

(No Model.)

2 Sheets—Sheet 1.

S. G. REED.
Bellows.

No. 236,626.

Patented Jan. 11, 1881.

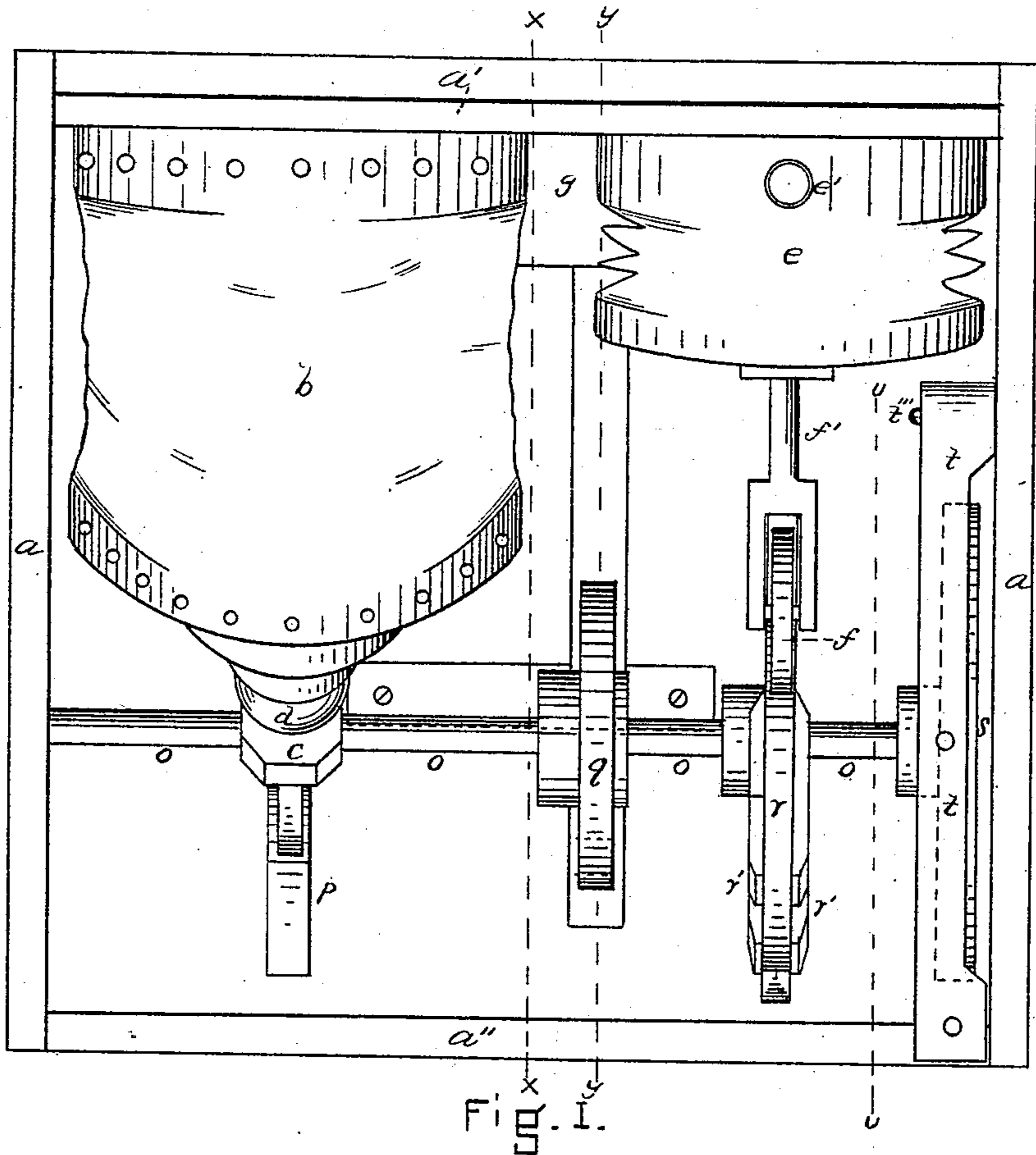


Fig. 2.

