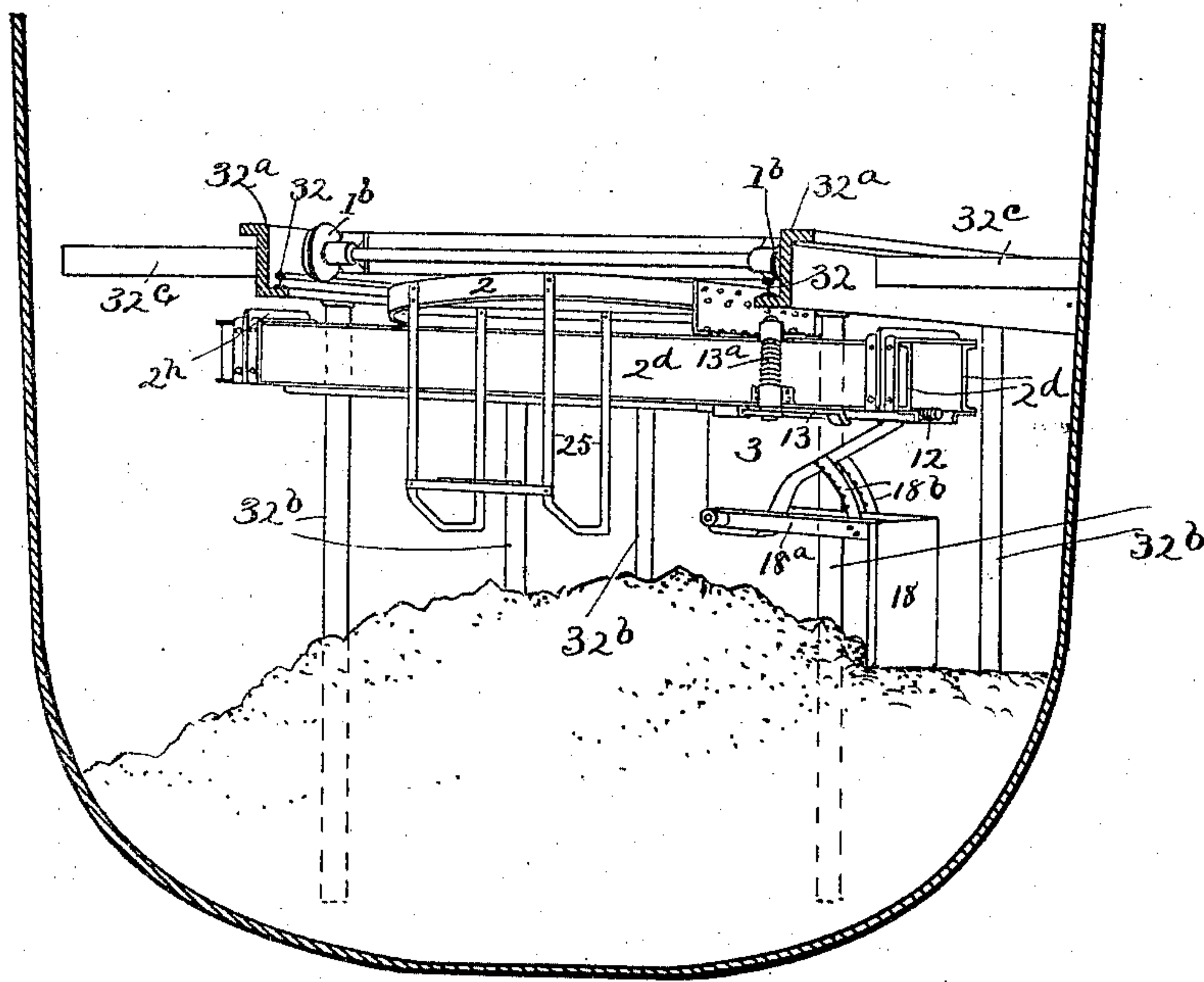
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(No Model.)

5 Sheets—Sheet 5.

Fig. 14.



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UNITED STATES PATENT OFFICE.

RICHARD THEW, OF CLEVELAND, OHIO.

VESSEL-TRIMMER.

SPECIFICATION forming part of Letters Patent No. 627,217, dated June 20, 1899.

Application filed January 29, 1897. Serial No. 621,206. (No model.)

