

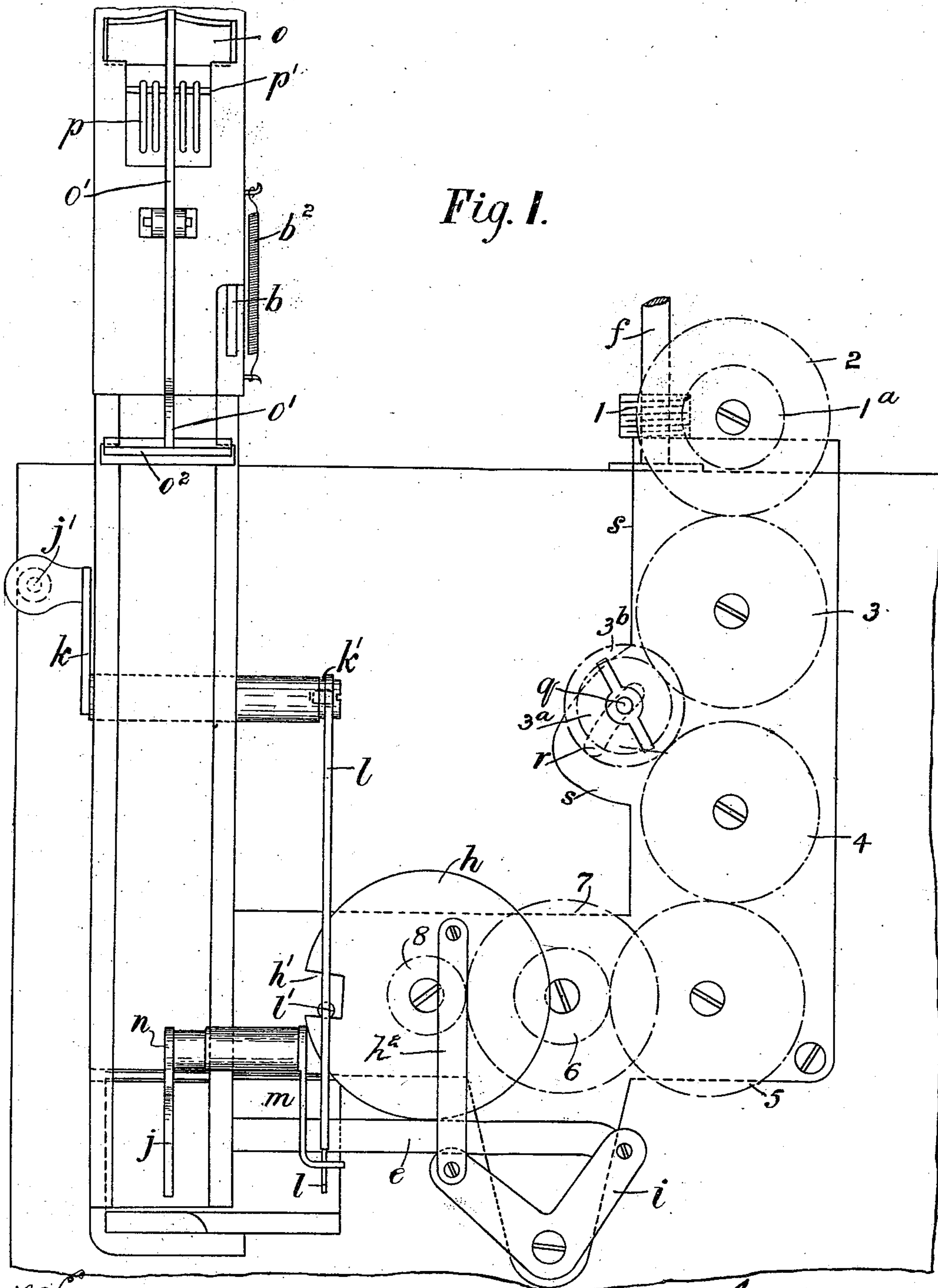
(No Model.)

4 Sheets—Sheet 1.

C. G. BEECHEY.
AUTOMATIC GAS METER.

No. 556,299.

Patented Mar. 10, 1896.



Witnesses:

H. van Oldenreep

O. Munk.

Inventor

Charles Grantley Beechey

Charles Grantley Beecher
by *Richard R.* attorneys

(No Model.)

