

No. 782,264.

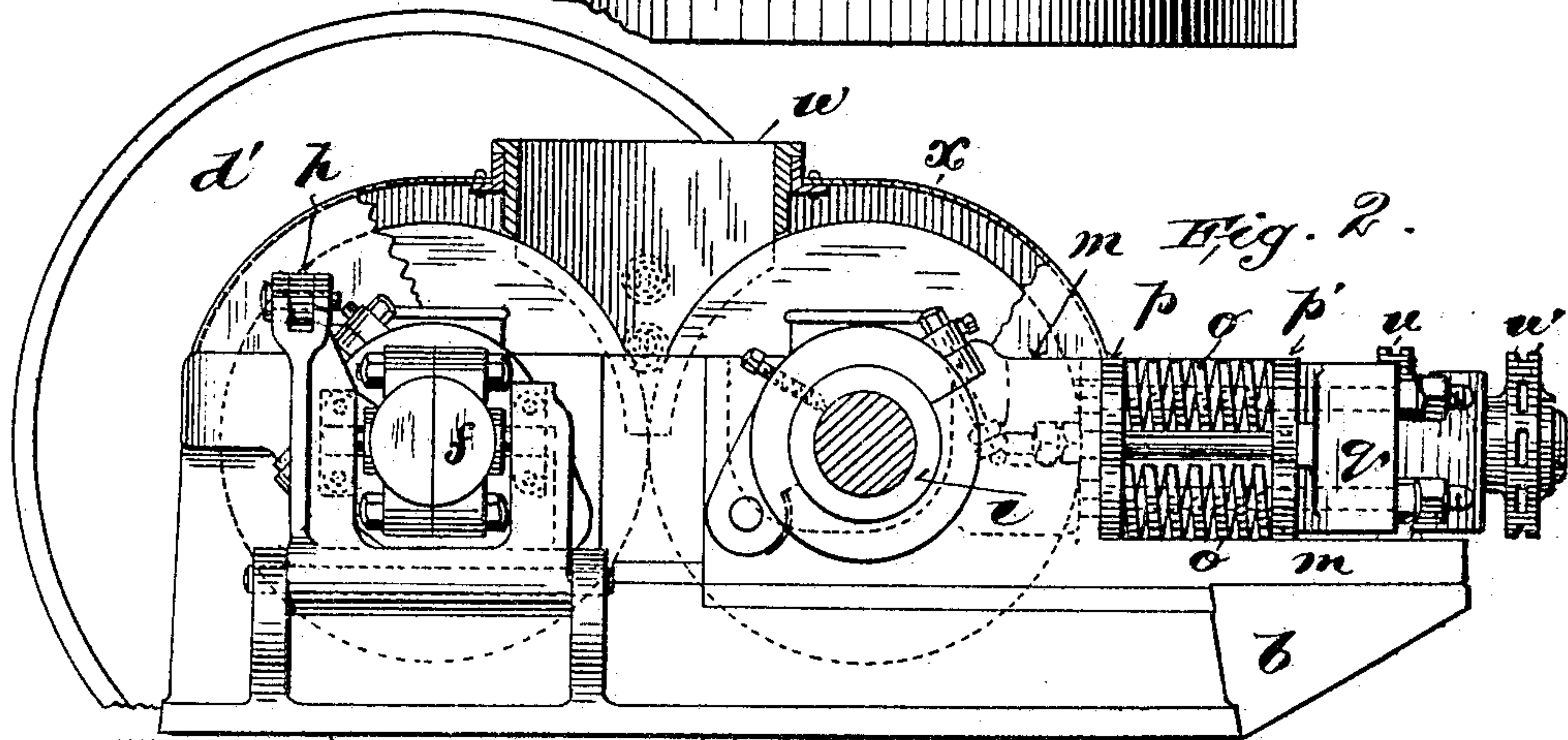
