

(No Model.)

2 Sheets—Sheet 1.

Z. B. COES & G. W. MILLER.

GEAR CUTTING MACHINE.

No. 310,796.

Patented Jan. 13, 1885.

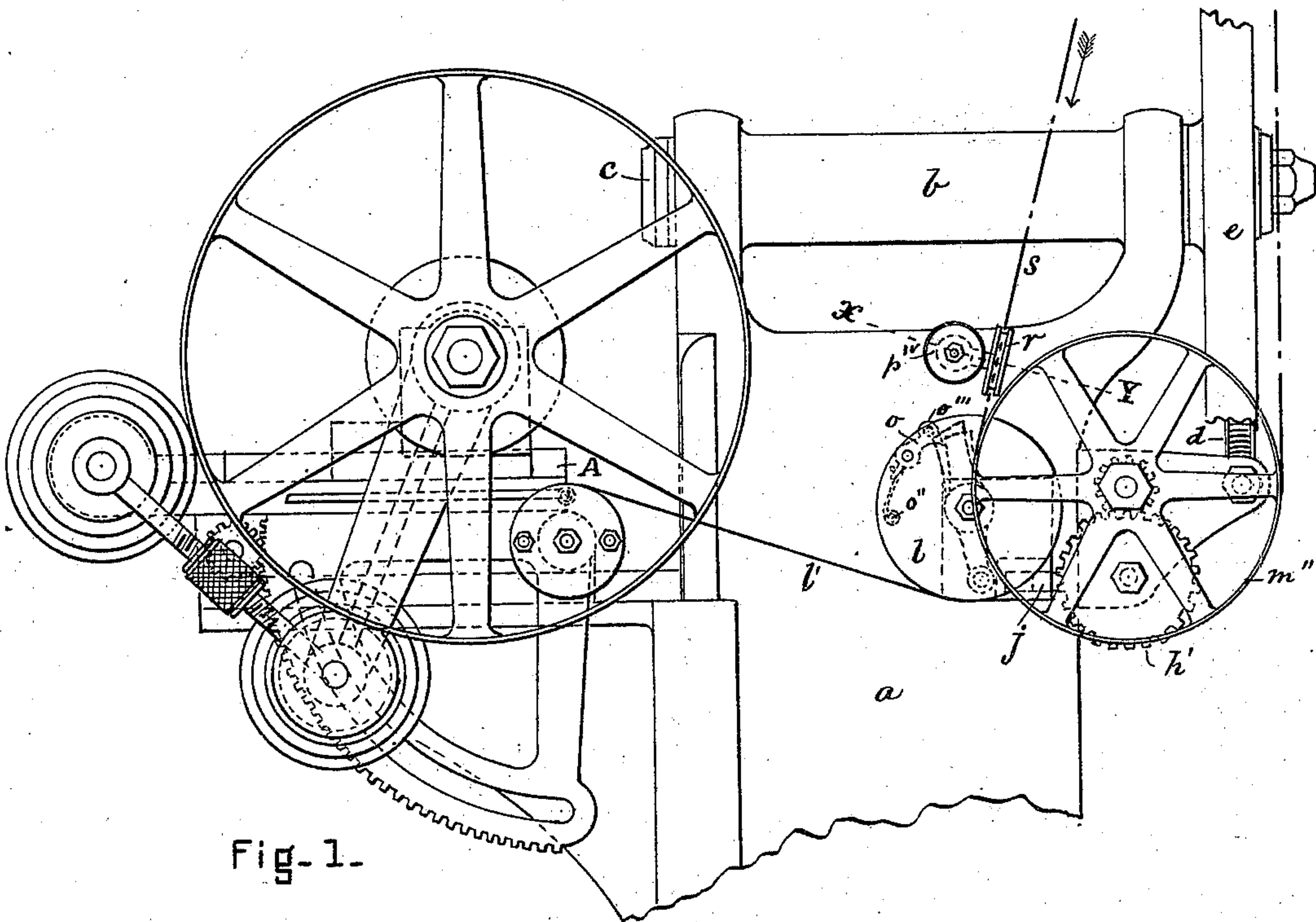


Fig. 1.