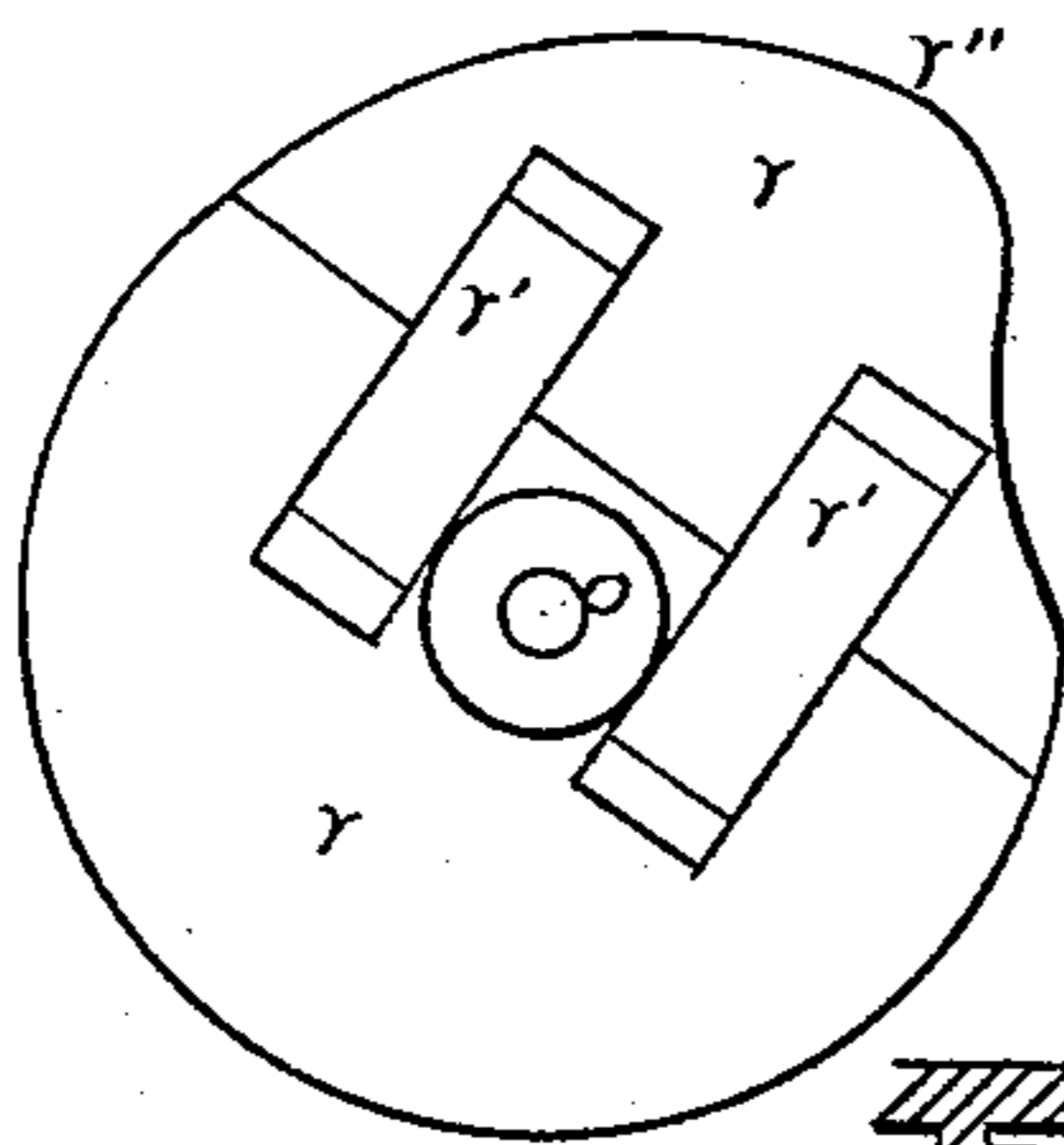


Fig. 3.

