

No. 622,634.

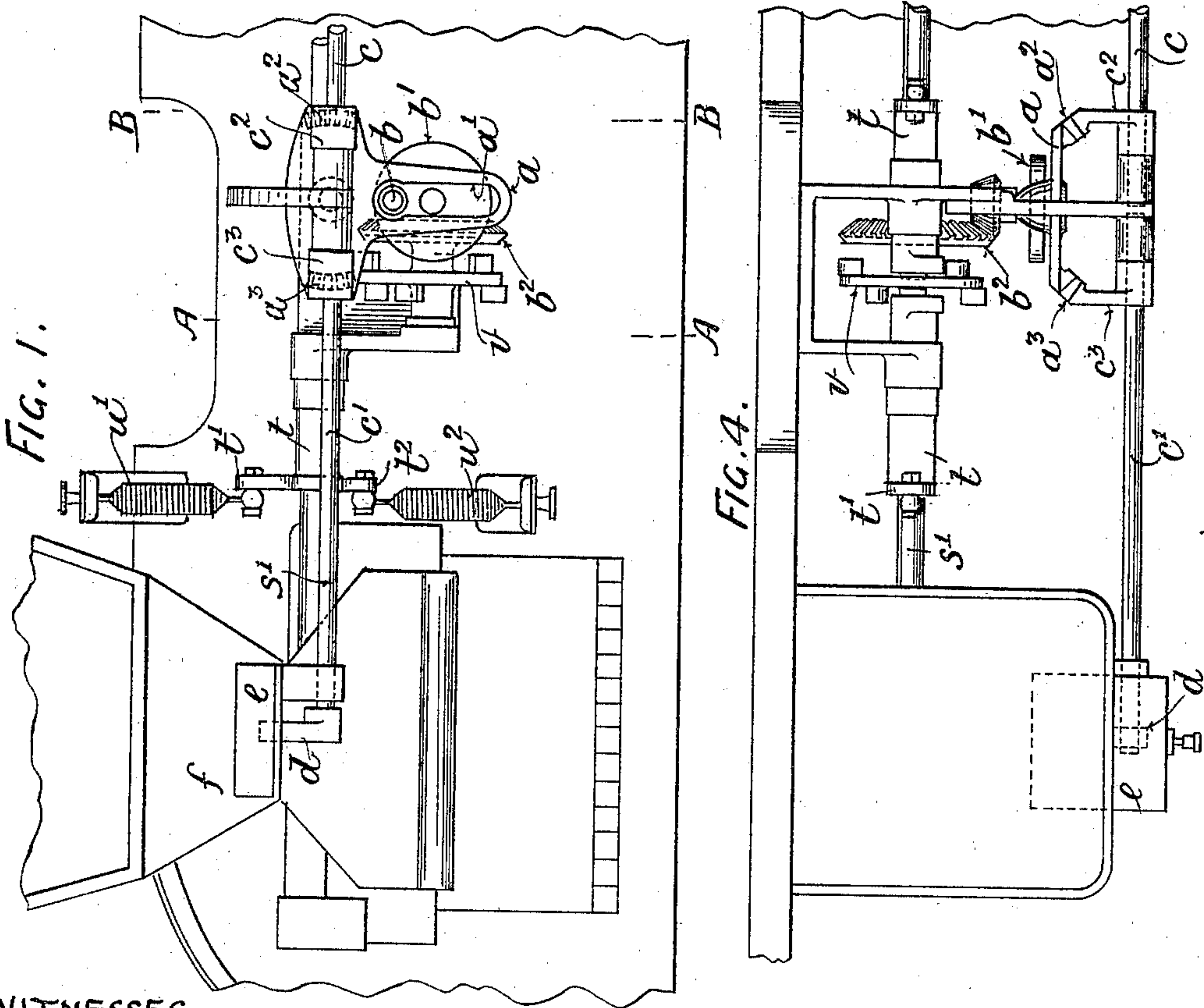
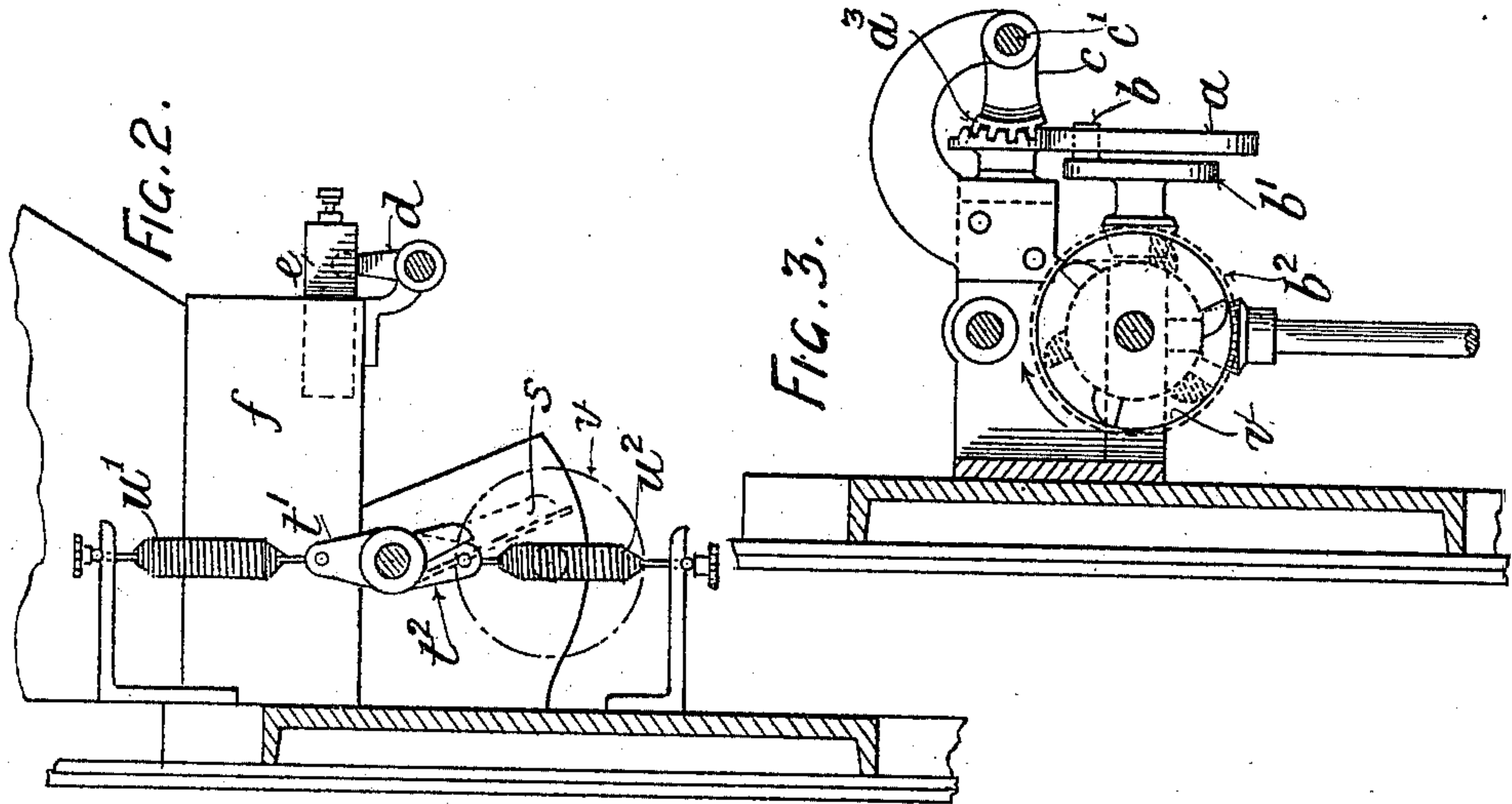
Patented Apr. 4, 1899.