To all whom it may concern:

Be it known that I, RICHARD THEW, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Vessel-Trimmers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In loading vessels with ore, coal, and other loose material it is customary to dump the load through the hatchways, beneath which it accumulates in heaps. These heaps must be leveled and spread evenly in the hold.

The object of my invention is to provide an apparatus which shall be a part of the permanent equipment of the vessel, wherewith the load may be cheaply and quickly leveled or, as it is called, "trimmed."

A vessel equipped with my apparatus may leave the dock as soon as the load is in and be trimmed while under way—a great saving in time.

The invention consists in the construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of my apparatus. Fig. 2 is a side elevation thereof. Fig. 3 is a sectional end elevation on line 3 3 of Fig. 1. Fig. 4 is a sectional view on line 4 4 of Fig. 1. Fig. 5 is a left end view, Fig. 1, of the trolley-supports. Fig. 6 is a sectional view on line 6 6 of Fig. 5. Fig. 7 is an end view of the trolley. Fig. 8 is a side view of the same. Fig. 9 is an enlarged plan view of the mechanism for supporting the free end of the screw. Fig. 10 is a sectional end view of the same parts on line 10 10 of Fig. 9. Fig. 11 is an enlarged sectional view on line 11 11 of Fig. 9. Figs. 12 and 13 are detailed views, being side and end elevations, respectively, of the electric switch for controlling the mechanism, this switch being shown in plan in Fig. 1. Fig. 14 is a sectional view of the hold of a vessel, showing means of supporting the track-rails on which my apparatus runs.

Referring to the parts by reference characters, 1 represents a carriage which is mounted upon four wheels 1^a 1^a and 1^b 1^b, of which the former are traction-wheels. These wheels

are adapted to ride upon tracks 32, which are supported at the proper elevation in the hold of a vessel. I have shown in Fig. 14 these tracks as carried by the beams 32^a, which are supported by posts 32^b and braced by cross-beams 32^c. If desired, two of the trimmers may be supported side by side. Upon this carriage is secured a circular rack 1^c and a depending cylindrical ring 1^d, which is concentric with rack 1^c. Secured to the outer surface of this ring is an annular flanged ring 1^e, the horizontal part 1^f of which serves as the support for the rotating member 2. This member 2 consists, partly, of a ring-shaped part 2^a, having an inwardly-turned horizontal flange 2^b. This flange lies above the flange 1^f and rides upon a series of balls 2^c, which roll upon the flange 1^f. Two parallel beams 2^d 2^d are secured to the lower edge of the part 2^a, these beams serving as the guide or support for the scraper-carrying trolley 3. A cage or platform 25 for the operator is suspended from the rotating member 2.

The various parts of the apparatus are operated independently by means of a motor 5, supported upon the rotating member 2, and connecting mechanism, which I will now describe. This mechanism is under the control of an operator upon the platform 25.

The motor shown is an electric motor, and upon opposite ends of the motor-shaft are the two bevel-gears 5^a 5^b, which respectively mesh with the two bevel-gears 4^a 7^a on the two shafts 4 and 7. These shafts are mounted in suitable bearings upon the rotating member. The shaft 4 is a short shaft, and motion is transmitted from it to a longer shaft 6 by means of the two gears 4^b 6^b, which are secured, respectively, to said two shafts. The shafts 6 and 7 are revolved constantly so long as the motor is in operation.

Motion is transmitted from the shaft 7 to the traction-wheels 1^a of carriage 1 for the purpose of causing said carriage to move in either direction by the instrumentalities, as follows: The two traction-wheels 1^a 1^a are secured to the axle 1^t, upon which is secured a gear 1^q. This gear meshes with a gear 1^p, mounted on short shaft 1^s, to which also is secured the bevel-gear 1^h. A bevel-gear 1^j, secured to shaft 1^k, meshes with bevel-gear 1^h, and another bevel-gear 1^m, secured to