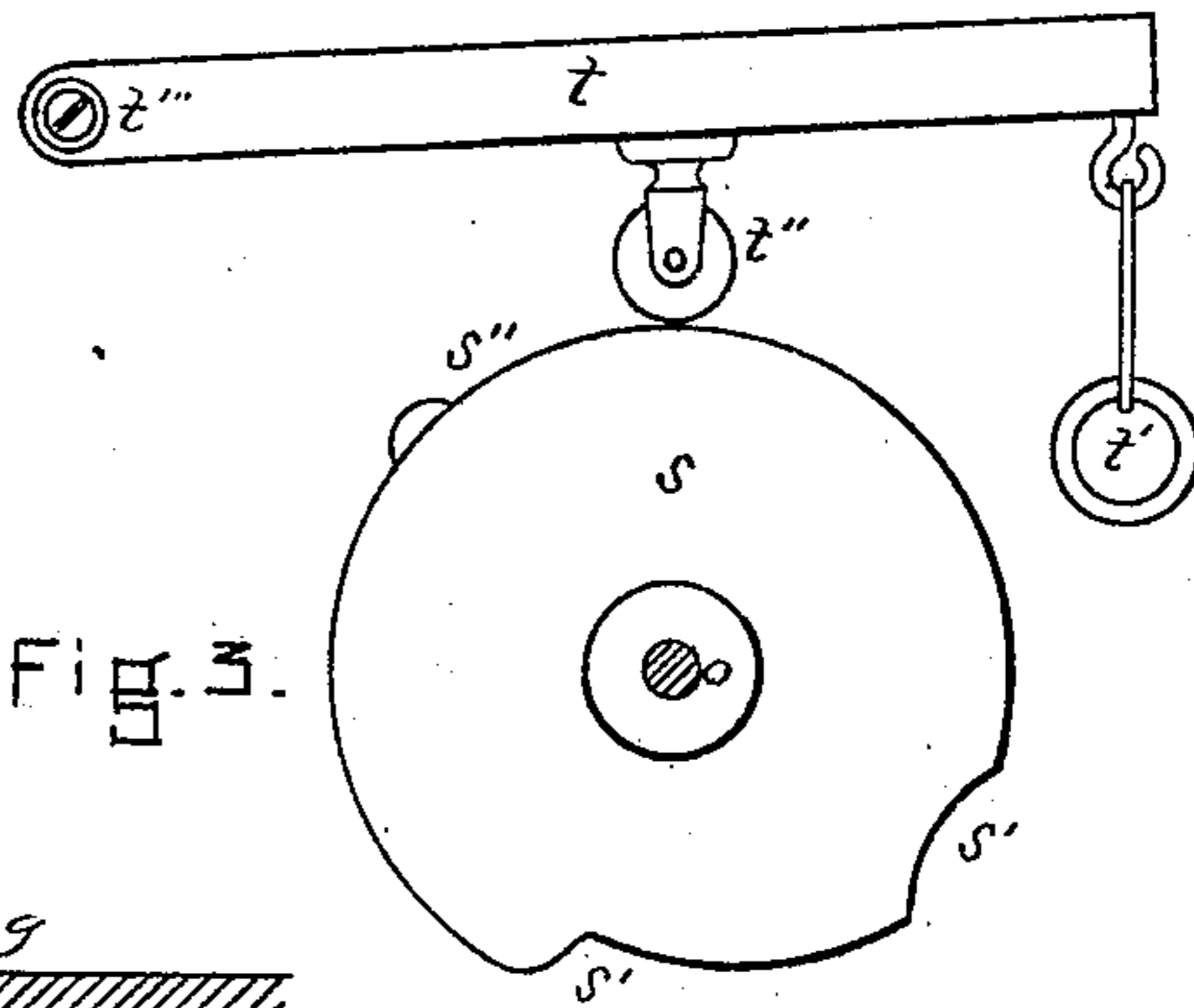