J. PROCTOR.
MECHANICAL STOKER.

(Application filed Jan. 7, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES
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FIG. 6.

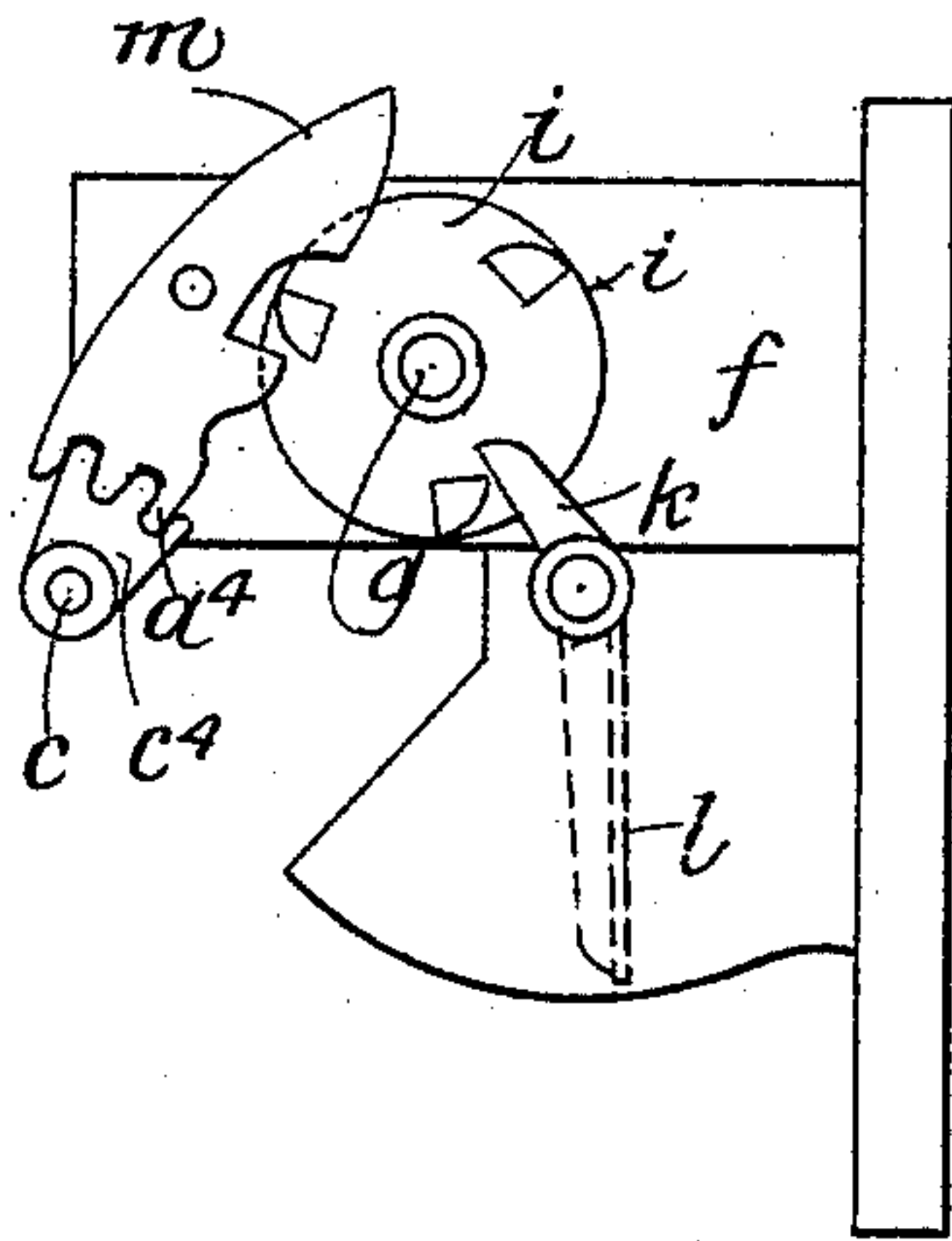


FIG. 5.