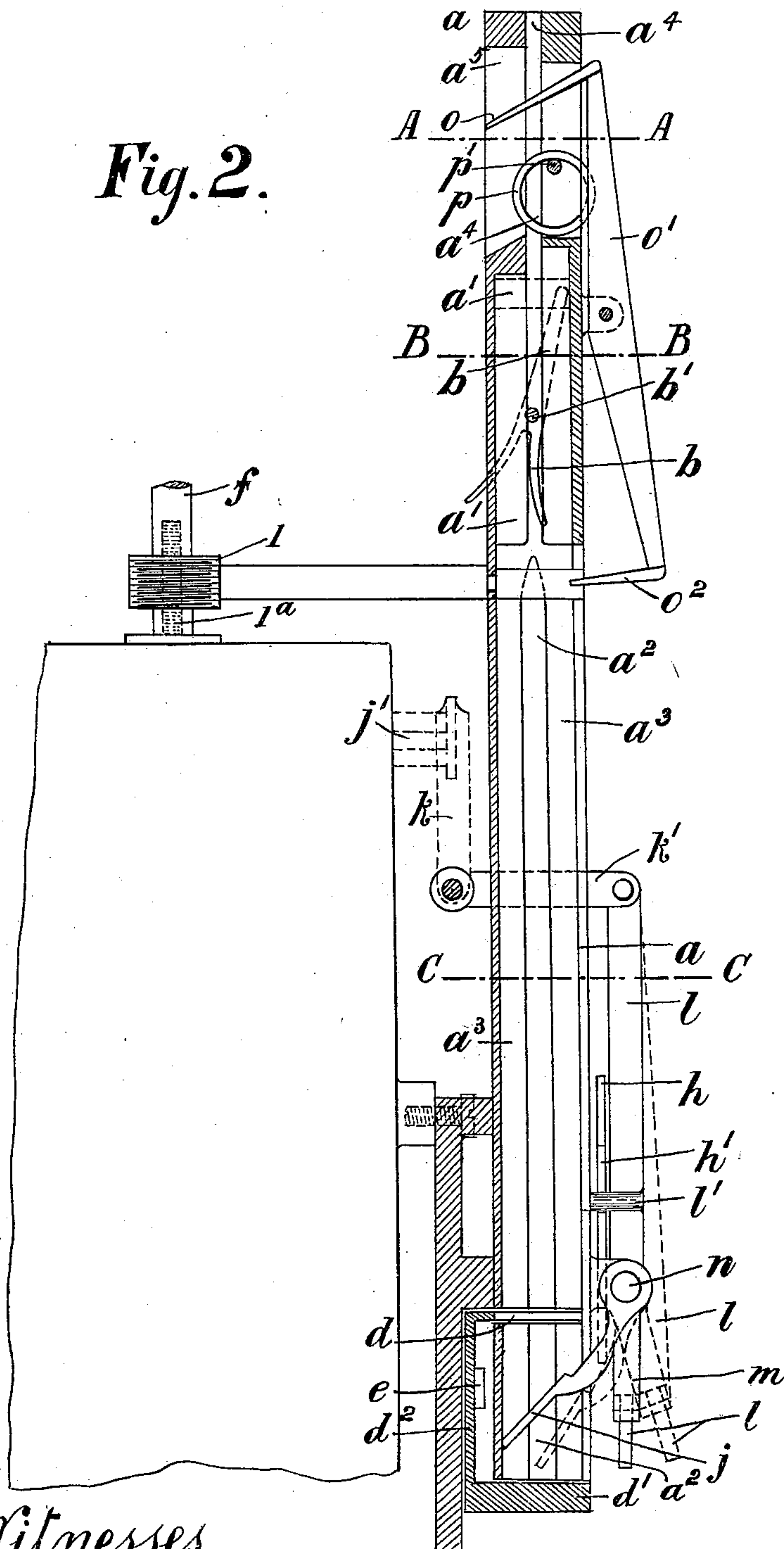
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Fig. 2.