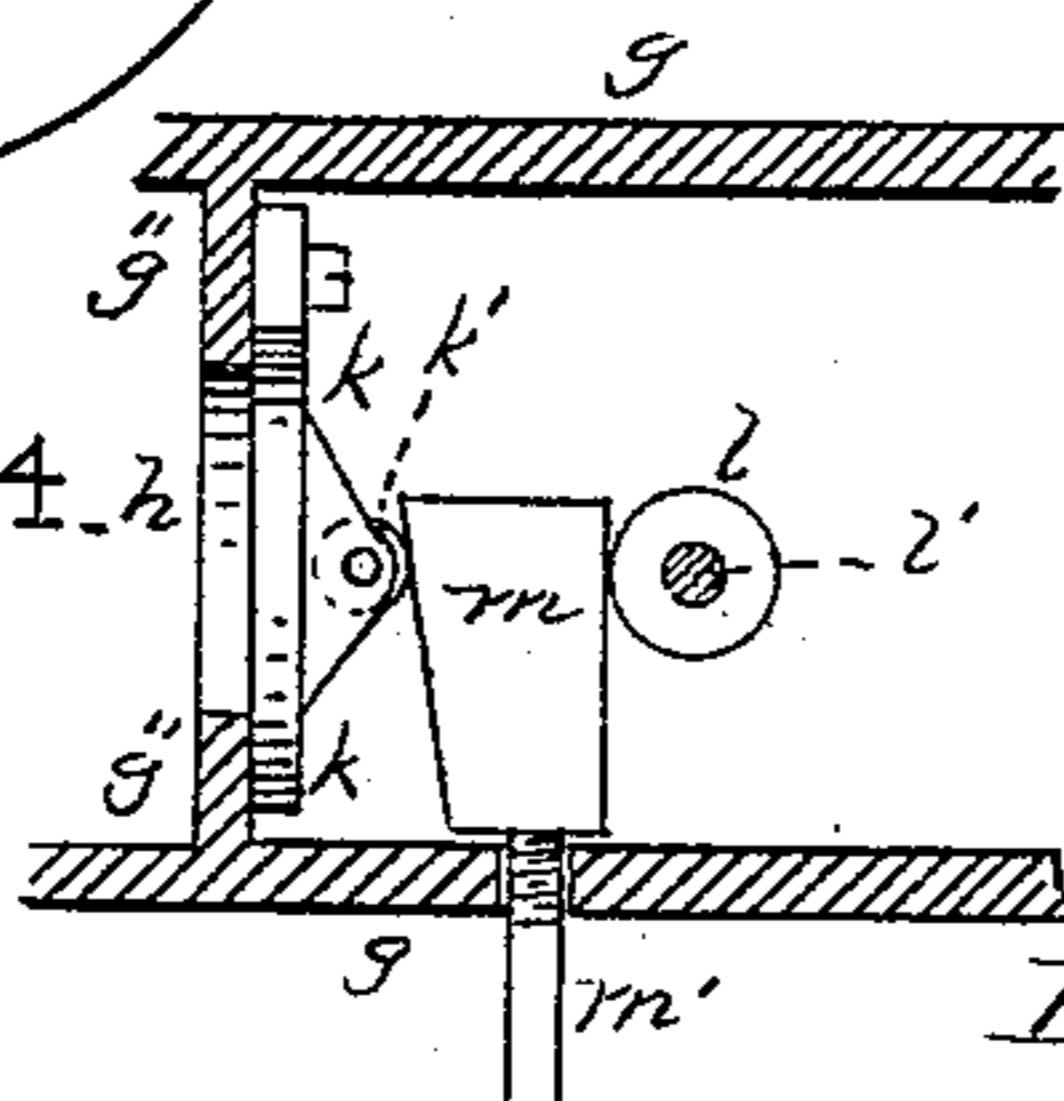