shaft 1^k, meshes with a bevel-gear 8^a. The shafts 1^s and 1^k are mounted in suitable bearings upon the carriage 1, one bearing of the shaft 1^k being secured to the under side of the cross-bar 1^o. The bevel-gear 8^a is secured to a vertical shaft 8, which shaft is placed concentrically with the rotating member 2, and it is mounted in suitable bearings in the bracket 2^c. This bracket is secured to the tops of the two beams 2^d. On the lower end of this shaft 8 is a second bevel-gear 8^b, which meshes with the bevel-gear 9^b, secured to the horizontal shaft 9, which shaft is also mounted in the bracket 2^c. A bevel-gear 9^a is also secured to the shaft 9. This bevel-gear is in mesh with two bevel-gears 7^b 7^c, which gears are loosely mounted upon the shaft 7 on opposite sides of the axis of shaft 9. Clutches 7^d 7^e are provided for respectively securing the two bevel-gears 7^b 7^c to the shaft 7. The particular construction of these clutches is not essential to the invention, and therefore no effort has been made to do more than to indicate the position of said clutches upon shaft 7. The levers 7^f 7^g are provided for respectively throwing said clutches 7^d 7^e into and out of action. These levers are connected by a link 7^k, whereby both levers must be moved at the same time. A vertical lever 7^j for moving link 7^k is pivoted to the bar 2^f, which forms a part of the rotating member 2. This lever is placed in a position where it may be operated by a person upon the cage 25. When the lever 7^j is moved in one direction, the bevel-gear 7^b is connected with the shaft 7 by means of the clutch 7^d, while at the same time the clutch 7^e is thrown out of action and the bevel-gear 7^c is permitted to revolve freely upon shaft 7. When the lever 7^j is moved in the opposite direction far enough, the bevel-gear 7^c is connected with shaft 7, while the bevel-gear 7^d is permitted to run idly thereon. When the bevel-gear 7^b is connected with shaft 7, the shaft 9 is rotated in one direction, and the motion is transmitted through the mechanism described to the axle 1^t, with the result that the carriage is caused to traverse the tracks in one direction. When the bevel-gear 7^c is connected with the shaft 7, the shaft 9 is revolved in the reverse direction, and this motion being transmitted by the same mechanism to axle 1^t causes the carriage to move in the contrary direction.

Mounted in suitable bearings upon the rotating member is a vertical shaft 10, having upon its upper end a pinion 10^a, which engages with the circular rack 1^c. On the lower end of this shaft 10 is secured a bevel-gear 10^b, which engages on both sides of its axis with two bevel-gears 6^c 6^f, which are loosely mounted upon the shaft 6. Clutches 6^g 6^h are provided for respectively connecting these bevel-gears 6^c 6^f with shaft 6. When one of the gears—say 6^c—is connected with said shaft by the clutch, the vertical shaft 10 is revolved in one direction, and it, by its engagement with the circular rack 1^c, causes

the rotating member to turn upon its axis in one direction. When the bevel-gear 6^f is connected with shaft 6, the shaft 10 reverses its direction of movement, and thereby the rotating member 2 is caused to turn in the opposite direction. The two clutches 6^g 6^h are respectively operated by two horizontal levers 6^j 6^k. These levers are connected with each other by the link 6^m, and these levers are also connected with a vertical operating-lever 6ⁿ, placed within easy reach of the operator upon the cage by means of the following instrumentalities, viz: a horizontal lever 6^p, which is pivoted to the rotating member, a link 6^q, which connects one end of said lever with the lever 6^j, and a link 6^r, which connects the other end of lever 6^p with a lever 6ⁿ.

The movable carriage or trolley 3 is caused to move backward and forward upon its supports between the beams 2^d 2^d by means of a feed-screw 12, which is mounted at one end in the cross-beam 2^h, which extends between and is connected to the two beams 2^d 2^d. This screw passes through a threaded box 3^a, which is secured to the trolley, and the other end of said screw is normally supported upon two swinging arms 13, the construction and operation of which will be presently explained.

Motion is transmitted from shaft 6 to the screw 12 by the following instrumentalities: A short stud 14 is secured to one of the beams 2^d. On it is loosely mounted the two rigidly-connected bevel-gears 14^a 14^b. Two bevel-gears 6^u 6^v are loosely mounted upon shaft 6 and are always in engagement with the bevel-gear 14^a on opposite sides of its axis. Two clutches 6^z 6^z are adapted to respectively connect the two gears 6^u 6^v to shaft 6, with the result of causing the gear 14^a to revolve in one direction or the other. These clutches are respectively operated by the levers 6^z 6^z, which levers are connected by a link 6^w, so that both will operate simultaneously. The lever 6^z is connected by a link 6^d with the lever 16, which is pivoted to the rotating member. This lever is connected by the link 16^a with a vertical lever 16^b, which is placed convenient to the operator upon the cage. A short shaft 26 is mounted in bearings upon the rotating member. Secured to its ends are the two bevel-gears 26^a 26^c, which respectively mesh with the gears 14^b and 17^a. This gear 17^a is secured to a shaft 17, and motion is transmitted from it to the feed-screw by means of the two gears 17^b and 12^b, secured, respectively, to said shaft and feed-screw, and the intermediate gear 12^a, which is mounted upon a stud 12^c, secured to the cross-beam 2^h. By operating the vertical lever 16^b either of the gears 6^u 6^v may be connected with shaft 6, the other being at the same time permitted to run loosely thereon, with the result that the trolley is caused to traverse the beams 2^d 2^d in one direction or the other, as desired. The trolley projects below the beams 2^d a considerable distance, and to its lower end is piv-