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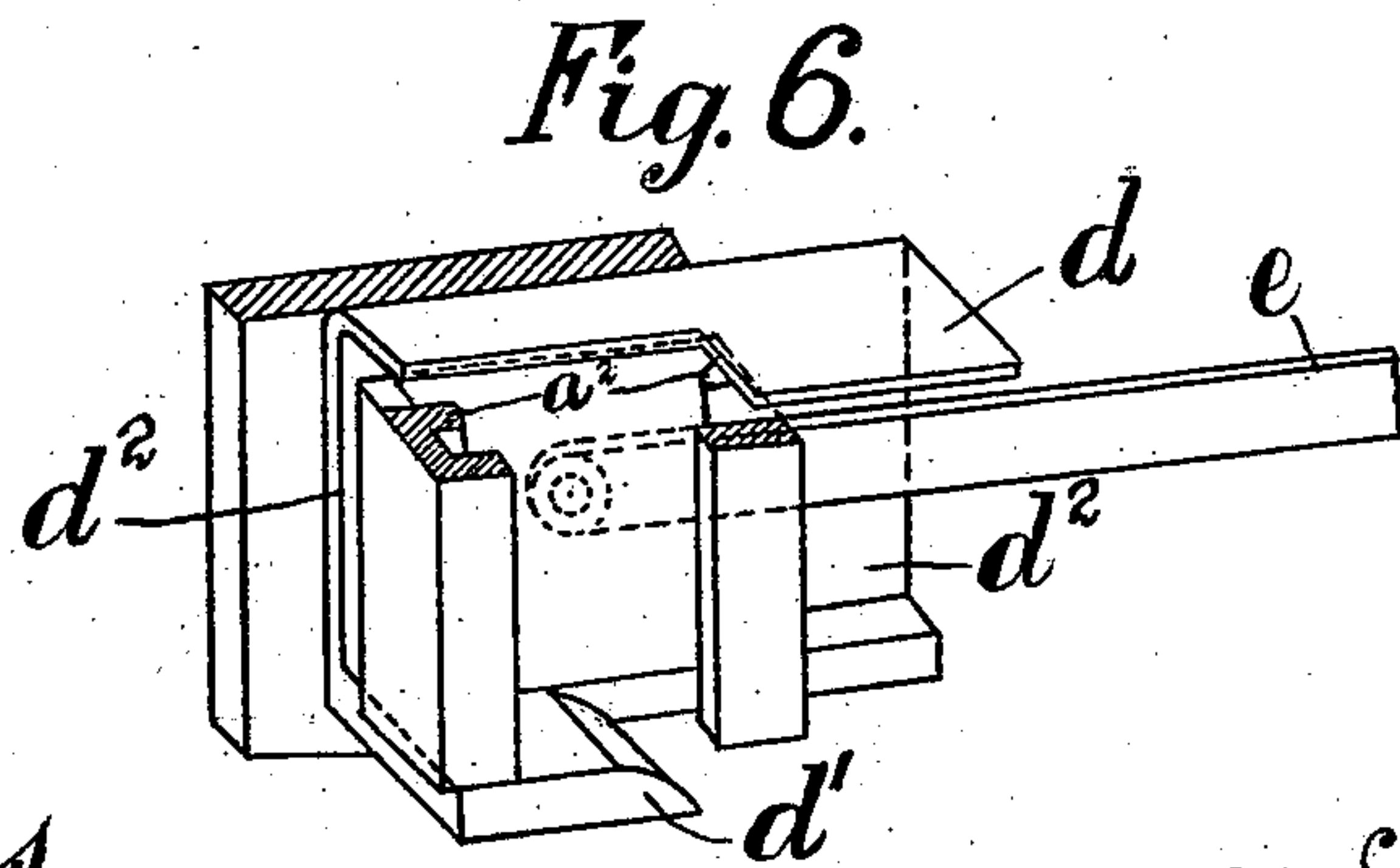
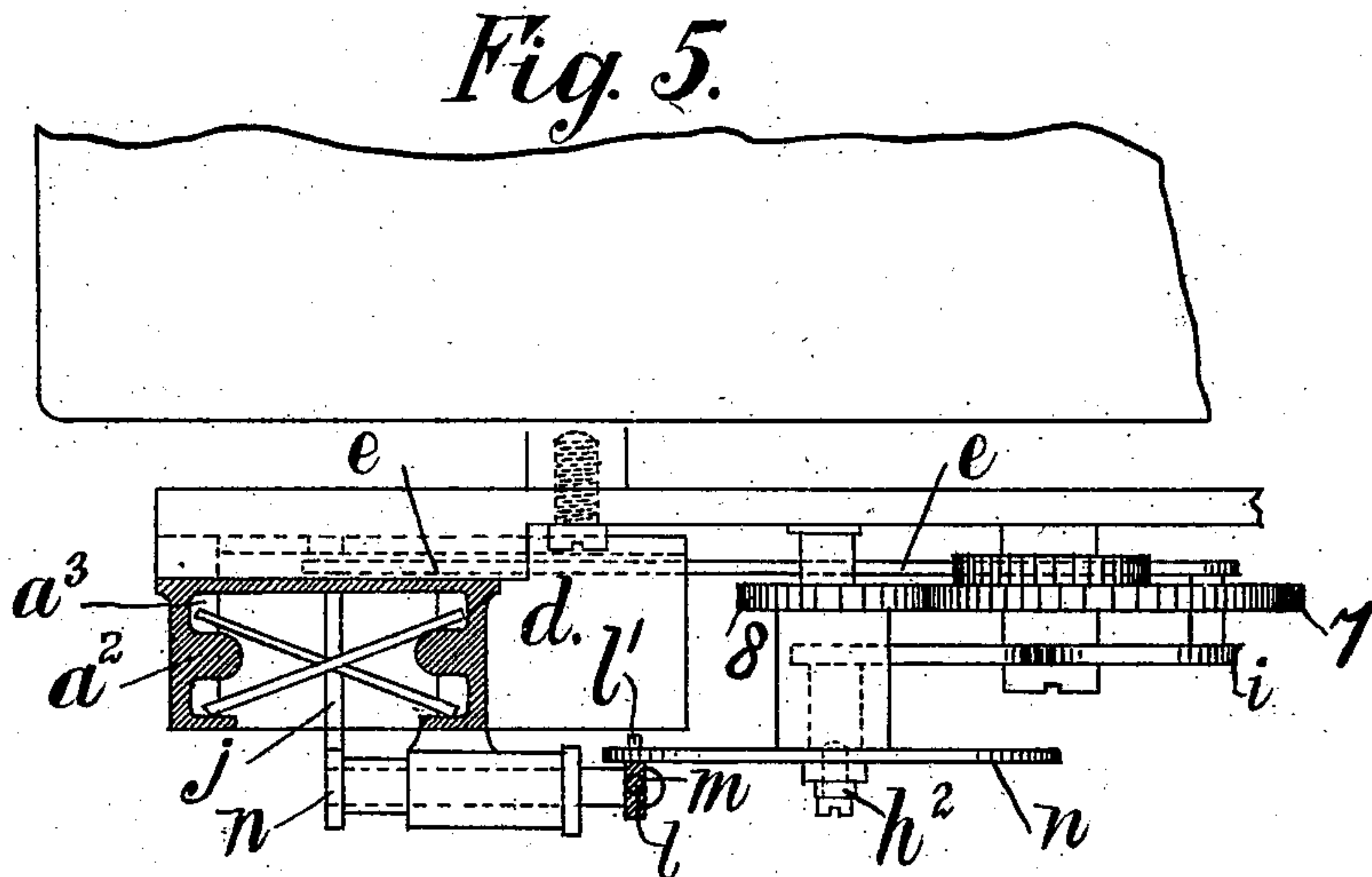