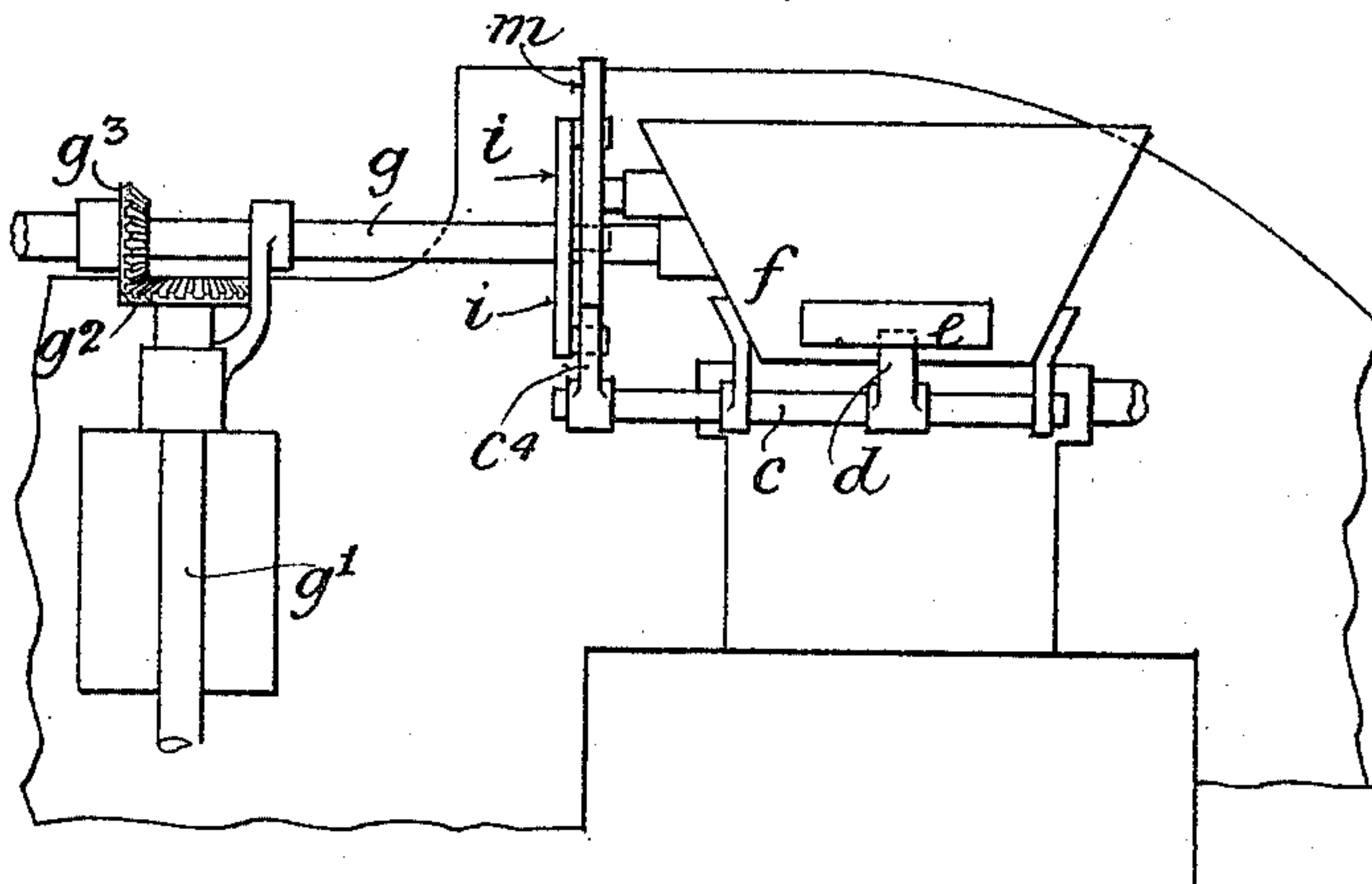


FIG. 7.

