

(No Model.)

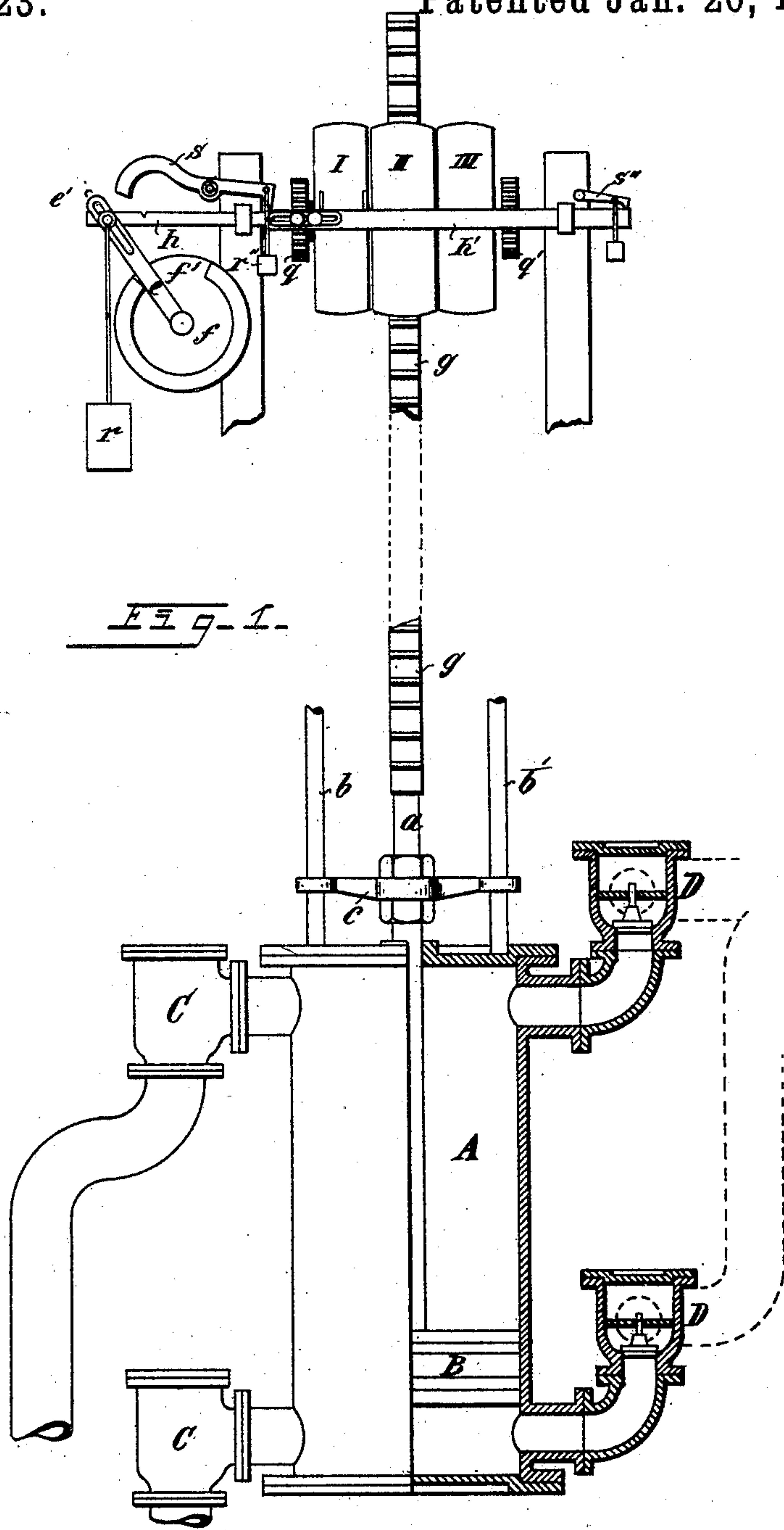
3 Sheets—Sheet 1.

A. MÜLLER.

MEANS FOR VARYING THE STROKES OF PUMPS.

No. 467,823.

Patented Jan. 26, 1892.



Witnesses:
G. C. Muel,
E. Arthur

Inventor:
August Müller.
By
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(No Model.)