Fig. 4.



WITNESSES

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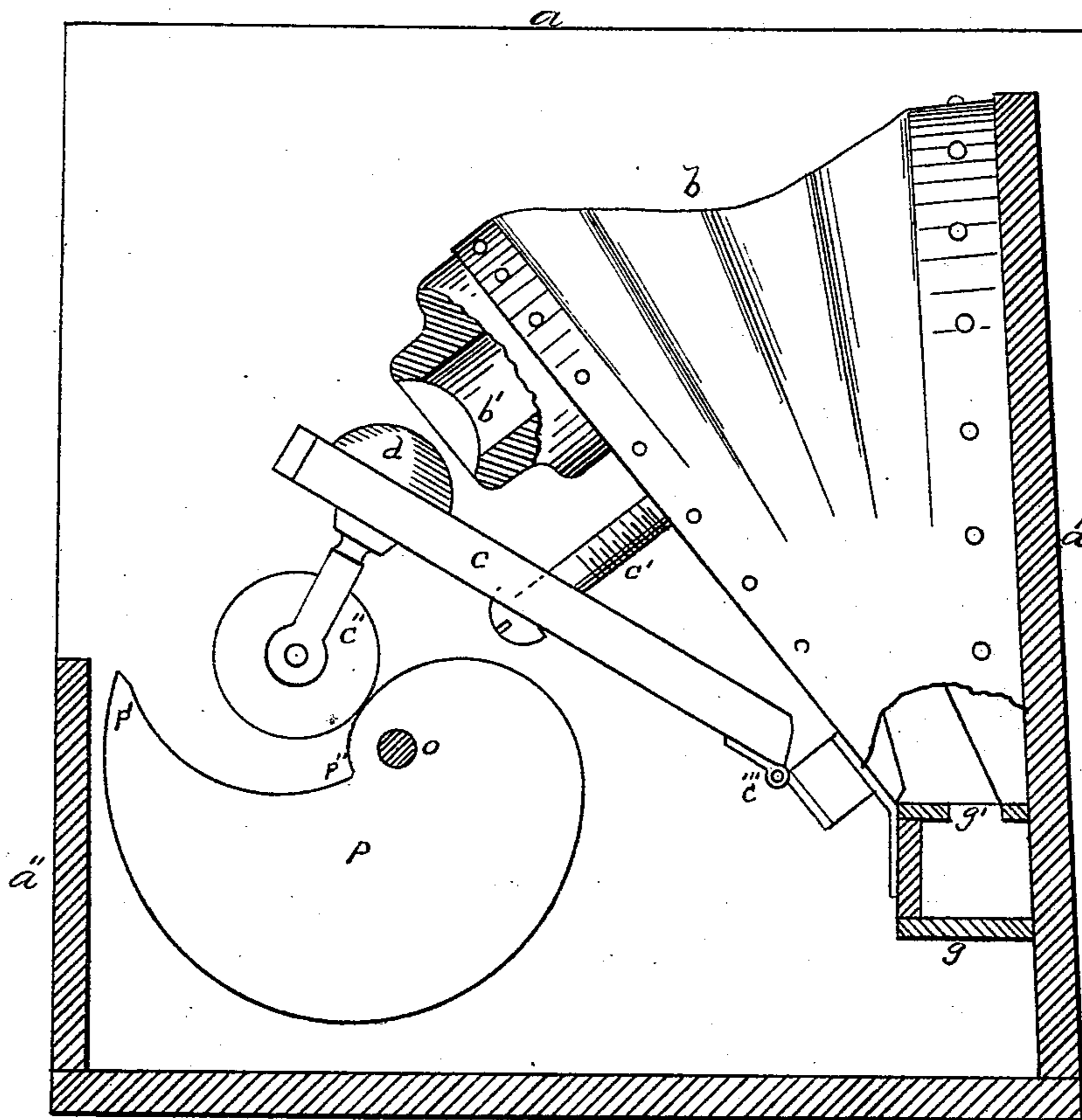