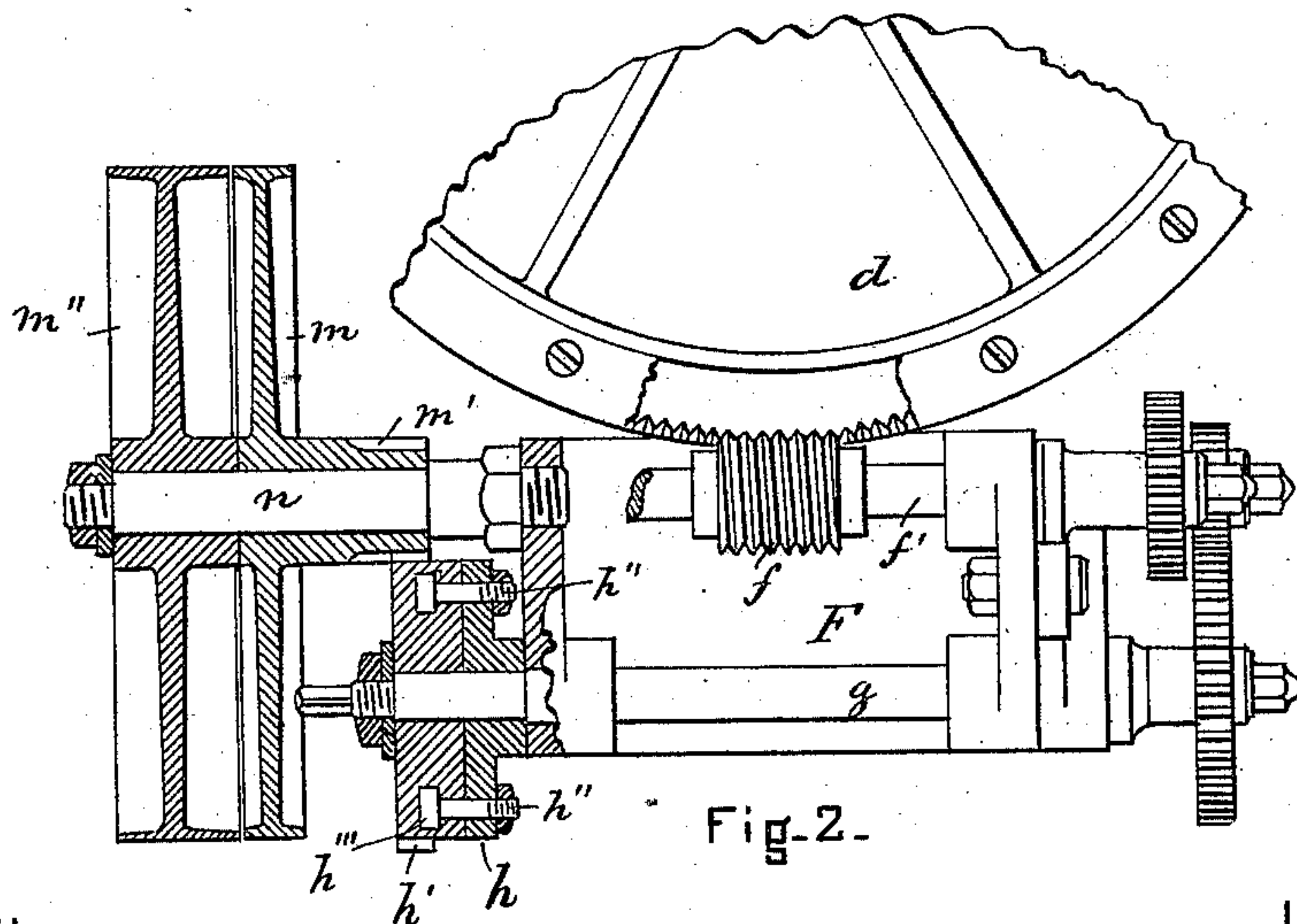


Fig. 2.

WITNESSES.

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their attys.

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2 Sheets—Sheet 2.