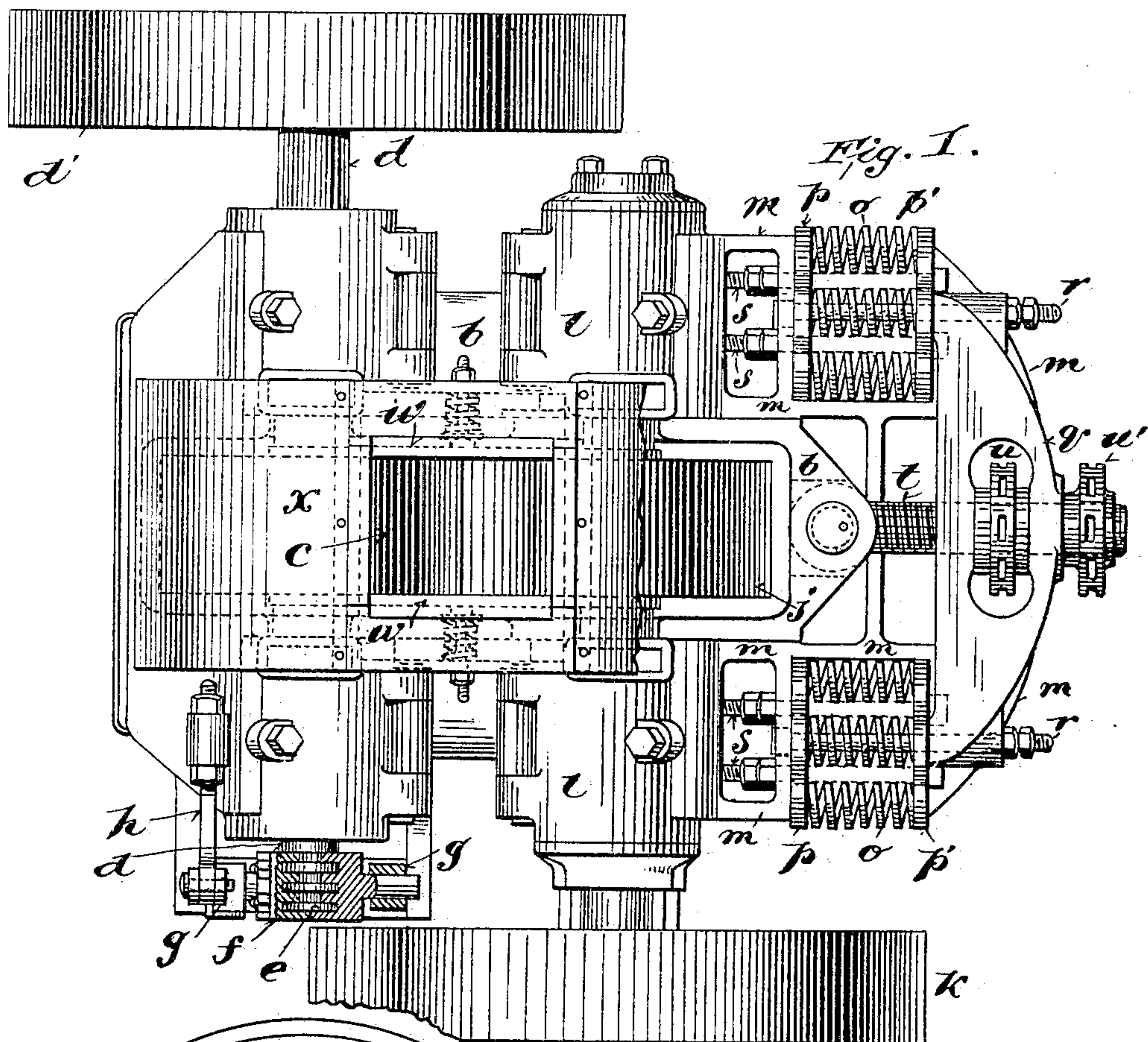
PATENTED FEB. 14, 1905.