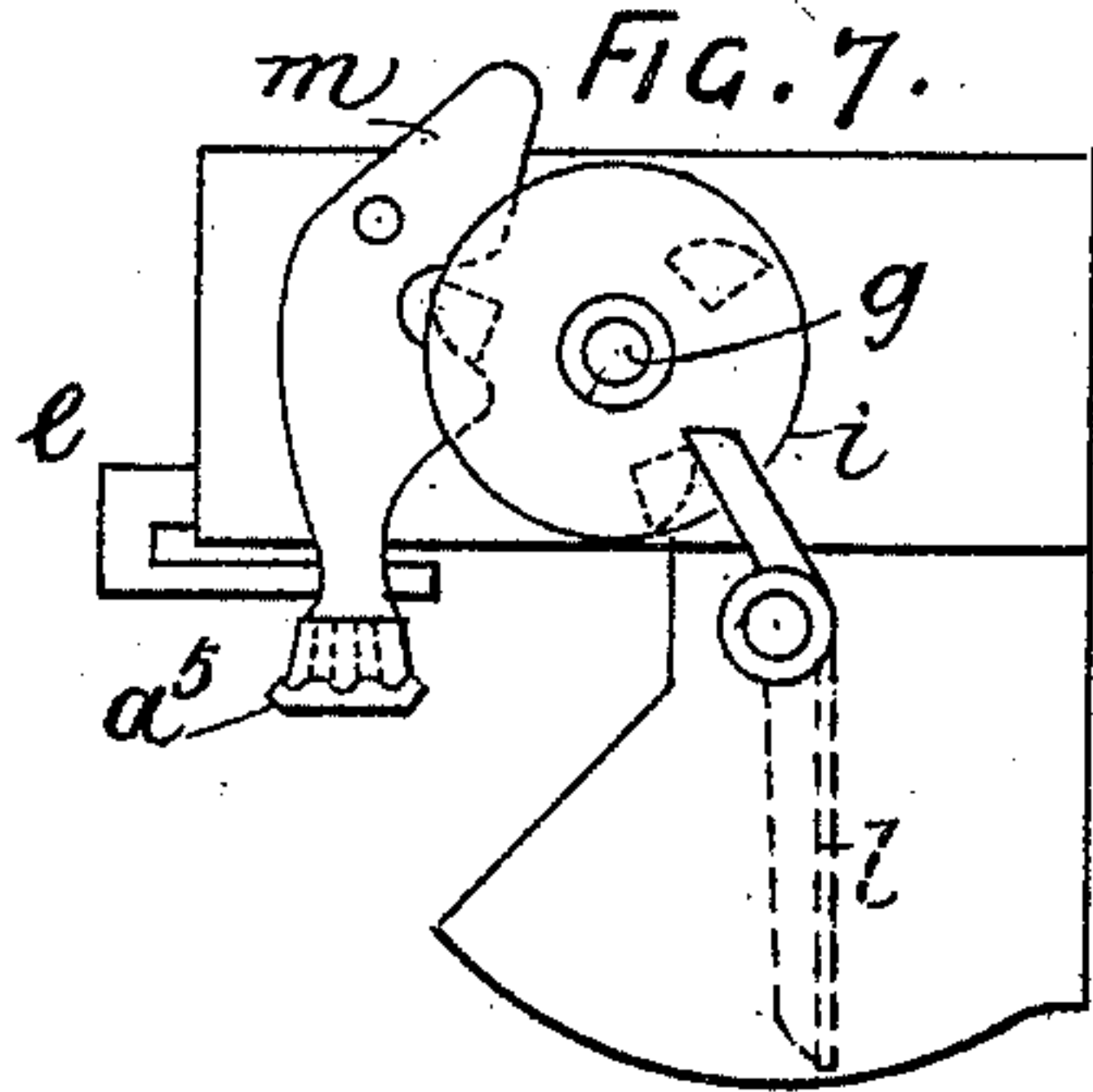


FIG. 8.