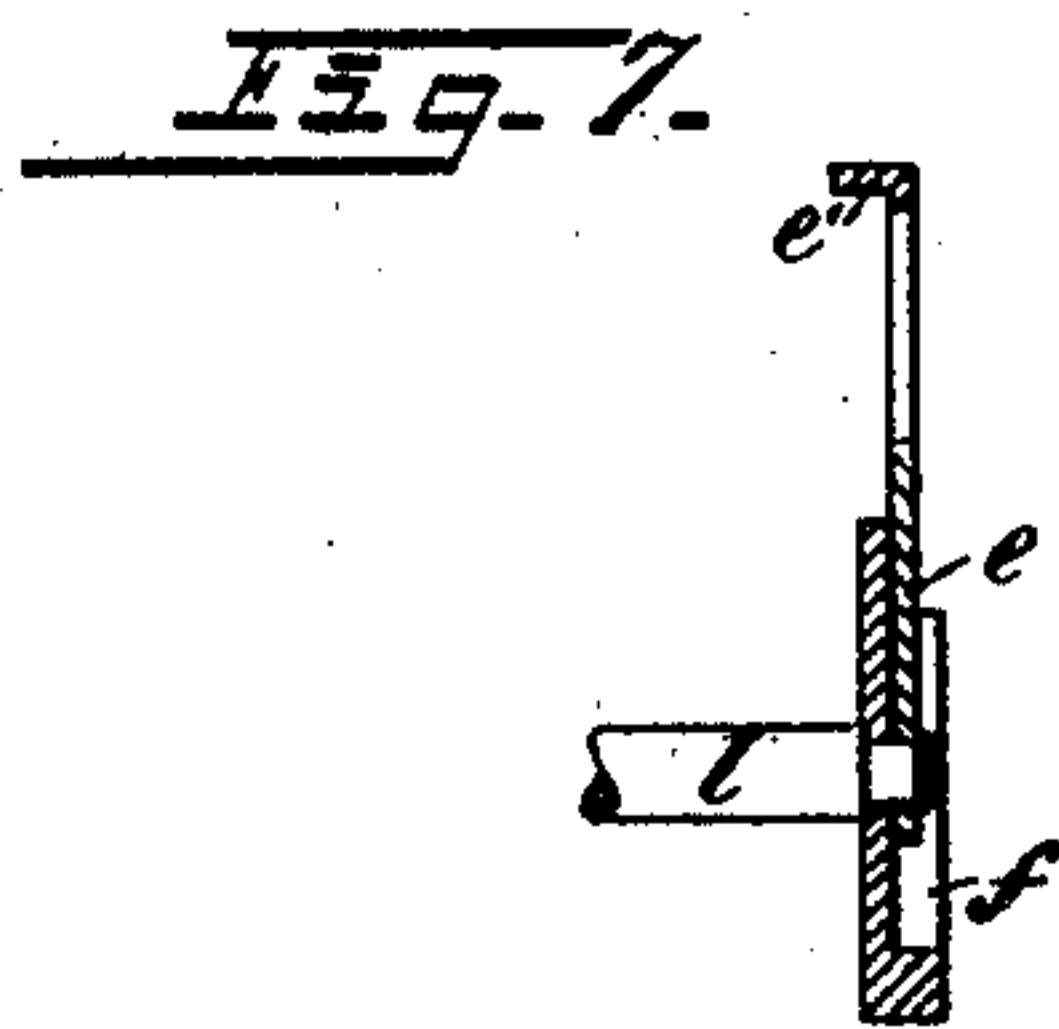
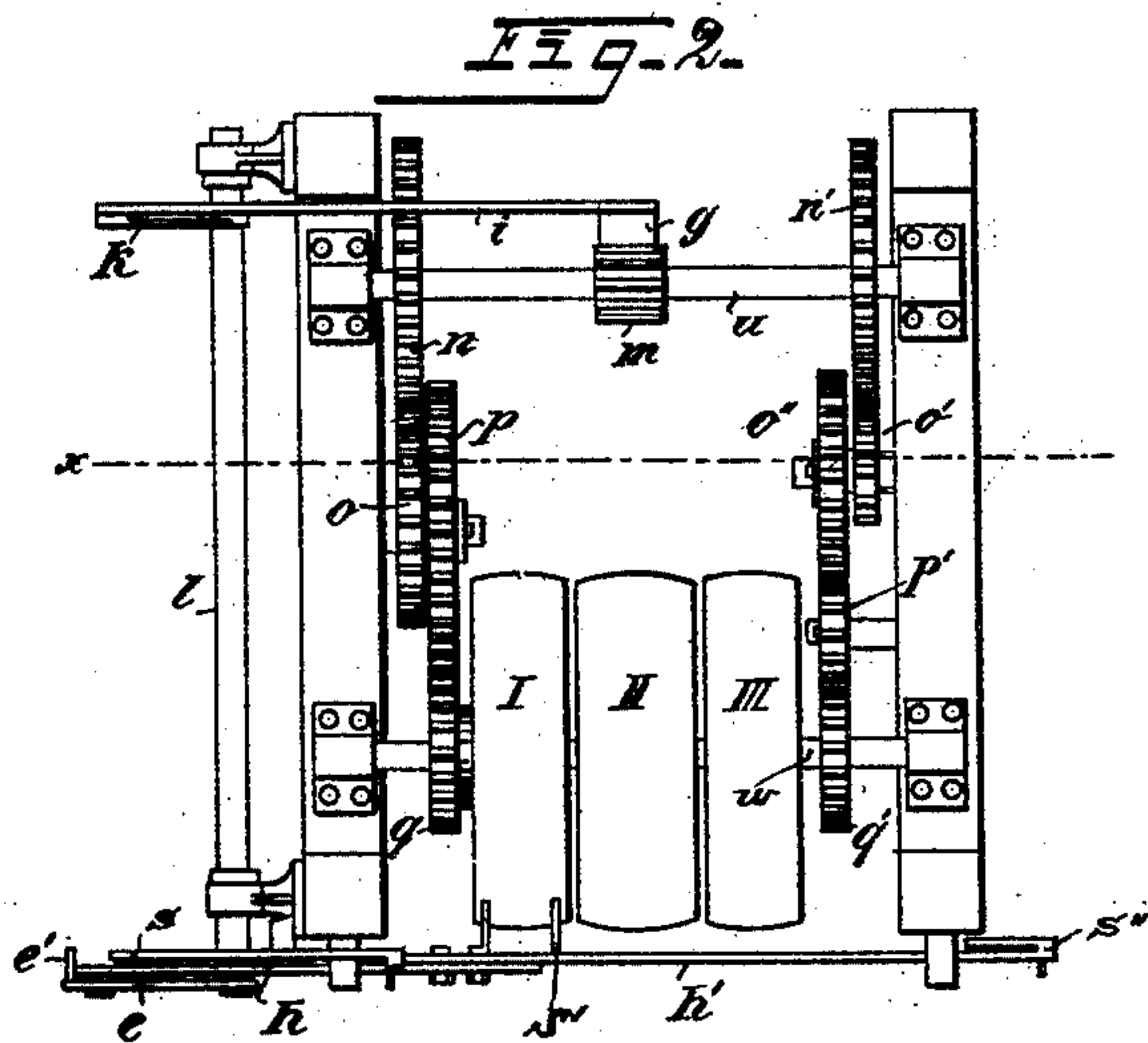
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3 Sheets—Sheet 3.