Fig. 5

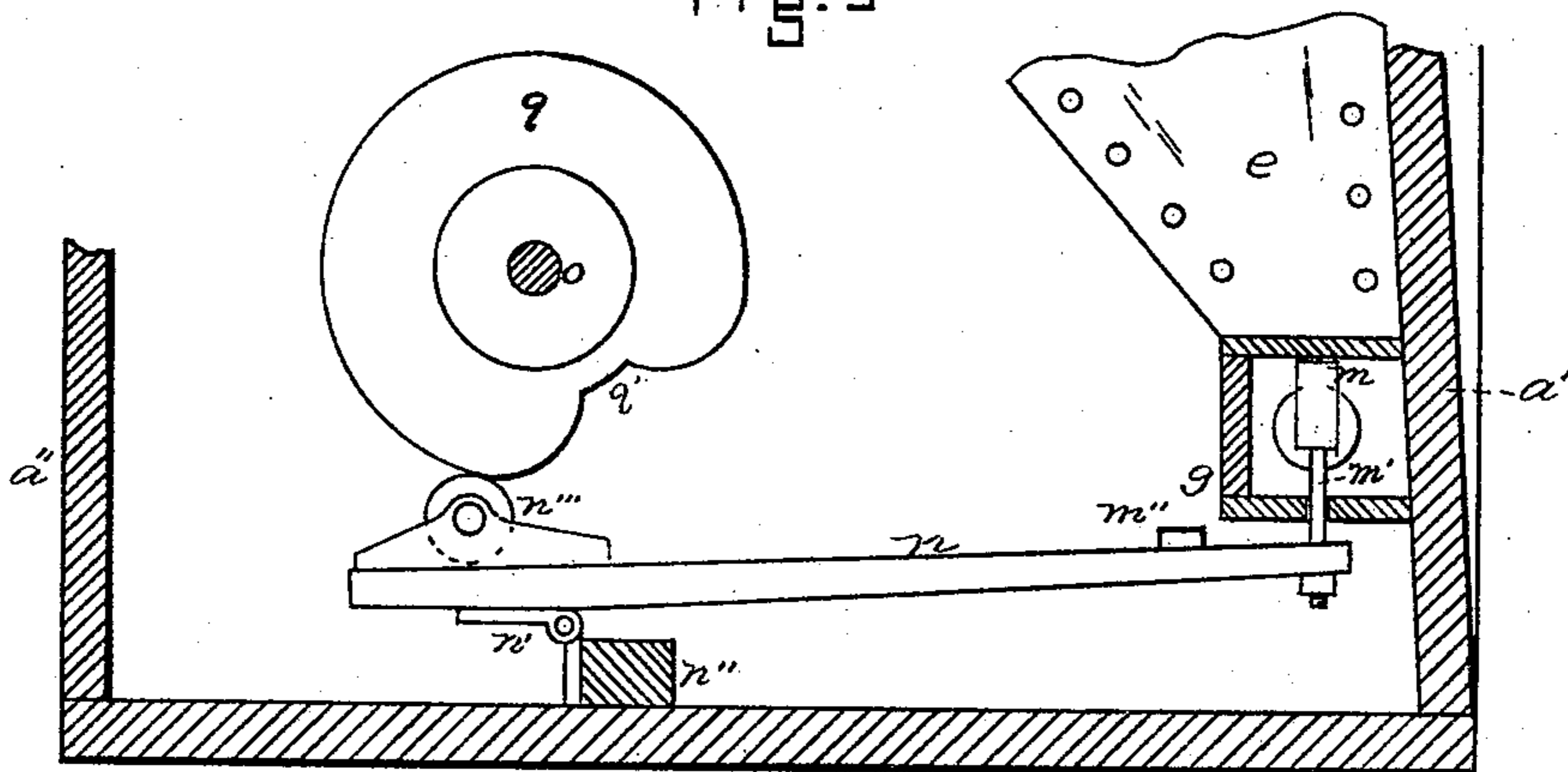


Fig. 6

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UNITED STATES PATENT OFFICE.

SAMUEL G. REED, OF NEWTON, MASSACHUSETTS.

BELLOWS.

SPECIFICATION forming part of Letters Patent No. 236,626, dated January 11, 1881.

Application filed April 16, 1880. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL G. REED, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Bellows, of which the following is a specification.

This improvement relates to bellows to be used mainly in the manufacture of gas, although the invention may be used to a limited extent in supplying air for some other purposes.