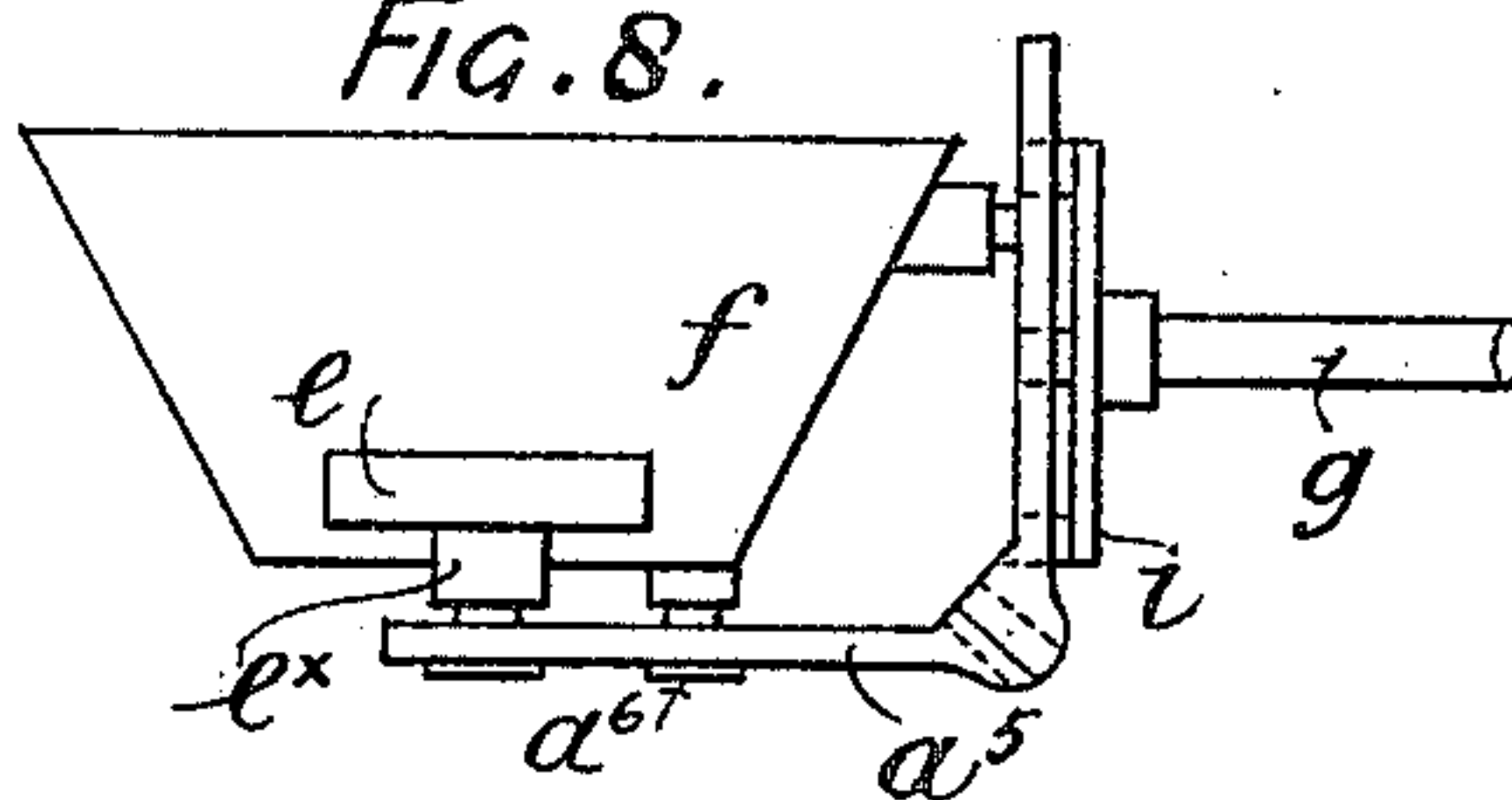


FIG. 9.