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Fig. 3.

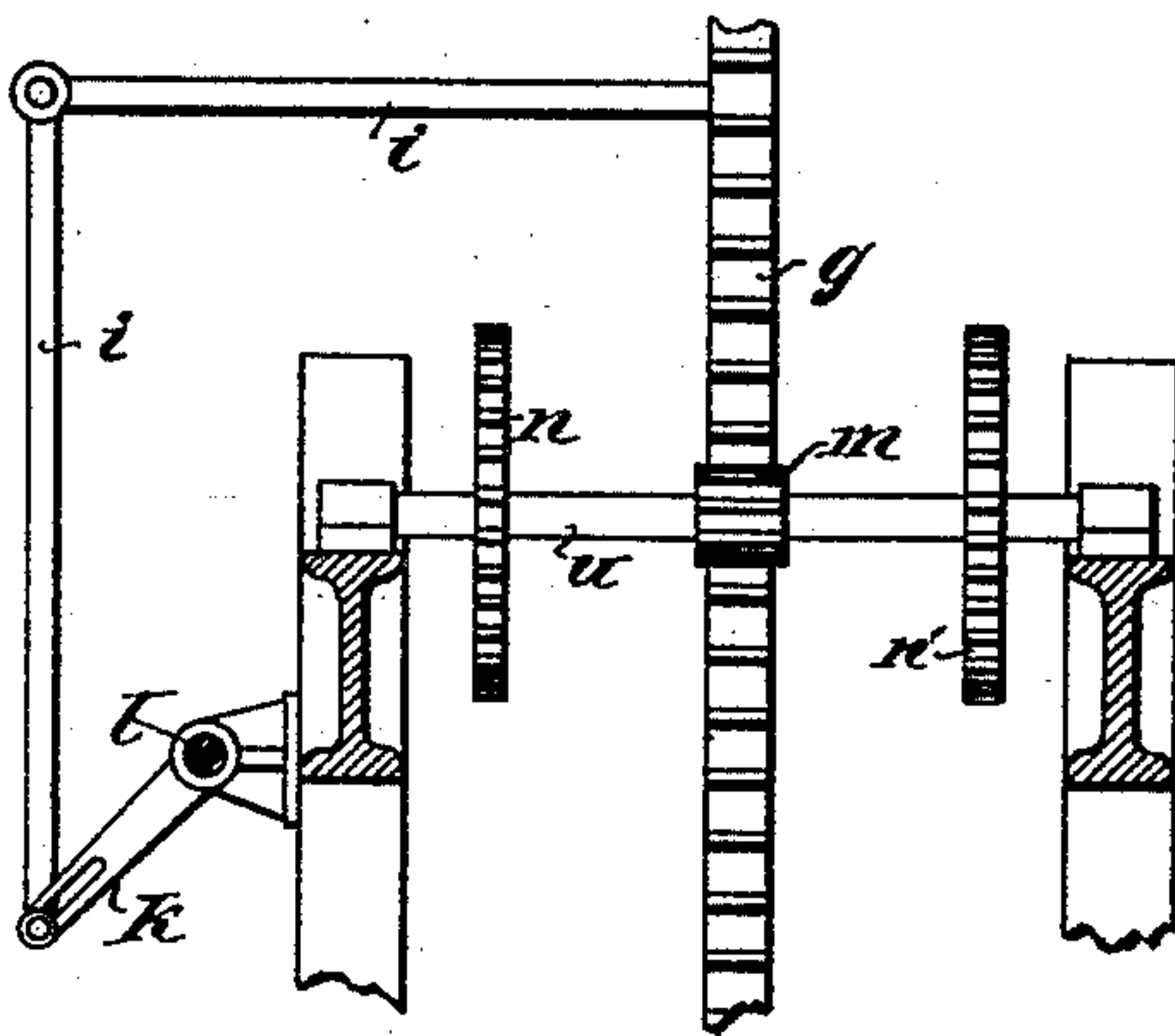


Fig. 6.