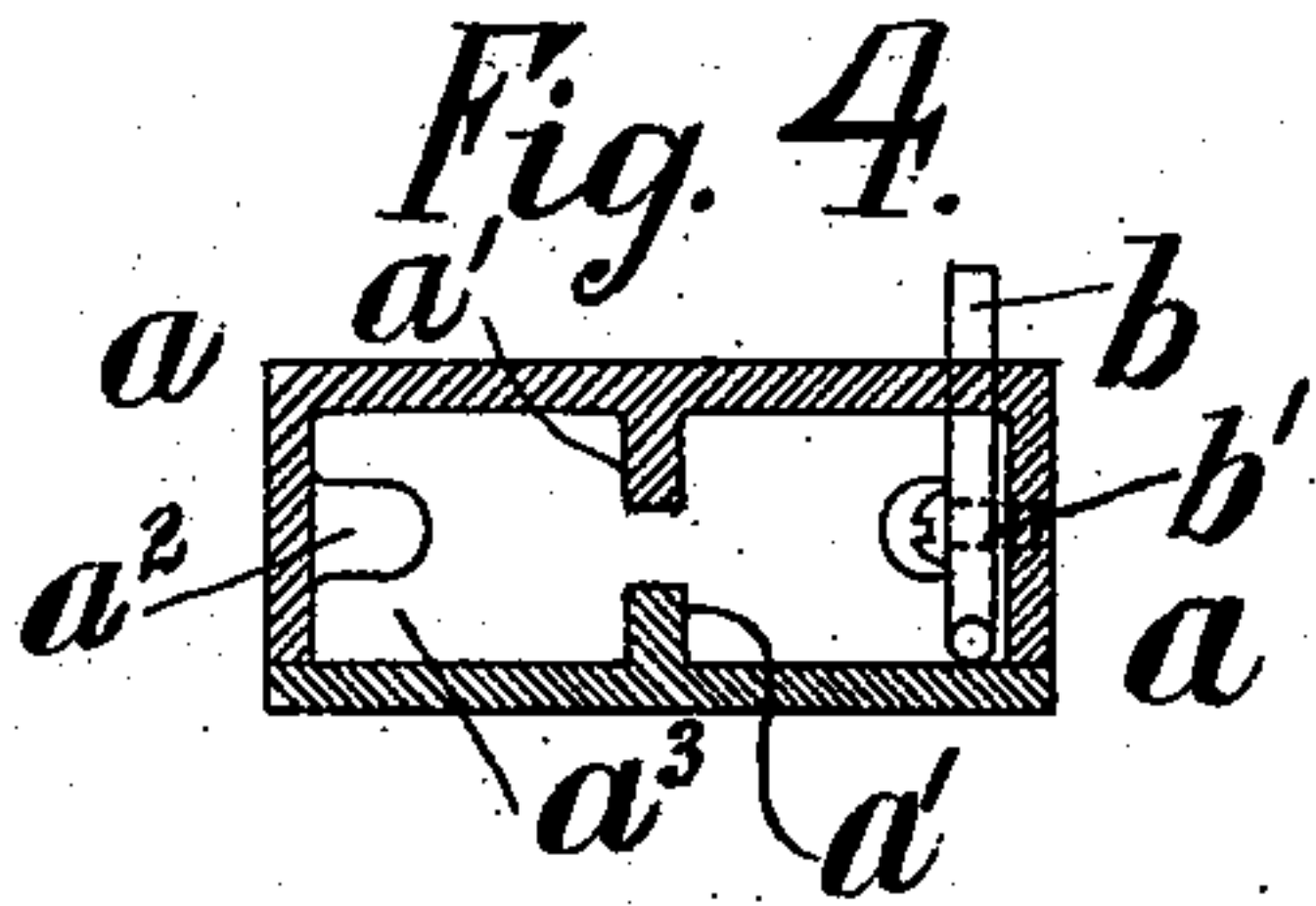
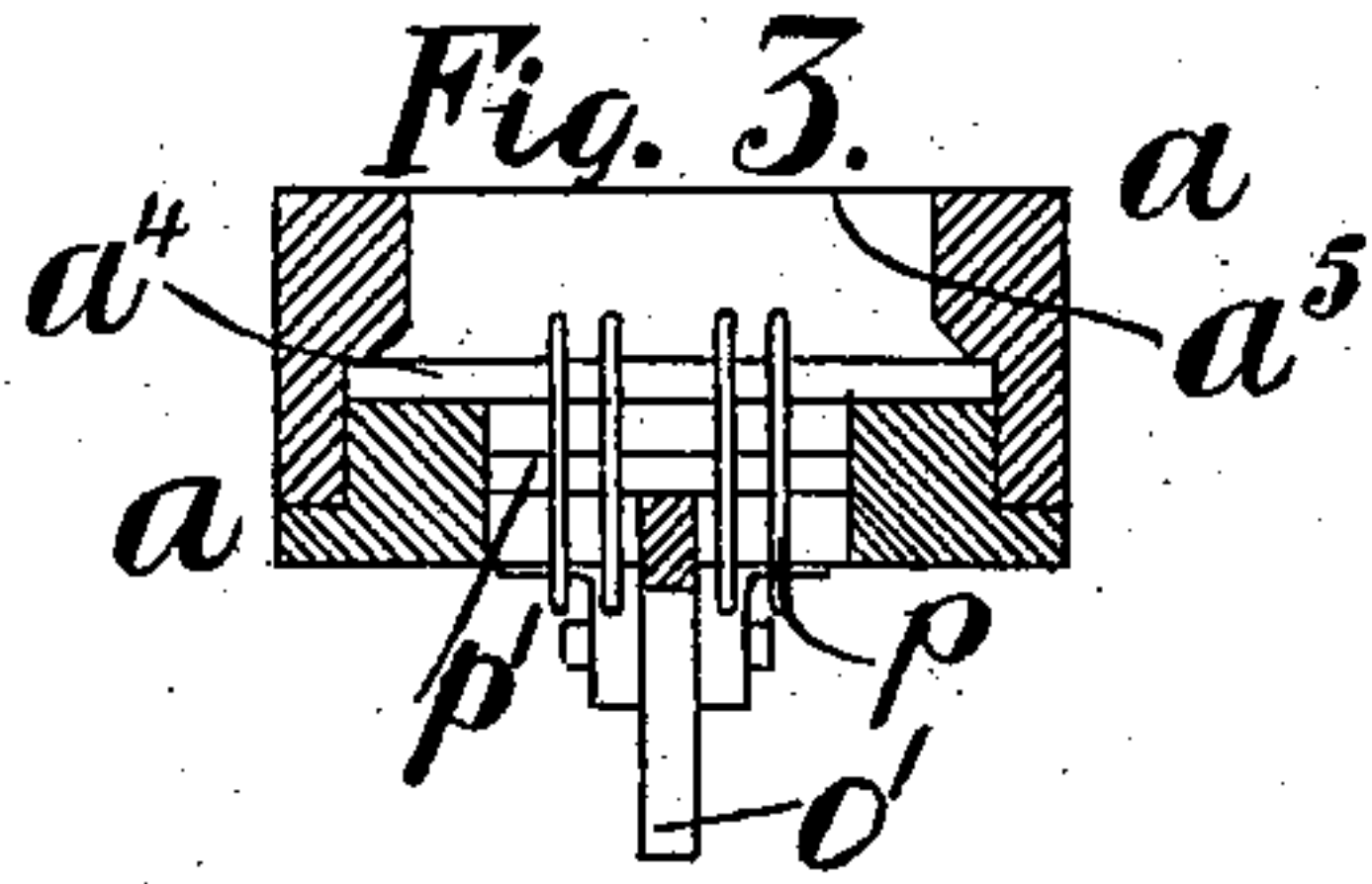
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4 Sheets—Sheet 3.