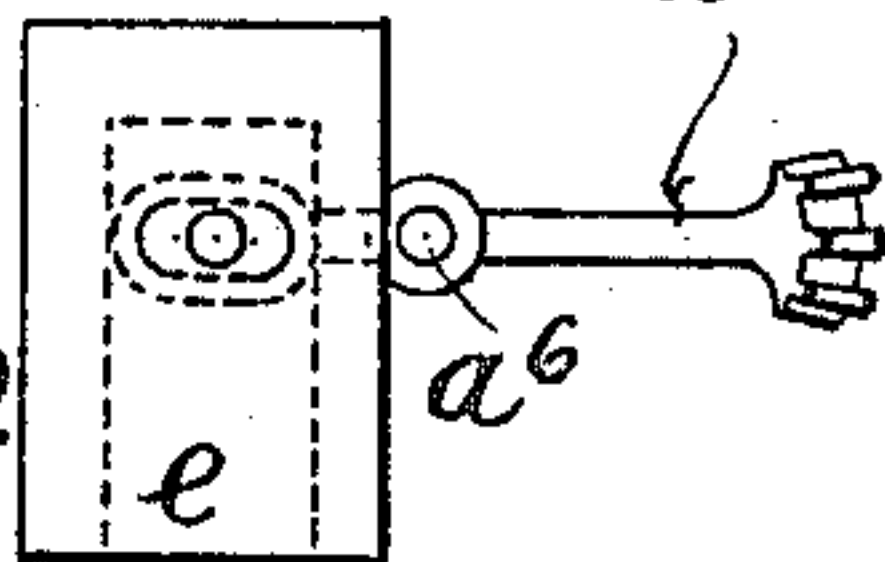


FIG. 10.

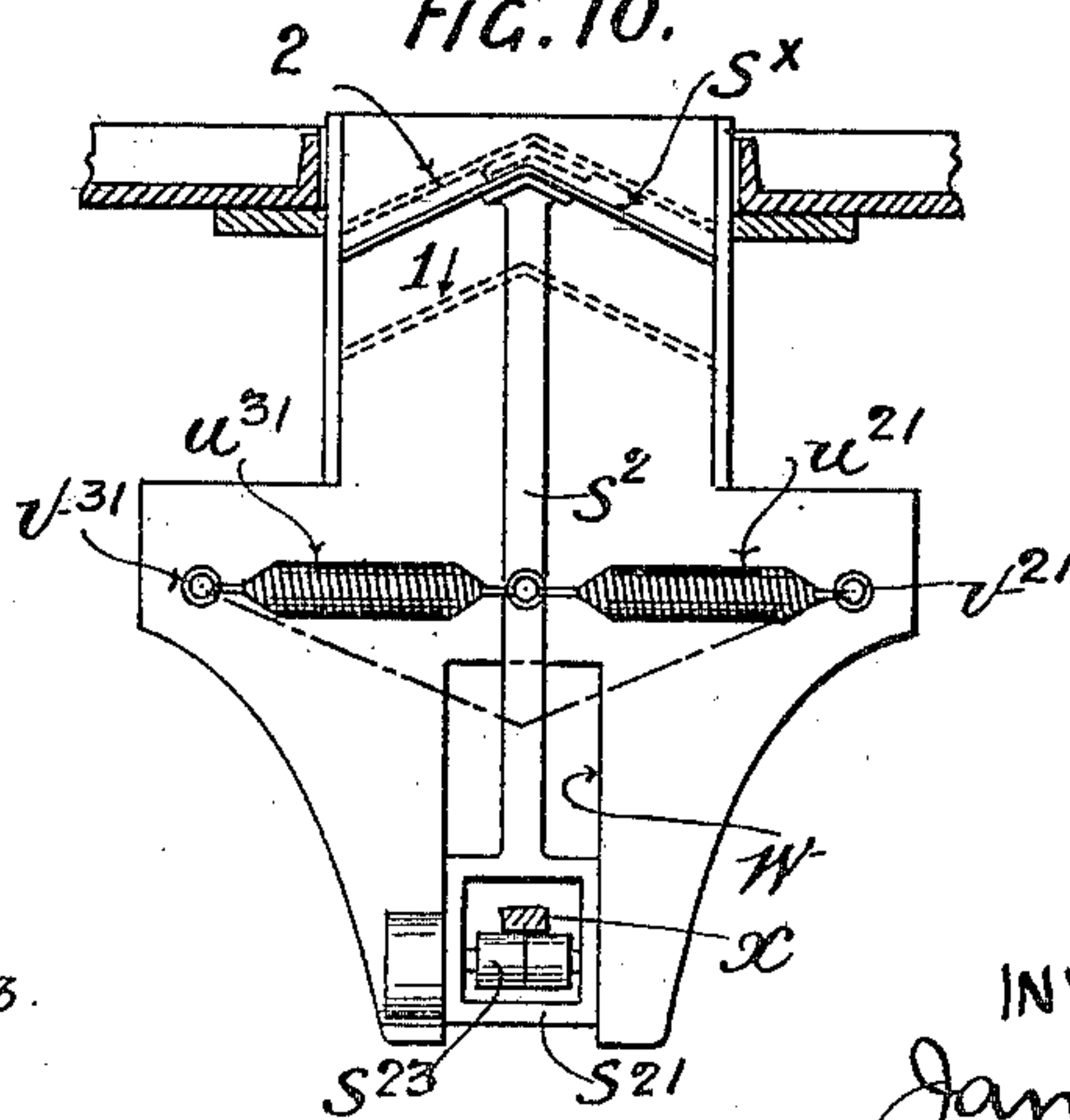
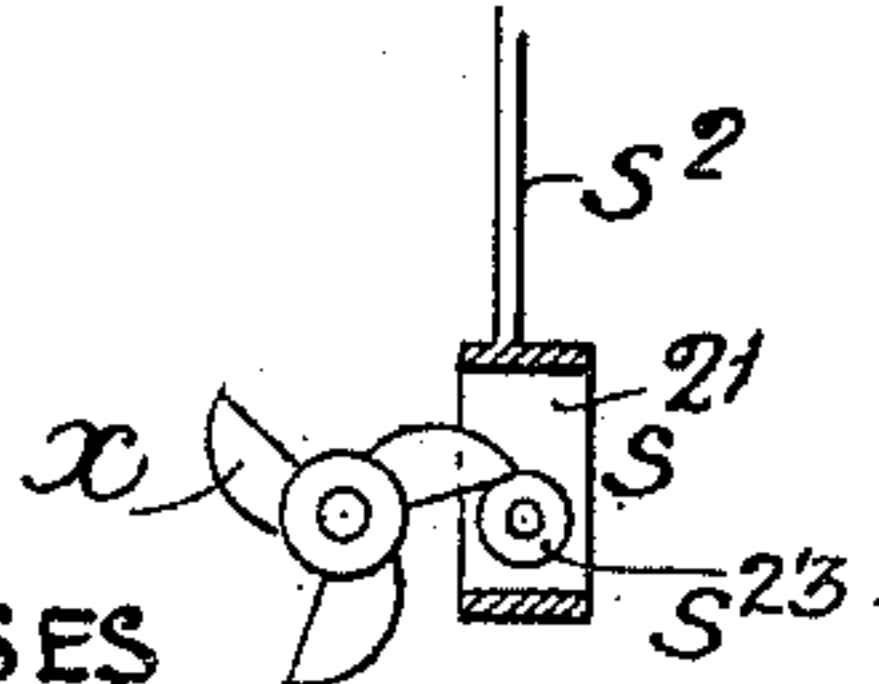