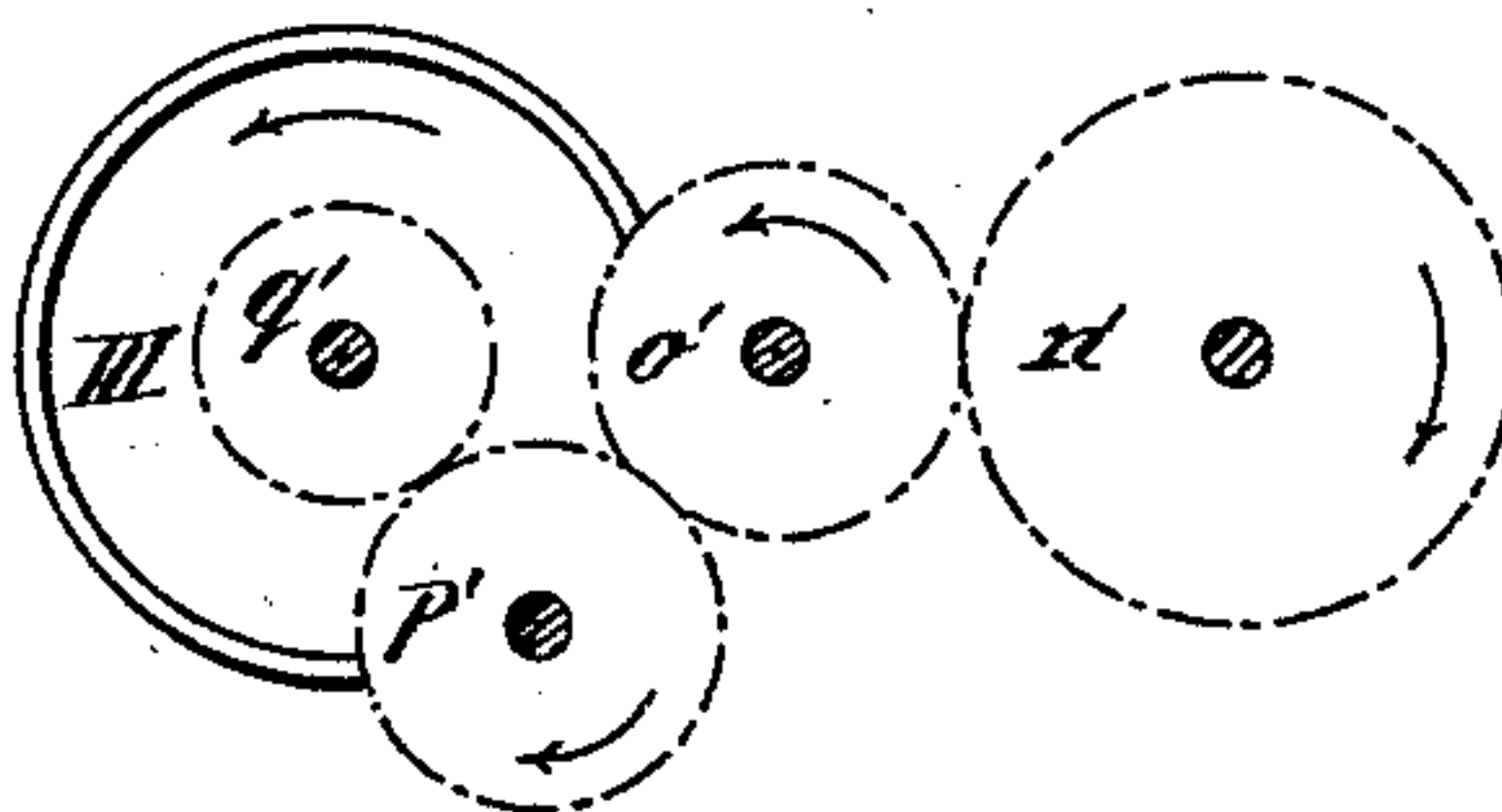


Fig. 4.