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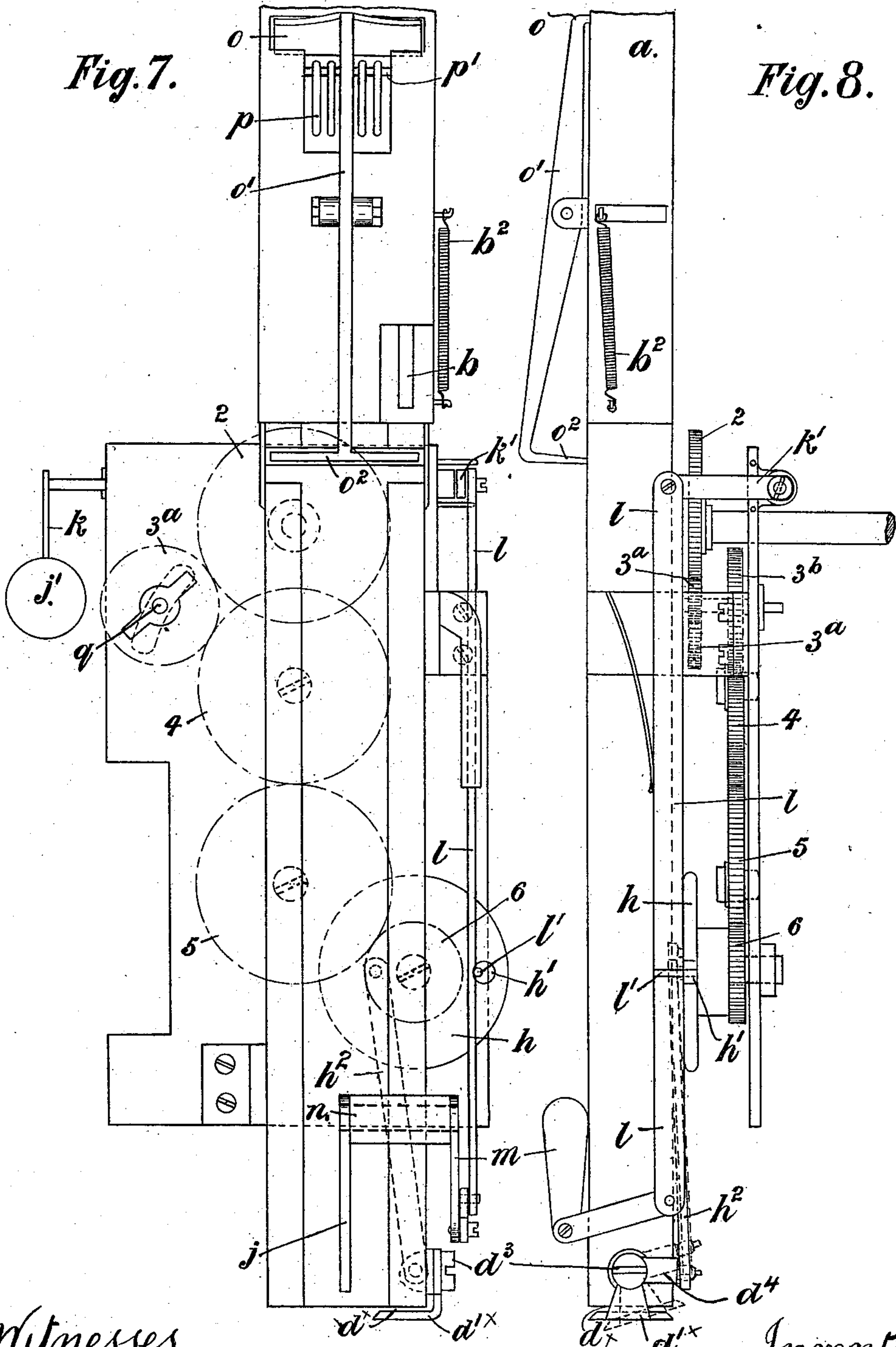
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Fig. 7.

Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES GRANTLEY BEECHEY, OF LIVERPOOL, ENGLAND.

AUTOMATIC GAS-METER.

SPECIFICATION forming part of Letters Patent No. 556,299, dated March 10, 1896.

Application filed August 21, 1895. Serial No. 560,010. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GRANTLEY BEECHEY, a subject of the Queen of Great Britain and Ireland, residing at Liverpool, in the county of Lancaster, England, have invented new and useful Improvements in or Connected with Automatic Gas-Meters and other Coin-Freed Apparatus, of which the following is a specification.

This invention has reference to gas-meters in which the act of placing a coin or the like in it, assuming it to be locked, will free or allow the meter to pass a given quantity of gas and which, after such a volume of gas has been passed through it, automatically becomes stopped or locked, and no more gas can pass through until another coin or the like, or a number of coins, is placed in the apparatus. The invention, however, has reference in part to other meters than gas meters or apparatus, where a coin or the like placed in it frees it and allows it to act or be operated or set in action.

The invention will now be described as applied to what are generally called "coin-freed gas-meters," and to that kind of such meters in which, if more than one coin is placed in it at one time, the coins actually passing from the freeing or actuating mechanism into the cash drawer or receptacle of the apparatus will only be passed as the quantity of gas paid for by each coin passed through it has been or is being consumed.

This application of the invention will be described with the aid of the accompanying drawings, in which—

Figure 1 is an elevation showing the face of the apparatus or mechanism. Fig. 2 is a side elevation in section. Figs. 3, 4, and 5 are cross-sections at A A, B B, and C C, respectively, of Fig. 2, while Fig. 6 is a perspective view of the lower part of the mechanism. Figs. 7 and 8 show, in side and front elevations, a modification of the invention.

Under this invention there is employed a tube to receive the coins as introduced, for conveying them to the operating mechanism and for holding two or more of said coins, a mechanism below operated by the meter itself and adapted to remove the coins from this tube one by one as the gas for which they are the payment is consumed and to de-

liver them to the money-drawer or other receptacle, and a stop or detent and freeing or releasing mechanism.

Referring to the drawings, *a* designates generally the tube into which the coins are introduced, and this tube is provided with a means or mechanism and is so constructed and adapted to operate that the successive coins which are introduced into it are caused to take such a position in relation to each other that the planes in which they lie intersect each other, whereby the adjacent coins in the tube cross each other and rest one upon the other, and therefore can never jam or stick, but are always resting fairly with their edges one upon the other, and are perfectly free.

A simple and convenient method or means by which the successive coins are caused to take these relative positions in the tube *a* is a switch *b*, that shown being hinged at *b'* just inside the conduit *a* at the upper part, while the tube itself at this part is provided with two central webs *a'*, which guide and hold the coins with their faces in vertical planes, and the tube itself being of considerable width the coins are enabled to adjust themselves to different angular positions while maintaining their faces in vertical planes. A slight spring *b²* is connected to the point of the switch *b* and exerts a pressure which tends to retain it in the position to which it is moved by the action of each coin inserted. Below this switch a rail *a²* at either side of the tube is provided, forming a channel *a³* at either side of such rail, and the groove at one side into which the coin falls will be the opposite one to that which receives the other edge at the other side. The action is that when a coin is introduced into the slot *a⁴* at the upper end of *a* it passes into the switch portion of the tube, and in falling down between the ribs *a'* one edge comes in contact with the upper half of the switch and the coin is thus turned about its vertical diameter and takes a position across the angles of the tube. The weight of the coin in passing down presses the tail of the switch away from that side of the conduit across which it stands, and leaving the switch part of the tube in this transverse position enters the grooves *a³* below standing in a position diagonally of the tube, and being thus held passes in this

manner throughout the rest of the apparatus. The switch *b* having thus been reversed by the action of this coin, the next coin that is introduced into the conduit will have its edge
 5 pressed to the opposite side thereof, and thereby the reverse transverse position will be given it to that of the preceding one, and its edges will therefore pass into the other two of the grooves a^3 , and if the former coin be
 10 still in the tube will rest upon its edge, but in a position or plane intersecting that of such coin below.

The means by which the coins are removed from the tube *a* and discharged into the coin-
 15 drawer (not shown) are operated from a suitable part of the meter in the action of passing gas, and it is disposed at the lower part of the tube *a* and consists of a double sliding trap, having an upper door, *d*, and a lower door, *d'*.
 20 This trap is moved by the connecting-rod *e* to and fro laterally across the tube *a*, the doors *d* and *d'* in the construction shown forming upper and lower horizontal plates on a vertically-guided plate d^2 , the door *d* being disposed on
 25 the plate d^2 at one side, while the door *d'* is at the opposite side, so that in operation, when the door *d* stands across and forms a sliding bottom to the tube *a*, the door *d'* stands in a
 30 position away from the lower end of the tube *a*, and vice versa. Thus in action (assuming there be a number of coins in the tube *a* one upon another) when the slide-bar *e* moved by the meter withdraws the trap, so as to bring
 35 the door *d* out of the tube *a* in the position shown in Fig. 6, a coin would fall from the tube onto the lower door, *d'*, but the upper ones would still be carried by this lower coin, and then as the meter works on and moves back the trap the top door, *d*, will slide in between
 40 the two coins and support that or those above, while the lower door, *d'*, when this is done would be moved back so far as to allow the coin in the part of the tube between *d* and *d'* to fall out into the coin receptacle or drawer,
 45 and this action will continue as long as one coin is in the meter.