FIG. 11.



WITNESSES

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UNITED STATES PATENT OFFICE.

JAMES PROCTOR, OF BURNLEY, ENGLAND.

MECHANICAL STOKER.

SPECIFICATION forming part of Letters Patent No. 622,634, dated April 4, 1899.

Application filed January 7, 1899. Serial No. 701,449. (No model.)

To all whom it may concern:

Be it known that I, JAMES PROCTOR, a subject of the Queen of Great Britain, residing at Burnley, in the county of Lancaster, England, have invented new and useful Improvements in Mechanical Stokers, of which the following is a specification.

This invention relates to that class of mechanical stokers known as "shovel-stokers," and is more especially designed to improve the shovel-stoker for which Letters Patent were granted to me in Great Britain, No. 7,308, dated April 4, 1896. A part of the invention is, however, applicable to other kinds of shovel-stokers, as will be hereinafter explained.

The invention will be readily understood from the following description on reference to the accompanying drawings.

Figure 1 is a front elevation of so much of one side of a two-flued "Lancashire" boiler with my stoker applied as is necessary to illustrate my present improvements. Figs. 2 and 3 are sections through the lines A A B B thereon, respectively. Fig. 4 is a plan view of the same. Figs. 5 and 6 illustrate in front elevation and side view one modification thereof. Figs. 7, 8, and 9 show a second modification, and Figs. 10 and 11 show part of my invention applied to a sliding shovel motion hereinafter described.

The first part of my invention relates to the moving of the ram which supplies the fuel to the shovel, as described in the specification of the above-named Letters Patent; and it consists of an improved motion for reciprocating the ram from the lantern-wheel or tappet-wheel, which actuates the shovel, whereby I am enabled to dispense with the sliding bar described and illustrated by the aforesaid specification.

I propose to use instead of the sliding bar aforesaid (see Figs. 1, 2, 3, and 4) a lever a , having a slot a' , in which the crank-pin b , carried by the disk b' aforesaid, works. This disk is actuated, as before, by the bevel-wheel b^2 of the lantern-wheel motion. As this lever a rocks from side to side it moves a sector or a pair of sectors $a^2 a^3$ of bevel-teeth, each sector gearing with a corresponding sector $c^2 c^3$, respectively fixed on shafts $c c'$. On the latter are respectively fixed arms, one of

which is shown at d , which work the rams, one shown at e . The arm d passes through a notch or slot in the bottom of the ram-box f and into a socket in the rams e for that purpose, or in some cases (see Figs. 5 and 6) the lantern-wheel shaft g is raised so as to be carried by the side of the ram-box f , and in the case of a two-flued boiler the lantern-wheel is divided, one half being shown at i , and instead of being at the center of the space between the two ram-boxes each part i is fitted on the shaft g close to the inner side of the ram-box h .

The lantern-wheel i , besides acting, as usual, on the tappets k on the center of oscillation of the radial shovel l , acts on the lever m , mounted on a fixed center in an upright position and so formed as to be first pushed in one direction and then in the other direction by each projection on the lantern-wheel i coming in contact with parts of this lever m on different sides of its fulcrum. This upright lever m is provided with a toothed rack or quadrant a^4 or with a projection or equivalent device.