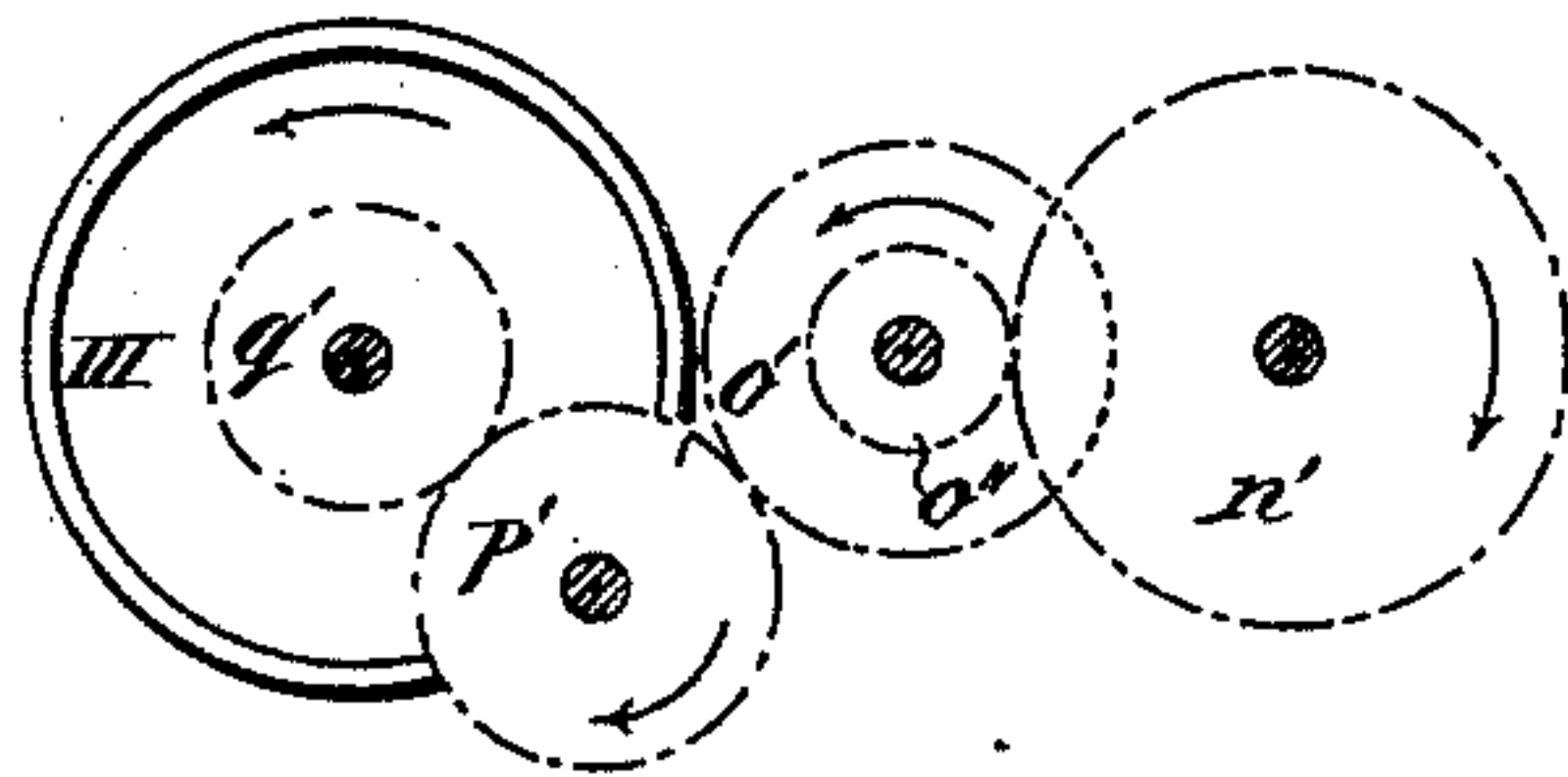