In my invention I provide a vertical bellows and a vertical bellows-shaped receiver or closed bellows, operated by cams, both of which are secured to and actuated by the same shaft, which shaft also drives a cam which regulates the passage of air from the bellows to the receiver, and also actuates a fourth cam, whose purpose is to counteract or compensate for any inequality in the cam which actuates the receiving-bellows. By means of these devices, and those connected with them, as below described, I am enabled to produce a steady, unvarying pressure, thus overcoming the great objection to and difficulty in bellows for use in gas-manufacture—viz., flickering, which will be produced by the slightest jerk or unevenness, or even sensation of any kind.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a plan view of my invention with the bellows open and the receiver closed, and the cams, &c., in their proper position. Fig. 2 is a side elevation of the cam which actuates the receiving-bellows, detached. Fig. 3 is a detached view, showing a side elevation of the equalizing or compensating cam with its weighted lever, &c., the section being taken on lines *v v*, Fig. 1. Fig. 4 is a sectional view, showing the device for regulating the passage of air from the bellows to the receiver. Fig. 5 is a vertical section on line *x x*, Fig. 1. Fig. 6 is a vertical section on line *y y*, Fig. 1, showing the cam in elevation.

a a are the sides, *a'* the back, *a''* the front, and *a'''* the bottom, of a box inclosing and supporting my apparatus.

b is a vertical bellows secured against the back *a'* of the box, said back being usually tipped slightly forward to facilitate the opening of the bellows.

b' is the opening for the admission of air.

c is an arm hinged at *c'''* to the front of the bellows *b*, and provided with a truck-wheel, *c''*, upon its under side, which crests on the edge of the cam *p*. A check or stop, *c'*, prevents the arm *c* from dropping too far. *d* is the rubber valve fitting into the opening *b'*.

e is the receiver, and is made like a bellows, but without opening and clapper or valve in front. In other respects it is similar to the bellows *b*, and is placed vertically by its side. A truck-wheel, *f*, is secured by means of the rod *f'* to the front of the bellows *e* and rests on the cam *r*.

e' is the vent or outlet through which the air which has passed through the bellows *b* and receiver *e* is conducted to the desired place.

g is a conducting-box extending beneath both the bellows *b e*, connecting them by means of a number of openings, *g'*, Fig. 5, which open into both bellows. The portion between the bellows is, of course, closed, and is shown in enlarged section in Fig. 4. A partition, *g''*, separates the part beneath the bellows *b* from that beyond and beneath the receiver *e*, and is provided with the vertically-hanging valve *k*, provided with the wheel *k'* and covering the hole *h* in the partition. A wedge, *m*, held by the rod *m'*, fixed in the lever *n*, plays vertically between the wheels *k'* and *l*, the latter held by the horizontal bearing *l'*. The lever *n* (see Fig. 6) is hinged or pivoted at *n'* to the block *n''*, and is, by means of the roller or wheel *m'''*, raised and lowered by the cam *q*.

o is the driving-shaft, and by its means are rotated the cam *p*, of the peculiar shape shown in Fig. 5, which actuates the bellows *b*; the cam *q*, which, through lever *n* and wedge *m*, regulates the passage of air from bellows *b* into receiver *e*, (shown in Fig. 6;) the cam *r*, whose shape is shown in Fig. 2, which actuates the receiver, and the cam *s*, whose use will be below described.

In operation, power having been applied to the shaft *o*, thus rotating the cams, the air enters the bellows *b* while it is dropping, as shown in Fig. 1. As the cam *p* rotates it pushes, by means of the wheel *c''* and arm *c*, the valve *d* into the hole *b'*, closing the bellows gradually as the wheel *c''* mounts the cam to-

ward its highest point. The cam q meantime is pressing down the wheel n''' , thus lifting the other end of the lever n , and hence the wedge m , allowing the valve k to open and let
 5 the air through the conductors g into the receiving-bellows e . The cam r during this operation is slightly and very gradually pushing up the receiving-bellows e . When the wheel c'' drops from the highest point p' of the cam
 10 into the depression p'' , or a trifle before it, the wheel n''' rises into the depression q' in the cam q , thus causing the wedge m to drop and close the valve k , as in Fig. 4, preventing any back flow of air. The wheel f , however, does
 15 not drop into its lowest point when the wheel c'' does, but passes the highest point r'' in its cam a trifle later, so that when the pressure is removed from the bellows b it is still retained for an instant on the receiver e , in order to pre-
 20 vent the slightest sensation which might otherwise be caused by the relief of bellows b .