The mechanism for operating the trap shown in Fig. 6 and for locking same when the gas for which coins have been introduced has all
 50 been consumed is as follows: The connecting-rod *e*, by which the trap is moved to and fro, is operated from the shaft *f*, which ordinarily actuates the counter mechanism of the meter, and this through the worm 1 thereon
 55 and a worm-wheel 1^a (shown in dotted lines) gearing with it and a train of wheels 2, 3, 3^a, 3^b, 4, 5, 6, 7, and 8 operates a disk *h* on the axis of the toothed wheel 8, which disk through a connecting-rod h^2 and the bell-crank lever
 60 *i* oscillates the rod *e* to and fro at each revolution. This constitutes the whole mechanism for giving motion to the trap.

The mechanism for stopping the action of the meter and supply of gas when the amount
 65 paid for has been consumed consists of a tappet *j*, which is actuated to free the meter by the coins as they pass into the trap portion of

the tube *a*, while the weight of the parts connected with it move it in the opposite direction when no coin is in such portion and effect
 70 a locking action between the parts operated by it and the disk *h*, and so stop the mechanism within the meter, and also the valve by which the flow of gas through the meter is controlled, or either of them. In the example
 75 given in the drawings both these effects are produced, and the means connected with tappet *j* by which this is obtained consists in connecting the meter gas-valve spindle *j'* to and working it through the tappet *j*, the arms
 80 *k* and *k'*, bar *l*, and arm *m*, which is mounted on the same spindle *n* as is the tappet *j*, and by locking the disk *h* by a pin *l'* on the bar *l*, which, when the notch at *h'* in the disk *h* comes opposite this pin in the disk-rotation,
 85 and no coin is in the tube *a* or trap, falls into said gap by gravity, and further rotation of the disk *h* is stopped. In this latter action the bar *l* is lifted (its engagement with *m* being such as to allow of its being raised and
 90 lowered) and the meter valve-spindle *j'* is thereby pressed in and the valve closed. By these means, both the gas-supply and the acting mechanism of the meter are stopped.

When the machine is empty the trap will be
 95 in the position shown in Figs. 1 and 6, and therefore the coin introduced will fall down the conduit and strike the tappet or pawl *j*, the action of which is that it and the arm *m* will be moved outward, and therefore the rod
 100 *l* will also be moved outward and withdraw the pin *l'* from the disk *h*, whereupon the mechanism of the meter is unlocked or freed, and at the same time the rod *l* and arm *k'* are free to fall, and by their own weight (or by a spring)
 105 do fall and so open the valve which controls the passage of gas. Then when a complete revolution is partly made the coin falls from the trap and the tappet *j* and arm *m* will be moved back by the weight of the rod *l* or by
 110 a spring. During the rotation of the disk *h* the end of the pin *l'* rests on its face, and as soon as the gap *h'* arrives opposite the pin *l'* the pin *l'* drops into the gap and the lever *m* and tappet *i* move into the normal position, as
 115 in Fig. 2; but the lower end of the bar *l* being free in the hole in the end of the arm *m* the disk *h* will rotate a certain amount and lift the bar and so move the arm *k* until it closes the gas-valve. When this is done the disk *h*
 120 is held.

The tube *a* by the slot a^4 is adapted to take only coins of a given size or value, and it is provided with means at the upper part by which coins of smaller sizes are discharged
 125 from the tube. This means consists in providing one side of the slot a^4 with an opening a^5 of slightly less width than the slot itself and providing such slot with rings *p*, carried in a bar *p'* below. The action of this device
 130 is that when the proper size and value of coin is introduced the lower edge of it acting upon the rings *p* presses them back, and so the coin passes them and falls down the tube; but

when a smaller coin is introduced this coin will not be held at its edges, and therefore the rings p cause it to pass away from the slot in an outward direction, and so throw the coin out of the tube. As a means of closing the tube a when full of coins, the mouth or slot a^4 is closed by a plate o , which is inclined, as shown, and supported on the hinged rocking lever o' , the opposite end, o^2 , of which is acted upon by the coins in the tube when full up to the lower edge of the bars a' . If when the tube is full to this point a coin be pressed into the slot a^4 the plate o cannot be pressed back, as the tail o^2 of the device is stopped from being moved inward by the presence of the uppermost coin in the tube. When, however, coins are removed from the tube, then by pressing a coin into the slot the edge acting upon the inclined plate o presses it back and allows the coin to fall into the tube. By this means no coins will be held or rest in the switch portion of the tube, which is desirable. To prevent wires or such like being passed down the tube a to tamper with the meter, the upper end or plate, o , and the lower part, o^2 , of the lever o' are carried right across the tube and so bar the entrance to any such device and obviate cheating and wrongful use of the meter.

The crosswise positions of the successive coins in the tube are shown in Fig. 5.

The mechanism shown would, of course, all be inclosed in a suitable casing formed on or attached to the meter-body, the slot a^4 being open.