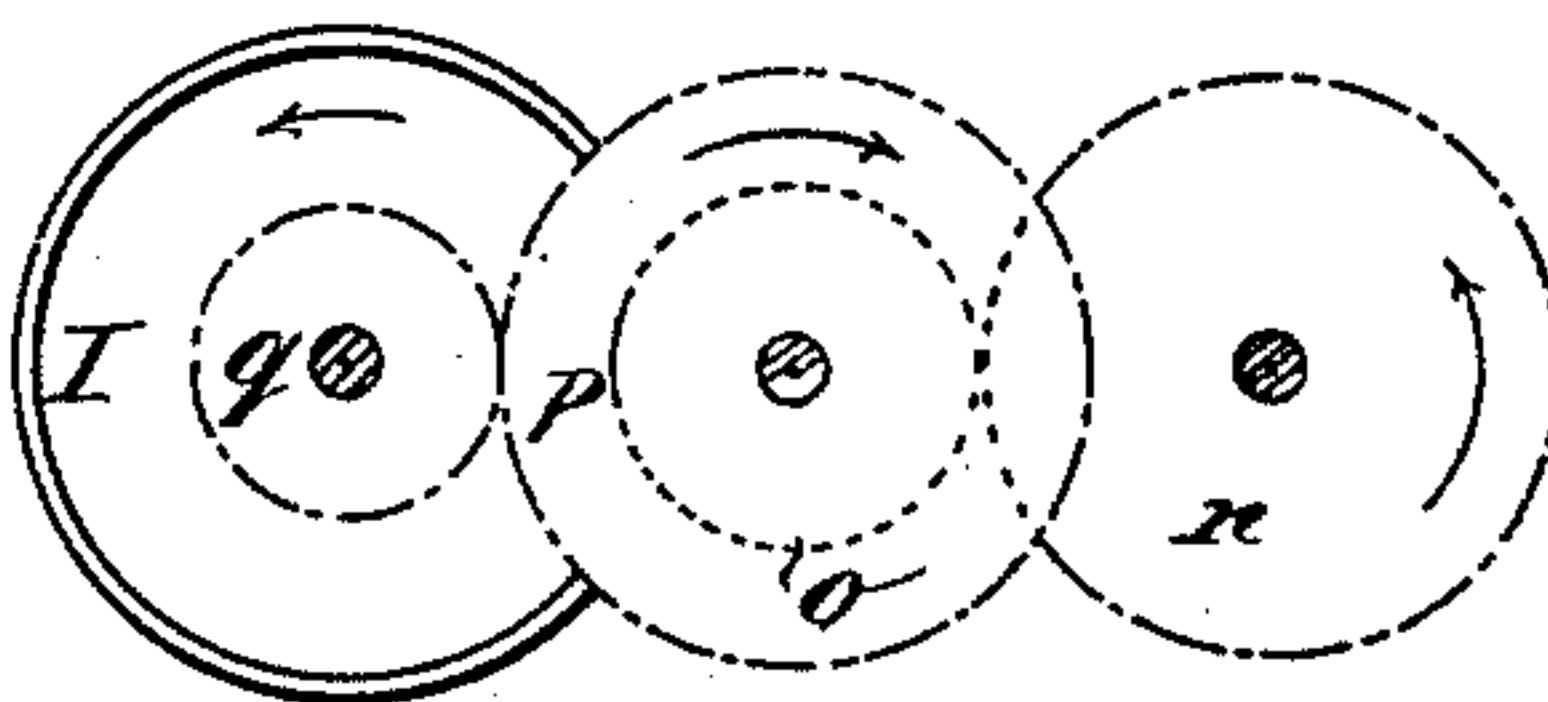