oted a frame 18^a, to the other end of which
frame the hoe or scraper 18 is secured at ap-
proximately right angles to said frame. Se-
cured to the frame 18^a is a segmental rack 18^b,
5 which engages with a pinion 19^b, secured to
a short shaft 19, which is mounted on the
trolley. A toothed wheel 19^a is likewise se-
cured to the shaft, and a latch 20 is provided
for engaging with this toothed wheel for the
10 purpose of preventing the rotation of shaft
19, and consequently of preventing any ver-
tical movement of the hoe or scraper.

As the trolley is caused to move forward
for the purpose of leveling the pile of ore or
15 other material the scraper strikes the pile and
will be automatically raised by it more or less,
and when the scraper has been sufficiently
elevated for this purpose the shaft 19 is locked
by means of a latch 20, which is operated by
20 the following mechanism: This latch is a
sliding block mounted in a groove 20^a on the
side of the trolley. On the outer side are two
laterally-projecting fingers 20^c 20^c, (shown in
dotted lines in Figs. 7 and 8,) between which
25 a spiral cam 21^a passes. This spiral cam is
journaled in a bearing 21^b, secured to the side
of the trolley, and has extending through it
axially a square hole, through which a square
rock-shaft 21 loosely passes. An oscillation
30 of this rock-shaft therefore oscillates the spi-
ral cam and causes the latch to engage or re-
lease the toothed wheel 19^a, while the cam is
compelled to travel with the trolley. The
rock-shaft 21 is mounted in the depending
35 brackets 23 and 23^a, which are secured to one
of the beams 2^b. At one end of this rock-
shaft is secured the gear 21^c, which meshes
with the gear 21^d on a rock-shaft 21^e, jour-
naled in the bracket 23^a and in the bracket
40 21^f, extending from the said beam 21^d. A
handle 21^s depends from this shaft within
reach of the operator in the cage, and by an
oscillation of this handle he may cause the
engagement or disengagement of the latch 20.

45 As before stated, the free end of the feed-
screw is normally sustained by two horizon-
tal arms 13, which are pivoted to brackets
which are secured to the beams 2^d. These
arms are subject to the action of springs 13^a,
50 coiled upon the pivot-rods of the arms, which
springs act to throw the ends of the arms
toward each other into the position shown in
Fig. 9, in which position they are held by the
latch-bolts 22, which are pressed toward said
55 arms by the springs 22^a and engage with
shoulders formed by the segmental bosses 13^b
on said arms. Each latch is withdrawn by
means of a bell-crank lever 13^m, pivoted to
one of said beams 2^d. The outer end 13^p of
60 this lever is slotted and embraces a pin 13^q,
which projects from the latch. The inner
ends 13ⁿ of the bell-cranks extend into the
path of the trolley. When the trolley mov-
ing toward said arms nearly reaches them, it
65 engages with these inner ends 13ⁿ of the bell-
crank levers, pushing them forward, and

thereby withdrawing the latch-bolts. The
further movement of the trolley causes it to
strike said arms, which are swung back out
of its way by the trolley itself and are held 70
open by the latch-bolts, which engage with
the opposite sides of the segmental bosses 13^b.
The trolley is therefore able to travel some
distance beyond the end of the beams 2^d, the
space between these beams being unob- 75
structed at the scraper end. In this manner
I secure a larger range of scraper travel for
a given length of supporting-beams 2^d than
would be possible if the end of the screw 13
were journaled in a stationary bearing carried 80
by those beams. The trolley itself easily sup-
ports the screw when the arms 13 are open;
but without those arms there would be too
much overhang to the screw when the trolley
is at the other end of its travel. When the 85
trolley, returning from its extreme forward
movement, has moved back of the open arms
13, it strikes the projecting ends 13ⁿ of the
bell-crank levers, and thereby withdraws the
latch-bolts 22, and the arms are returned by 90
their springs 13^a to the closed position and
become securely locked therein by the latch-
bolts, which return into engagement with the
other shoulder of the bosses 13^b when the trol-
ley has passed. 95