With regard to the train of wheels 1, 2, 3, 4, 5, 6, &c., upon the spindle q there are two toothed wheels 3^a and 3^b , 3^b always being in gear with the wheel 4 and of a fixed size, while the wheel 3^a is changeable, and according to the size of the wheel the position of the spindle q will change, a slot r in the supporting-plate s being provided to allow of change of position of its axis. The purpose of this wheel-changing arrangement is that as the price of gas per unit varies the amount of movement of the controlling mechanism which governs the frequency of action of the trap which receives and discharges the coins must be changed. This simple device effects this end.

Regarding the modification shown in Figs. 7 and 8, the coin-trap in this case, instead of being a sliding one, as shown in Figs. 1 to 6, is an oscillating one. It consists of a plate d'^x , which is disposed under one side of the tube a and mounted on a pin-pivot d^3 to the tube. Its operation—that is, oscillation—is effected by the disk h , in the same manner as the trap set forth with reference to Figs. 1 to 6, through the connecting-rod h^2 , the lower end of which is connected to the trap d'^x through an arm d^4 . The action of this modification is as follows: In the normal or stationary position the plate d'^x is horizontal, in which position it will hold a coin either in the one groove of the tube a at this side or in the

other groove. When, however, the disk h (moved, as above described, by the passage of gas through the meter) is revolved, the plate d'^x through the rod h^2 is tipped to one side, and when moved to near the extreme position and inclined—as, for instance, as indicated in dotted lines in Fig. 8—the coin which has been supported by the plate or the part of it at that side which has been moved away will be removed from under the coin, and so allow it to fall. In the case of there being another coin above, the edge of which will be in the groove at the other side of the tube, this coin will fall down and will be caught by the part of the plate d'^x which will be directly under the groove at that side of the tube. When, however, the trap d'^x is moved in the opposite direction by the other half-revolution of the disk h , the plate d'^x will be withdrawn from under this coin in the same way as from under the other coin just described. This arrangement of trap is preferable to that set forth with reference to Figs. 1 to 6, in that even coins bent very considerably do not interfere with or render less certain its continuous and correct action.

As regards the application of this invention to other coin-freed or automatic apparatus, as meters or measuring apparatus, or other analogous cases where a plurality of coins can, or may with the assistance of this invention, be placed in the apparatus one after another, the improvements herein described, connected with the means by which these successive coins are caused to take the relative positions, as specified, can be used with great advantage, and, also, the combination, with this improvement, of the means of discharging or removing the coins one by one and of stopping or locking the apparatus after the use thereof which has been paid for by the coins introduced can be used with advantage with such other types or kinds of apparatus, and, further, with respect to the particular forms or constructions of means by which the different modes of operation and of behavior and manipulation are automatically performed, these are not restricted under this invention to those more particularly set forth with reference to and shown in the drawings, as they may be modified or varied as to form or type and equivalents thereof used without departing from the essential or controlling characteristics of the improvements and the purposes of their use and application, and what is claimed in respect of this invention, both including and irrespective of the particular apparatus and mechanisms described herein with reference to and shown in the drawings, is pointed out, specified, or referred to in the following claiming clauses.

I claim—

1. In a coin freed or actuated fluid-meter or like apparatus, into which coins are introduced into a tube or conduit, the combination of a tube or conduit adapted to cause the successive coins to take a crosswise position in

relation to each other; a moving trap device working in connection with the lower end of such tube or conduit, and actuated by a part of the said meter or other apparatus moved
 5 by the fluid passing through it; and detent means by which when there are no coins in the said tube or conduit said trap is locked and stopped; substantially as set forth.

2. In a coin freed or actuated fluid-meter
 10 or like apparatus in which coins are introduced into a tube, the improvement consisting of a tube or conduit down which the coins introduced pass, having a switch at its upper part adapted to cause the successive coins to
 15 take a crosswise position in relation to each other therein; for the purposes described.

3. In a coin freed or actuated meter, the combination of a tube into which the coins are introduced, adapted to cause the successive
 20 coins to take a transverse position in relation to each other; a moving trap at the lower part of said conduit by which the coins are removed from the tube one by one, operating to and fro, and actuated by the movement of
 25 the meter in passing the material for which payment is made by said coins; and a mechanism actuated by the coins in the conduit, and by a disk device actuated by said meter, whereby the action of the mechanism, and
 30 the movement of material through the meter are stopped; for the purposes set forth.

4. In a coin-freed meter or like apparatus, the combination of a tube into which the coins are introduced, and a switch device at the up-
 35 per part of the same operated alternately in opposite directions by the coins as introduced,

and by which the coins in passing down said tube are in succession caused to take a crosswise position in relation to each other; substantially as and for the purposes described. 40

5. In a coin freed or actuated meter or like apparatus, a tube or conduit into which the coins are introduced; a trap oscillated to and fro by the movement of the apparatus itself; and a locking means actuated by the coins
 45 in passing through said tube and trap, by which said trap is locked, and a valve controlling the flow of fluid through the meter closed; substantially as and for the purposes set forth. 50

6. The tube *a* having the switch *b*, and grooves or channels *a*³ at either side; said switch and grooves co-operating to make the coins stand on edge one above the other and to take a crosswise position in relation to each
 55 other as set forth with reference to the drawings.

7. In a coin-freed meter or like apparatus, the combination of vertical coin-tube adapted to receive a plurality of coins, and means consisting of the rings *p* supported loosely on the
 60 pin *p*¹ and extending across the channel for the coin by which coins smaller than those which it is designed to be used in connection with the apparatus are thrown out of the tube; 65 substantially as described.

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

CHARLES GRANTLEY BEECHY.

Witnesses:

FREDERICK JOHN CHEESBROUGH,
 JOHN HINDLEY WALKER.