Fig. 5.



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UNITED STATES PATENT OFFICE.

AUGUST MÜLLER, OF CHRISTIANSTADT, GERMANY.

MEANS FOR VARYING THE STROKES OF PUMPS.

SPECIFICATION forming part of Letters Patent No. 467,823, dated January 26, 1892.

Application filed April 30, 1890. Serial No. 350,039. (No model.)

To all whom it may concern:

Be it known that I, AUGUST MÜLLER, of Christianstadt on the Bober, in the Kingdom of Prussia and German Empire, have invented
5 a new and useful Means for Varying the Stroke of a Pump, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates particularly to means
10 for varying the stroke of a pump, and its object is to provide a boiler-pump having a slow and reliable operation in feeding the boiler; and to this end my invention consists of an arrangement of composite gearing for changing
15 the stroke of the plunger, which affords great facility in firing or feeding the furnace and effects a saving in coal to the extent of about thirty to thirty-five per cent.

The improved mechanism is illustrated in
20 the accompanying drawings.

Figure 1 represents an elevation of my improved pump with the toothed gearing above the same, part of the pump being in section. Fig. 2 represents a plan view of the gearing
25 and its disengaging mechanism. Fig. 3 represents a vertical section on the line X X, Fig. 2. Fig. 4 represents the gearing connected with the belt-pulley III. Fig. 5 represents a similar view of the connection with the pulley I. Fig. 6 represents a modification of Fig. 5. Fig. 7 represents a section through the lever *e*, guiding the lever *k*, and disk *f*.

The arrangement of this improved boiler-pump is as follows: In the barrel-pump A,
35 fitted with two suction-valves C and two pressure-valves D, moves the plunger B, whose rod *a* has a device *b c b'* for guiding it in its vertical movement. To the rod *a* is secured a toothed driving-bar *g*, which extends to the
40 upper part of the apparatus, where it gears with the toothed wheel *m*, keyed on the shaft *u*. By suitable means of transmission, consisting of the wheels *n o p q* and *n' o' o'' p'*, respectively, the wheel *m* and shaft *u* are connected with pulley-gearing consisting of two
45 fixed pulleys I III and an intermediate loose pulley II. The pulley I and gear-wheel *q* are secured together and run loosely on the shaft *w*, and the pulley III and gear-wheel *q'* are
50 both keyed to the shaft and run with it. To the toothed driving-bar *g* is secured an angle-piece *i*, (see Fig. 3,) which adjusts a lever *k*,