The ring 1^e has, in addition to the external
flange 1^f, an internal flange 1^z, in which are
formed the vertical holes 1^r. A vertically-
movable latch 24 is mounted on the rotating
member and is adapted to enter any one of 100
these holes, and thus to check the rotation of
said member. This latch is moved vertically
by means of a rock-shaft 27, mounted on the
side of one of the beams 2^d, having an oper-
ating-handle 27^a within easy reach of the op- 105
erator upon the cage. Upon its other end is
a crank-arm, which is connected by means of
a link with said latch-pin.

The current for operating the motor is con-
ducted to and from the motor and generator 110
by the two conductors 28 29, which are sus-
pended at the proper elevation above the car-
riage and parallel to the tracks. Two trolley-
arms 28^a and 29^a are pivoted on horizontal
pivots to the carriage, and the upper ends of 115
said trolley-arms are held in contact with the
respective conductors by the weights 28^b 29^b.

An insulated ring 30, having two annular
contact-strips 30^a 30^b on its under side, is sus-
pended concentrically with the rotating mem- 120
ber, being secured to the cross-bar 1^o. Con-
tact-brushes 31^a 31^b, carried by the rotating
member 2, severally contact with said strips.
These contact-brushes are electrically con-
nected with opposite ends of the motor, while 125
the two contact-strips are respectively con-
nected with the two trolleys. These connec-
tions are shown diagrammatically in Fig. 13.

Having described my invention, I claim—

1. In a freight-boat, the combination of a 130
longitudinal rail or way in the hold, a mov-
able carriage or trolley, and a scraper there-

on carried by and hinged to the trolley to permit of a vertically-swinging adjustment, substantially as described.

2. In a freight-boat, the combination of a longitudinal rail or way in the hold, a movable carriage or trolley, and a pivoted arm carrying a hoe or scraper and capable of a vertically-swinging adjustment and suitably supported by said trolley, substantially as described.

3. In a vessel-trimmer, the combination of a frame, guides or ways depending from the frame, a movable carriage or trolley, a scraper carried by the movable carriage or trolley and vertically adjustable, means for moving the frame back and forth and means for moving independently back and forth the movable carriage or trolley, substantially as described.

4. In a vessel-trimmer, the combination of elevated tracks, a traction-carriage mounted thereon, a horizontal rotatable member mounted upon but depending below the carriage, said member having horizontal trolley-guides, a trolley movable upon said guides, and a scraper carried by said trolley, with a motor, and mechanism operated by the motor for independently moving the carriage, rotatable member and trolley, substantially as and for the purpose specified.

5. In a vessel-trimmer, the combination of elevated tracks, a traction-carriage mounted thereon, a horizontal rotatable member mounted upon the carriage, said member having depending horizontal trolley-guides, a trolley movable upon said guides, an adjustable scraper carried by the trolley, and locking mechanism therefor, with a motor carried by the rotatable member, an axial vertical shaft mounted upon said member, power-transmitting mechanisms connecting said shaft with the motor and with the traction-wheels of the carriage, and power-transmitting mechanisms connected with the motor for moving the trolley, and turning the rotatable member, substantially as and for the purpose specified.

6. In a vessel-trimmer, the combination of elevated tracks, a traction-carriage thereon having a circular rack and a depending ring with a horizontal flange, a rotatable member having as a part of itself a ring with a horizontal flange which lies above the flange on the carriage, antifriction-balls between said two flanges, a motor on the rotatable member, a vertical shaft mounted upon said member and having secured to it a pinion which engages with said rack, and transmitting mechanism intermediate of the motor and shaft, substantially as and for the purpose specified.

7. In a vessel-trimmer, the combination of elevated tracks, a traction-carriage thereon, a ring secured thereto having an annular horizontal track-flange, and a second annular flange which is perforated, with a rotatable member supported upon said annular track-flange, a vertical locking-bolt carried by said member and adapted to engage in said per-

forated flange, trolley-guides forming a part of said rotatable member, a trolley mounted upon said guides, and a scraper carried by said trolley, with mechanism for independently operating the traction-carriage, rotatable member and trolley, substantially as and for the purpose specified.