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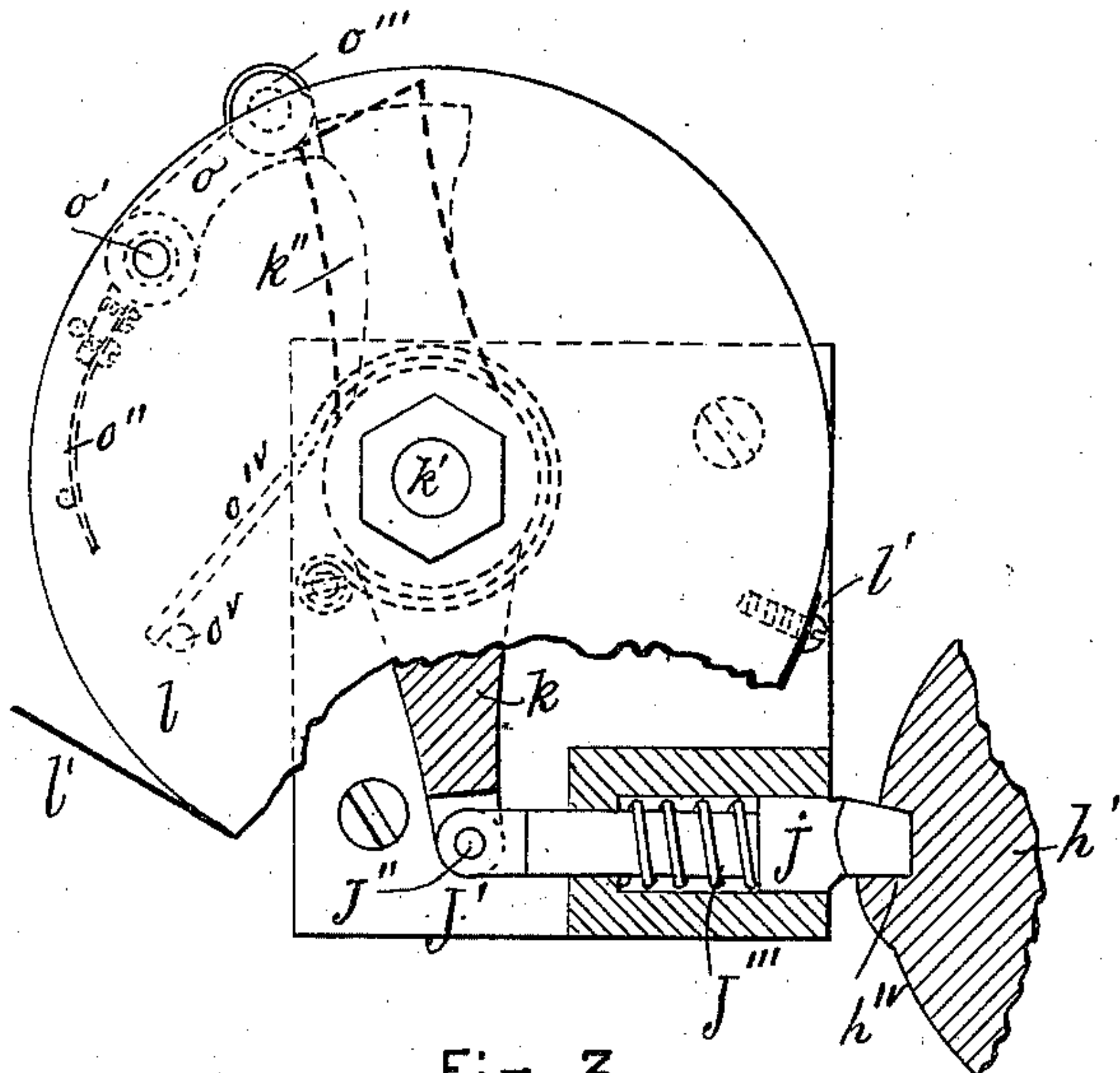


Fig. 3.