(fixed on a spindle *l*) when the toothed bar rises or descends. On the same spindle *l* is fixed a lever *e*, connected with the rod *h*, and
55 thereby communicating with the lever *h'*, which serves to shift the belt. A weight *r* tends to move the lever *e* radially into the extreme positions determined by the notch *f'* in a disk *f*. 60

To prevent shifting of the disk *f* a pawl *s*, having a weight *r''*, is provided, which pawl falls into a notch in the rod *h*, corresponding to the position of the belt-shifting fork *S'*. The pawl *s* is released by a stud *e'*, fixed on
65 the lever *e*, and which, when such lever is moved, depresses the pawl *s*. The pawl *s* serves to fix the belt on the loose pulley II. The belt actuates the pulley I, and by the intermediate gearing *q, p, o, n*, and *m* causes
70 the bar *g* and the piston B to be raised. This raises the lever *i*, Fig. 3, and the lever-arm *k* is swung upward and releases the pawl *s*, and by the weight *r* it is caused to fall on the other side, shifting the belt to the pulley III. This,
75 through the gearing *q' p' o'' o' n' m*, at once causes the return movement of the piston. By using the two sets of intermediate gearing above described varying motion of the plunger is caused. The upstroke is rapid, the down-
80 stroke slow. By using the gearing shown in Fig. 4 equal speeded motion is produced. By using the two gearings above described the motion of the plunger is made uniform in speed. The motion can be made unequal in
85 speed (rapid upstroke and slow downstroke) by using the gearing shown in Fig. 6.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent: 90

1. The combination, with the pump having its piston-rod provided with a rack-bar, of a pinion engaging said rack-bar, two sets of gearing adapted to operate said pinion at different rates of speed, a pulley for operating
95 each set of gearing, and a belt-shifter connected with and operated by said rack-bar for shifting the belt from one pulley to the other, substantially as set forth.

2. The combination, with the pump having
100 a piston-rod, of differential gearing for reciprocating said rod, belt-pulleys for operating said gearing, a belt-shifter connected with and operated by said piston-rod for shifting the

belt from one pulley to the other, and a pawl for locking said belt-shifter in position, substantially as set forth.

3. The combination, with the pump having
5 a piston-rod provided with a rack-bar, of differential gearing for reciprocating said piston at different rates of speed, belt-pulleys for driving said gearing, the shaft *l*, a lever *k* on
10 said shaft connected with the said rack-bar, the belt-shifter, and the lever *e* on said shaft connected with said belt-shifter and having a limited range of movement, substantially as set forth.

4. The combination, with the pump having
15 its piston-rod provided with a rack-bar, of differential gearing for reciprocating said piston at different rates of speed, belt-pulleys for driving said gearing, the shaft *l*, a lever *k* on said shaft connected with the rack-bar, the
20 belt-shifter, the lever *e* on said shaft connected with said belt-shifter, the disk *f*, having a notch *f'* for limiting the oscillations of the lever *e*, the weight *r*, connected with lever *e*,

and the pawl for locking the belt-shifter in position, substantially as set forth.

5. The combination, with the pump having
its piston-rod provided with a rack-bar, of a pinion engaging said rack-bar, two sets of gearing adapted to operate said pinion in different directions, a pulley for operating each
30 set of gearing, a belt for driving said pulleys, a belt-shifter *h*, having a notch for limiting its movement, a pivoted weighted pawl adapted to engage in said notch for retaining the belt-shifter in the desired position, and means op-
35 erated by the reciprocation of the piston-rod for disengaging the pawl from the belt-shifter and moving the belt-shifter, substantially as set forth.

In witness whereof I have hereunto set my
40 hand in presence of two witnesses.

AUGUST MÜLLER.

Witnesses:

PAUL FISCHER,
W. BINCLEWALL.

Correction in Letters Patent No. 467,823.

It is hereby certified that in Letters Patent No. 467,823, granted January 26, 1892, upon the application of August Müller, of Christianstadt, Germany, for an improvement in "Means for Varying the Strokes of Pumps," an error appears in the printed specification requiring the following correction, viz.: In line 1, page 2, the word "paw" should read *pauc*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2d day of February, A. D. 1892.

[SEAL.]

Countersigned:

W. E. SIMONDS,
Commissioner of Patents.

CYRUS BUSSEY,
Assistant Secretary of the Interior.