8. In a vessel-trimmer, the combination of a traction-carriage adapted to ride upon elevated tracks, a rotatable member supported by but hanging below said carriage, a motor mounted upon said member, a shaft driven by said motor, two bevel-gears loosely mounted upon said shaft, clutches for connecting said gears to the shaft, a shaft mounted upon the rotatable member having at its end a bevel-gear which meshes with both of the bevel-gears above named, an axially-placed vertical shaft mounted upon the rotatable member, bevel-gears connecting the two shafts last named, and power-transmitting mechanism connecting said vertical shaft with the traction-wheels of the carriage, substantially as and for the purpose specified.

9. In a vessel-trimmer, the combination of a traction-carriage adapted to ride upon elevated tracks and having a circular rack, a rotatable member supported, concentrically with said rack, upon but hanging below said carriage, a motor mounted upon said rotatable member, a shaft driven from said motor, two bevel-gears loosely mounted upon said shaft, clutches for connecting said bevel-gears severally to the shaft, a vertical shaft mounted on the rotatable member having at its end a pinion which engages with said circular rack, and having at the other end a bevel-gear which engages with both of the bevel-gears first named, substantially as and for the purpose specified.

10. In a vessel-trimmer, the combination of a traction-carriage adapted to ride on elevated tracks, a rotatable member supported by but hanging below said carriage, trolley-guides, a trolley mounted in said guides, a feed-screw mounted upon the rotatable member and extending through a threaded box which is secured to the trolley, and power-transmission mechanism intermediate of said motor and feed-screw, substantially as and for the purpose specified.

11. In a vessel-trimmer, the combination of a traction-carriage adapted to ride on elevated tracks, a rotatable member supported by but hanging below said carriage, parallel horizontal trolley-guide beams suspended from the rotatable member, a trolley movable upon said guide-beams, a threaded box carried by said trolley, a feed-screw parallel with said guide-beams mounted at one end in a cross-bar connecting them, which screw passes through said threaded box, swinging arms pivoted to said guide-beams and adapted to support the free end of said feed-screw, and mechanism for turning the feed-screw in either direction, substantially as and for the purpose specified.

12. The combination of elevated tracks, a traction-carriage, adapted to travel thereon, a circular rack secured to said carriage, a rotatable member mounted upon said carriage, a motor, two constantly-rotating horizontal shafts connected with said motor, an axial vertical shaft, mechanism connecting one of said shafts with the vertical shaft, a vertical shaft having a pinion which engages with the circular rack, all of said shafts being mounted upon the rotatable member, with mechanism mounted upon the carriage for transmitting motion from the axial vertical shaft to the traction-wheels of the carriage, and means for transmitting motion to said shaft 10, substantially as and for the purpose specified.

13. The combination of a traction-carriage, a rotating member mounted thereon, a trolley movable upon said rotating member, and the operating mechanism for such parts, with an approximately horizontal frame pivoted at one end to said trolley, a scraper secured to the other end of the frame, and an adjustable connection between said frame and said trolley, substantially as and for the purpose specified.

14. The combination of the trolley, the scraper-frame pivoted thereto, a hoe carried by said frame, a segmental rack, a pinion mounted on the trolley engaging with said rack, and a lock for said pinion, substantially as and for the purpose specified.

15. In a vessel-trimmer, the combination of a traction-carriage, a rotatable member supported thereby, two horizontal trolley-guides secured to said rotatable member, a trolley

movable upon said guides, a swinging frame pivoted to said trolley, a scraper carried by said frame, a segmental rack secured to said frame, a pinion mounted upon the trolley and engaging the said rack, a rock-shaft mounted upon the rotatable member, and means for operating said rock-shaft, a spiral cam adapted to slide upon said shaft but incapable of independent revolution, and a sliding latch for engaging the said pinion, which latch is operated by said spiral cam, substantially as and for the purpose specified.

16. In a vessel-trimmer, the combination of a traction-carriage adapted to ride on elevated tracks, a rotatable member supported by but hanging below said carriage, an electric motor mounted upon said rotatable member, a fixed cross-beam secured to the carriage, annular contact-strips secured to said fixed cross-beam, contact-fingers carried by the rotatable member respectively connected with opposite ends of the motor, and held in contact with said annular contact-strips, two parallel conductor-wires, trolley-arms carried by the carriage for engagement with said wires, and electrical connections between said trolley-arms and the two annular contact-strips, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD THEW.

Witnesses:

E. L. THURSTON,
E. B. GILCHRIST.