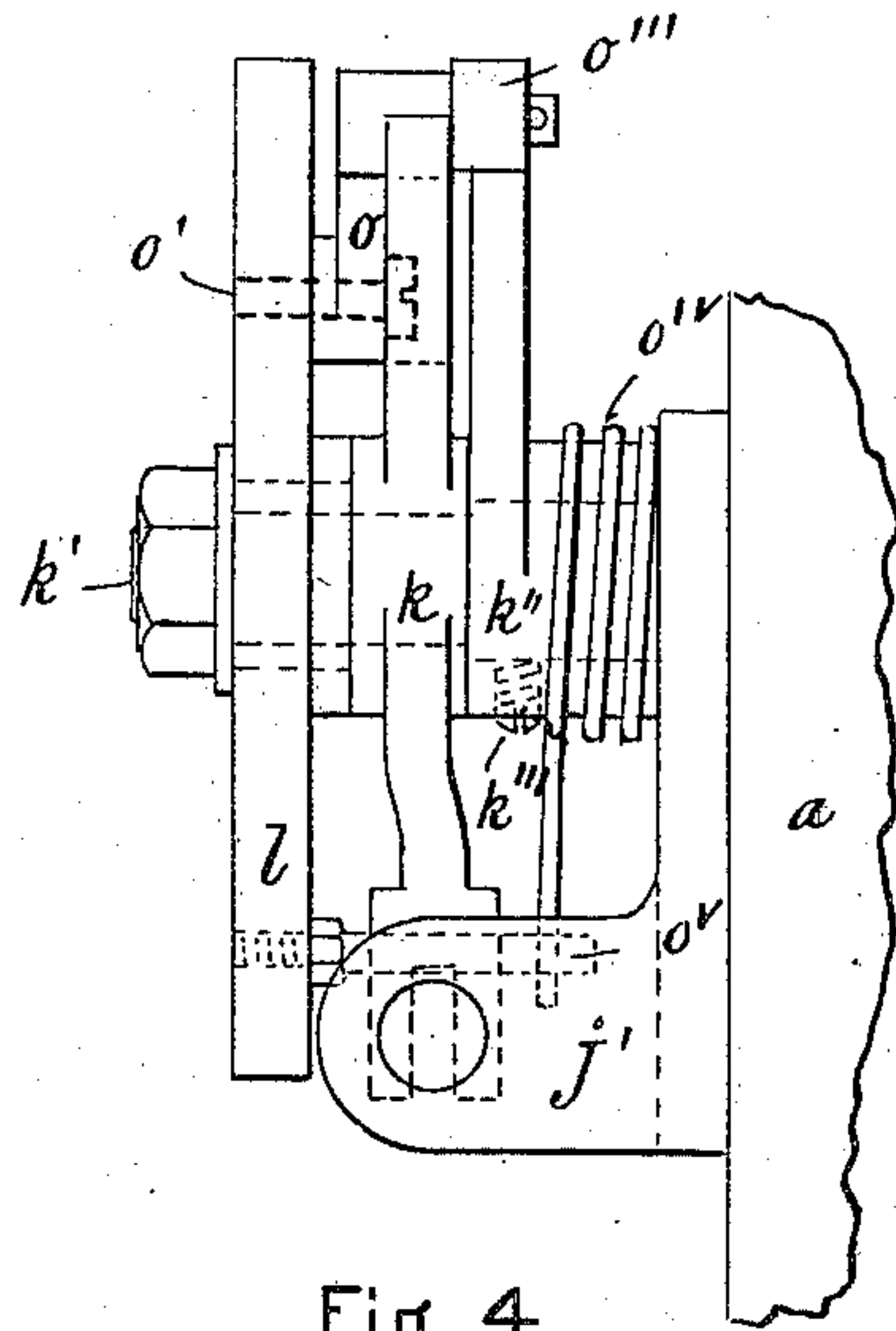


Fig. 4.