The rack or quadrant a^4 may gear with a similar quadrant c^4 on the short shaft c , the shaft c being, as before described, provided with a finger d , extending through a slot in the bottom of the ram-box f and working the ram e therein, or the rack or quadrant a^4 , above described, may act upon teeth on a horizontal lever a^5 , (see Figs. 7, 8, and 9,) mounted on a vertical center a^6 beneath the ram-box f , and this horizontal lever a^5 will act by means of a suitable finger e^x upon the ram e .

The lantern-wheel shaft g may be driven by a vertical shaft g' and bevel-wheels $g^2 g^3$, as before; but in the cases illustrated on Figs. 5, 6, 7, 8, and 9 all the remaining working parts will by the above arrangement be close to the inner side of the ram-box.

The spring of each shovel may be applied as usual; but I prefer the following arrangement, consisting, essentially, of a pair of springs to each shovel acting against each other to hold the shovel in the forward position, but yielding to the action of the tappets while the shovel is being withdrawn and acting in concert to return the shovel quickly when it is released, as hereinafter explained. In applying this arrangement of double spring

(which forms the second part of this invention) to the radial shovel of the above-described stoker (see Figs. 1, 2, 3, and 4) or to the radial shovels of other mechanical stokers

5 I fix on the rocking shaft s' , to which the radial shovel s is attached, a boss t , provided with two lugs t' t'' or eyes at opposite sides of its center, and I attach the inner end of one of the pair of springs aforesaid (and marked

10 $u' u^2$, respectively) to each of these lugs. As the lantern-wheel v causes the shaft s' to rock in the usual way, the two springs $u' u^2$ are expanded in opposite directions while the shovel s is being withdrawn, and when the

15 latter is released the reaction of the springs $u' u^2$ will throw the shovel s forward rather in advance of its normal position, and the springs will then bring it back to this position again. In such cases as above described

20 a great advantage is obtained, as the two springs $u' u^2$ will produce an equality of tension on both sides of the rocking shaft, whereas by the usual arrangement hitherto employed the action of the spring was always on

25 one side of the shaft, thus causing a considerable amount of friction in the bearings.

In the case of a shovel which slides, as seen in plan at Fig. 10, without rocking on a center—for example, as referred to in my former

30 specification above named—the two spiral springs (in this case marked $u^{21} u^{31}$) are placed at right angles to the shovel rod or bar s^2 , and are both connected at their inner ends to the said rod or bar s^2 , their outer

35 ends being connected to studs $v^{21} v^{31}$, respectively fixed in the bottom of the shovel-box, the springs $u^{21} u^{31}$ being in a state of tension, so that in their normal position the two springs $u^{21} u^{31}$ will lie in the same line and

40 will tend to keep the sliding shovel s^x in a central position in the shovel-box. The rear end of the shovel rod or bar s^2 is opened out into the form of a rectangular strap s^{21} , the outside of which slides in a guiding-groove w

45 in the bottom of the shovel-box, and each arm of the three-throw or other cam seen at x works above it against a friction-roller s^{23} , mounted inside this open strap s^{21} , so that as

the cam x (shown detached at Fig. 11) revolves it pulls the shovel-bar s^2 back and then lets it go alternately.

When the shovel-bar s^2 is drawn back (see dotted position 1) it pulls both of the springs $u^{21} u^{31}$ backward into a diagonal position, lengthening the springs, and as soon as the

55 cam x lets go the reaction of the springs $u^{21} u^{31}$ will throw the shovel forward (see dotted position 2) until the springs $u^{21} u^{31}$ assume a slightly-diagonal position in a forward direction and will then return the same to its normal or central position with both springs $u^{21} u^{31}$ in a line again, as shown by the full lines.

The studs $v^{21} v^{31}$, to which the outer ends of the springs are attached, may be so mounted as to be adjustable, so as to increase or diminish the tension of the springs $u^{21} u^{31}$, as may be desired.

I claim as my invention—

1. The combination with each ram (such as e) of a shaft such as c , with arms or finger

70 such as d , and sector-racks and an actuating lantern-wheel motion, substantially as hereinbefore described.

2. The combination with each ram of a shaft provided with an arm or finger and sector of teeth, a lever provided with a slot and a sector with which the first-named sector

75 gears, a plate having a crank-pin to work in said slot and an actuating lantern-wheel motion, substantially as hereinbefore described.

3. The combination with the mechanical shovel of a pair of counteracting-springs holding the shovel in the forward position and tappets for withdrawing the same, the said

80 springs acting when the shovel is released to throw it forcibly forward again and bring it to its forward position, substantially as hereinbefore described.

In testimony whereof I have signed my name to this specification in the presence of

85 two subscribing witnesses.

JAS. PROCTOR.

Witnesses:

CHARLES A. DAVIES,
J. E. HUGHES.