It will be noticed that the pressure upon the receiver is directly from the shaft, and not through the bellows b . It is therefore an in-
 25 dependent and regular action, not influenced by the action of the bellows b , and hence lessening danger of producing flickering; also, that by the relative positions and shapes of the cams p and r the pressure of the wind through the outlet e' is equalized, the receiver
 30 making wind when the bellows b ceases to produce wind. Again, by placing the bellows b in a vertical position great advantages are secured. The sudden drop, as in a horizontal
 35 bellows, is avoided. There is but little resistance when the bellows is being collapsed, and the valve k hanging vertically but little resistance there, the lifting both of the valve and bellows being nearly done away with. Again,
 40 the gate or wedge m is governed by the shaft, as is each of the bellows, reducing the danger of "sensation" (causing flickering) to a minimum.

A weight, m'' , is usually placed upon the
 45 lever n , in order to make its action more positive.

The cam r is often made in two parts and provided with cleats r' , Fig. 2, so that a portion may be removed and replaced by a new
 50 section, if desired.

The cam s is placed upon the shaft for the purpose of compensating for any inequalities which may appear on the edge of the cam r .

An arm, t , is pivoted at t''' , provided with a
 55 weight, t' , and a wheel, t'' , resting on the edge of the cam s .

In case there should be some portion of the cam r which went a little too hard, a small portion of the cam s might be removed, as at
 60 s' , to compensate for it. If there should be a

place on the cam r which went too easy, a protuberance, s'' , might be placed on the cam s . The protuberances placed on the edge of cam s , of which s'' is an example, tend to counter-
 65 act the effect of a too easy spot on the edge of cam r , and the removed portions s' s' on cam s tend to counteract the effect of a too hard spot on the edge of the cam r . The danger is that some imperfect spot on the edge of
 70 cam r will affect the bellows e , which, being the bellows from which the air is directly supplied, must be very even and steady in its motion in order to prevent flickering or sensation, even though slight. Of course the cams,
 75 being all on the same shaft, should all be as nearly perfect as possible; but the greatest necessity for perfection lies in the cam r , because this cam acts directly on the bellows e .

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

1. The combination, with the vertical bellows b , of the vertical receiving-bellows e and the conductor g , provided with valve k , the
 85 said bellows b being an open and the bellows e a closed bellows, each of the ordinary oblong shape and set with its expanding end uppermost, arranged to be operated substantially as and for the purpose set forth.

2. The combination of the cam p p' , arm c c' , and bellows b , and the cam r r'' , arm and wheel $f' f$, and receiving-bellows e , both cams
 90 being of the shape shown and fixed to the same actuating-shaft, substantially as and for the purpose set forth above.

3. The combination, with the bellows b e and conductor g , having valve k , of the cams p and r and cam q , lever n , rod m' , gate m , and wheels $k' l$, the said cams being all actuated by the shaft o , substantially as and for
 95 the purpose set forth.

4. In combination with the shaft o , cam r r'' , and closed receiving-bellows e , the cam s , lever t t' , and weight t' , said cam s being fixed to shaft o and provided with inequalities
 100 upon its surface for the purpose of compensating for corresponding inequalities upon the surface of cam r r'' , substantially as herein described.

5. In combination with the cam p upon the shaft o , the vertical bellows b , placed with its larger end up, and the hinged arm c , for opening and closing the air-hole b' , arranged to fall into the depressed portion of the cam p by its own gravity, and provided with the check c' ,
 110 substantially as and for the purpose set forth.

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Witnesses:

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