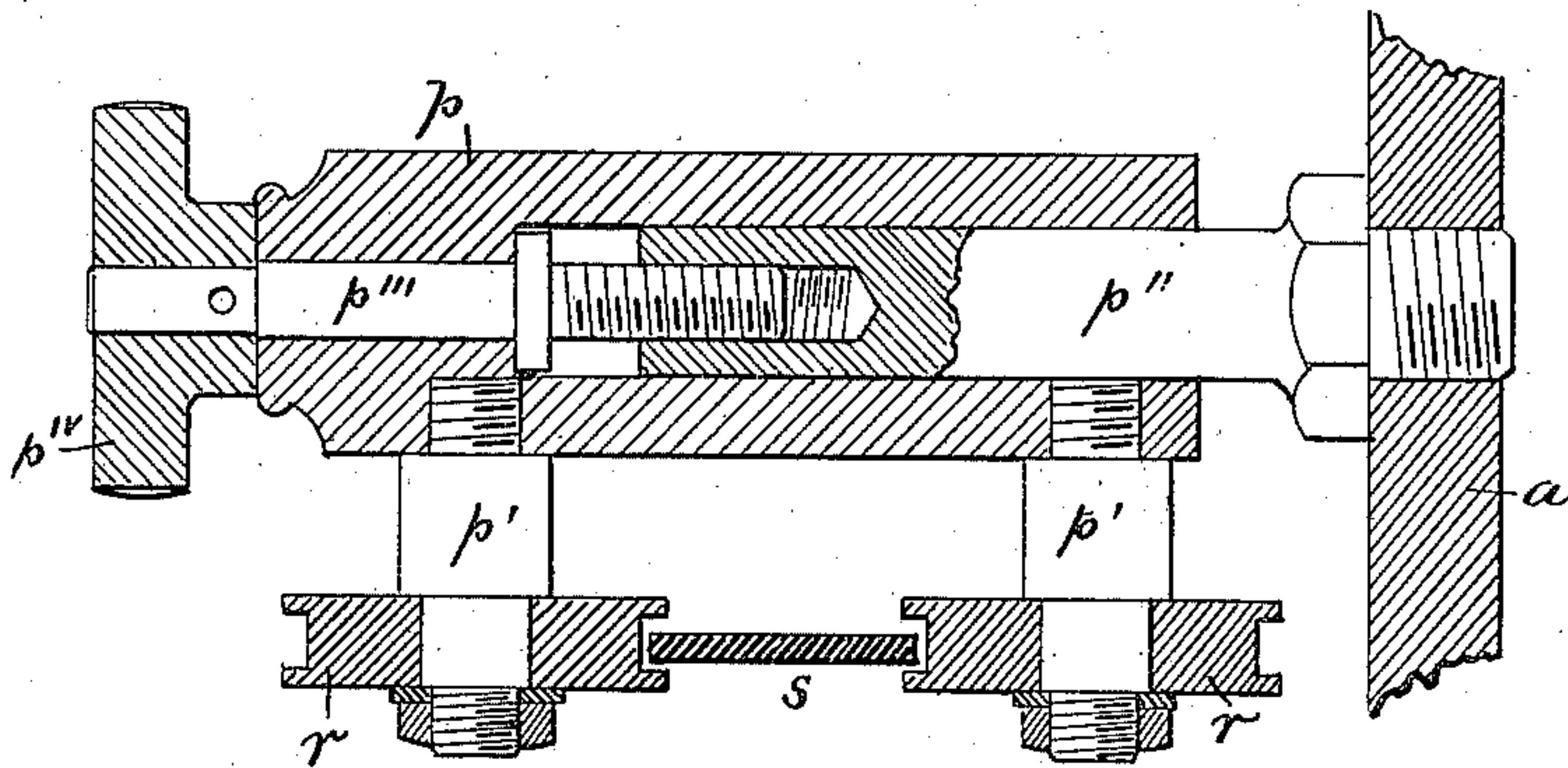


Fig. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

ZORESTER B. COES, OF HYDE PARK, MASSACHUSETTS, AND GEORGE W. MILLER, OF WOONSOCKET, RHODE ISLAND, ASSIGNORS TO AMOS H. BRAINARD, OF HYDE PARK, MASSACHUSETTS.

GEAR-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 310,796, dated January 13, 1885

Application filed July 11, 1884. (No model.)

To all whom it may concern:

Be it known that we, ZORESTER B. COES, a citizen of the United States, residing at Hyde Park, in the county of Norfolk and State of Massachusetts, and GEORGE W. MILLER, a citizen of the United States, residing at Woonsocket, in the county of Providence and State of Rhode Island, have jointly invented certain new and useful Improvements in Gear-Cutting Machines; and we do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawings.

This invention relates to improvements in gear-cutting machines of that class in which the functions are entirely automatic; and it consists, essentially, of means for driving and unlatching the dividing mechanism.

The mechanism for operating the various other parts of the machine are not subject-matter in the present application, but are contained in another application of A. H. Brainard and Z. B. Coes, now pending in the United States Patent Office.

The improvements are shown in the drawings, on which Figure 1 represents a general side view of the improved machine. Fig. 2 represents a detail rear view of the worm dividing-wheel, its worm-shaft, and adjustable bracket, with a sectional view of the mechanism for operating the change-gears by which the movement of the dividing-wheel is controlled. Figs. 3 and 4 represent, respectively, enlarged front and side views of the unlatching mechanism shown in Fig. 1. Fig. 5 represents a sectional view of the mechanism for controlling the belt by which the dividing mechanism is operated, such view being an enlarged section on the line X Y. (Shown in Fig. 1.)

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a is the standard or frame of the machine, having in its upper end a bearing, b , for the spindle c , to the forward end of which is secured the wheel to be cut.

To the rear end of the spindle c is fastened the worm-wheel d , protected by the guard e .

f is the worm, and f' the worm-shaft, by means of which the worm-wheel is operated.

g is a shaft mounted in the same block or bracket F as the shaft f' , and to one end of which is secured the disk h , while on the other end is placed the change-gearing connecting with the worm-shaft f' .

h' is a gear-disk mounted loosely on the shaft g , and secured to the disk h by bolts h'' and T-slot h''' , as shown in Fig. 2. The gear-disk has a notch, h'' , Fig. 3, cut in one side to receive the latch j . The disk h is graduated on its periphery. This construction of disks allows the shaft g to be moved when the latch j is seated in notch h'' by simply loosening the bolts h'' , and is used for obtaining the "set over" required in bevel-gear cutting. This latter construction is the subject-matter of Patent No. 255,409, dated March 28, 1882, and issued to A. H. Brainard.

m is a pulley, having on its hub a pinion, m' , and mounted loosely on a stud, n , which is secured to the worm-bracket F . m' engages with h' . m'' is also a pulley mounted loosely on the stud n . The latch j is mounted in a block, j' , which is secured to the main frame of the machine.

k is a lever mounted loosely on a stud, k' , which is secured to the block j' .

k is pivoted to the latch j by a pin, j'' . (Shown in Figs. 3 and 4.)

j''' is a spring for operating the latch j .

k'' is a cam, which is secured in place on the stud k' by a set-screw, k''' .

l is a disk mounted loosely on the hub of the lever k , and operated by a ribbon, l' , which is in turn moved by the backward movement of the slide A , (shown in Fig. 1,) which carries the cutter for cutting the gear-blank.

o is a pawl pivoted loosely to the disk l by a screw, o' , and kept in its seat on the lever k by a spring, o'' . (Shown in Fig. 3.)

o''' is a roll pivoted loosely on the pawl o , and arranged to engage with the fixed cam k'' .

o'' is a spring which engages with a stud, o'' , secured to the disk l . (Shown in Fig. 3.)

p is a sleeve carrying the studs p' p' , and mounted loosely on a stud, p'' , (shown in Fig. 5,) which is secured to the main frame of the

machine. The sleeve p is adjustable on the stud p'' by a screw, p''' , which is tapped into it, and operated by a milled knob, p^{iv} . (Shown in Fig. 3.)

5 On the studs p' are mounted loosely the respective flanged guide-rolls rr , between which runs the driving-belt s .

The operation of these parts is as follows: The sleeve p is adjusted on the stud p'' by
10 manipulating the hand-knob p^{iv} until the rolls rr have crowded the belt s over on the pulley m sufficiently to drive the change-gear mechanism, when the latch j shall be removed. This in practice requires but a small fraction
15 of the width of the belt, the remainder running on the loose pulley m'' .

The latch j is operated in the following manner: After a cutter has been passed through the gear-blank to be cut, and while
20 the cutter is returning, motion is communicated to the ribbon l' , which in turn moves the disk l . This communicates motion to the lever k by means of the pawl o engaging with it, which withdraws the latch j from its seat
25 in h' , thus permitting the belt s to drive the change-gear mechanism and revolve the worm-wheel d . As soon, however, as the latch j has left its seat in h' further movement is arrested by reason of the pawl o being
30 tripped from its connection with k by means of the cam k'' and roll o''' . The latch j is at once returned against the periphery of the disk h' by the influence of the spring j''' , and on the completion of a revolution of the disk

h' the latch j is seated again into the recess on 35 the periphery of disk h' . On the next forward movement of the cutter carrying slide A the disk l is returned to its former position by the spring o^{iv} bearing against the stud o^v , and the pawl o is again engaged with the lever k by the influence of the spring o'' , when
40 the roll o''' shall have passed off the cam k'' .

Having thus fully described the nature, construction, and operation of our invention, we wish to secure by Letters Patent and claim— 45

1. A friction-gearing for driving the dividing mechanism of a gear-cutting machine, composed of a tight and loose pulley, and means, substantially as described, for constantly retaining a portion of the driving-belt on the
50 loose pulley, and adjusting such portion of the belt only upon the tight pulley as may be required for operating the dividing mechanism, as herein set forth and described.

2. In a gear-cutting machine, the adjustable sleeve p , carrying the rolls rr , for regulating width of belt necessary to drive the dividing mechanism, substantially as set forth. 55

3. In combination, the disk l , pawl o , spring o'' , roll o''' , cam k'' , and the lever k , as and for 60 the purpose set forth.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ZORESTER B. COES.
GEORGE W. MILLER.

Witnesses:

L. W. BALLOU,
H. L. BALLOU.