D. J. NEVILL.

MACHINE FOR CRUSHING ORES OR OTHER USES.

APPLICATION FILED FEB. 13, 1902.

3 SHEETS—SHEET 1.



WITNESSES:

Ed. Benjamin
H. S. Morton.

INVENTOR

Daniel Jack Nevill

BY

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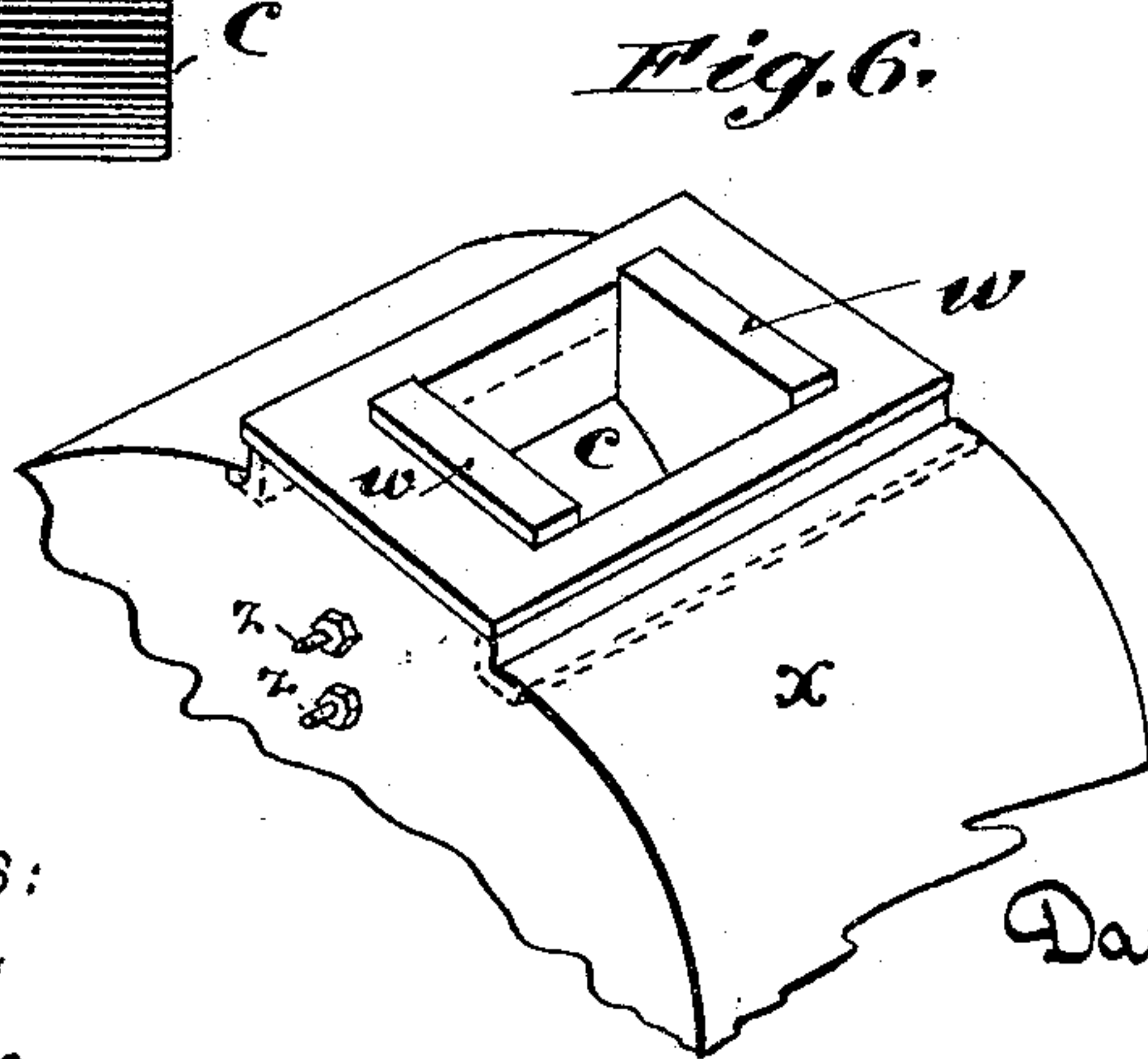
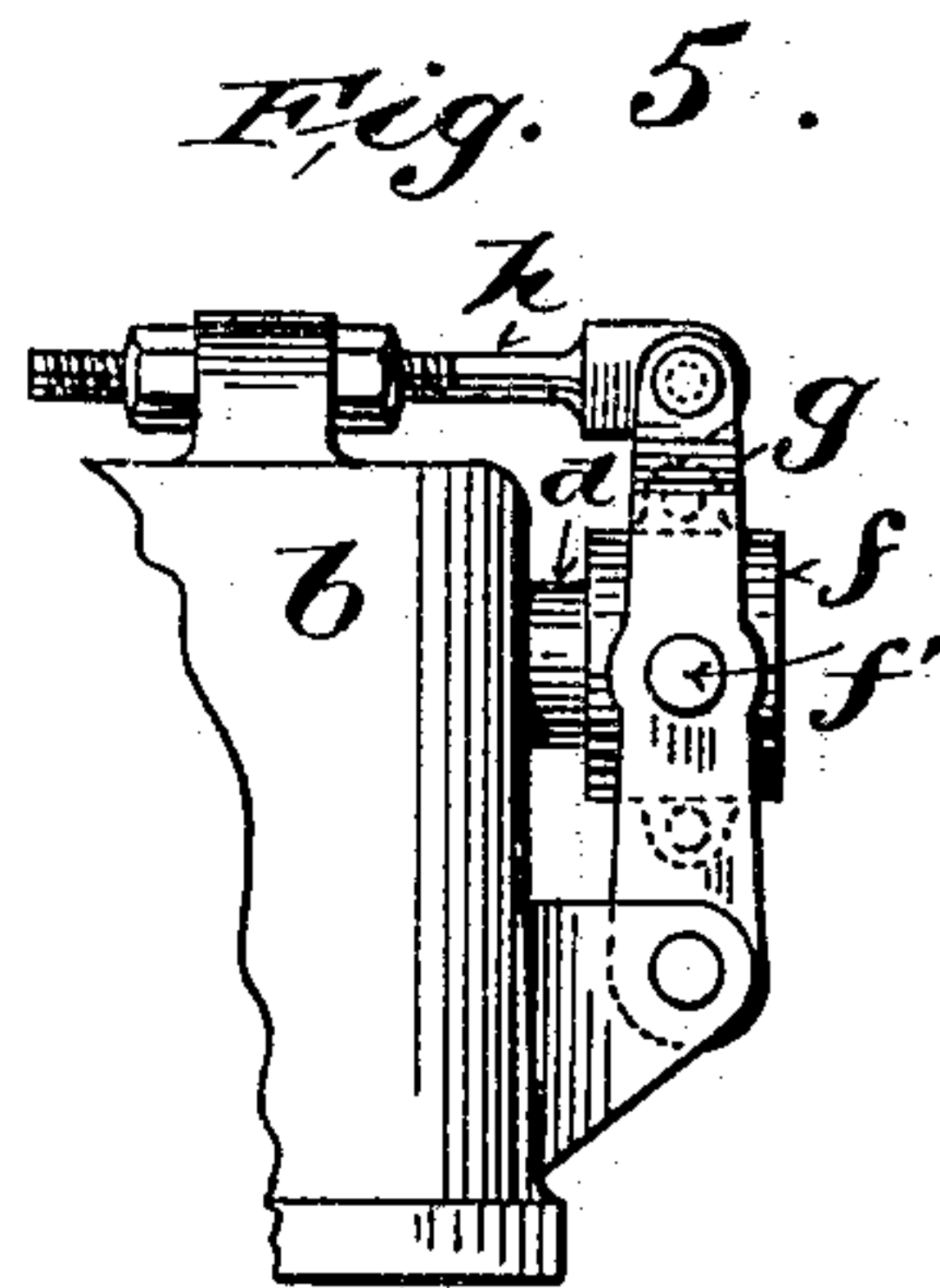
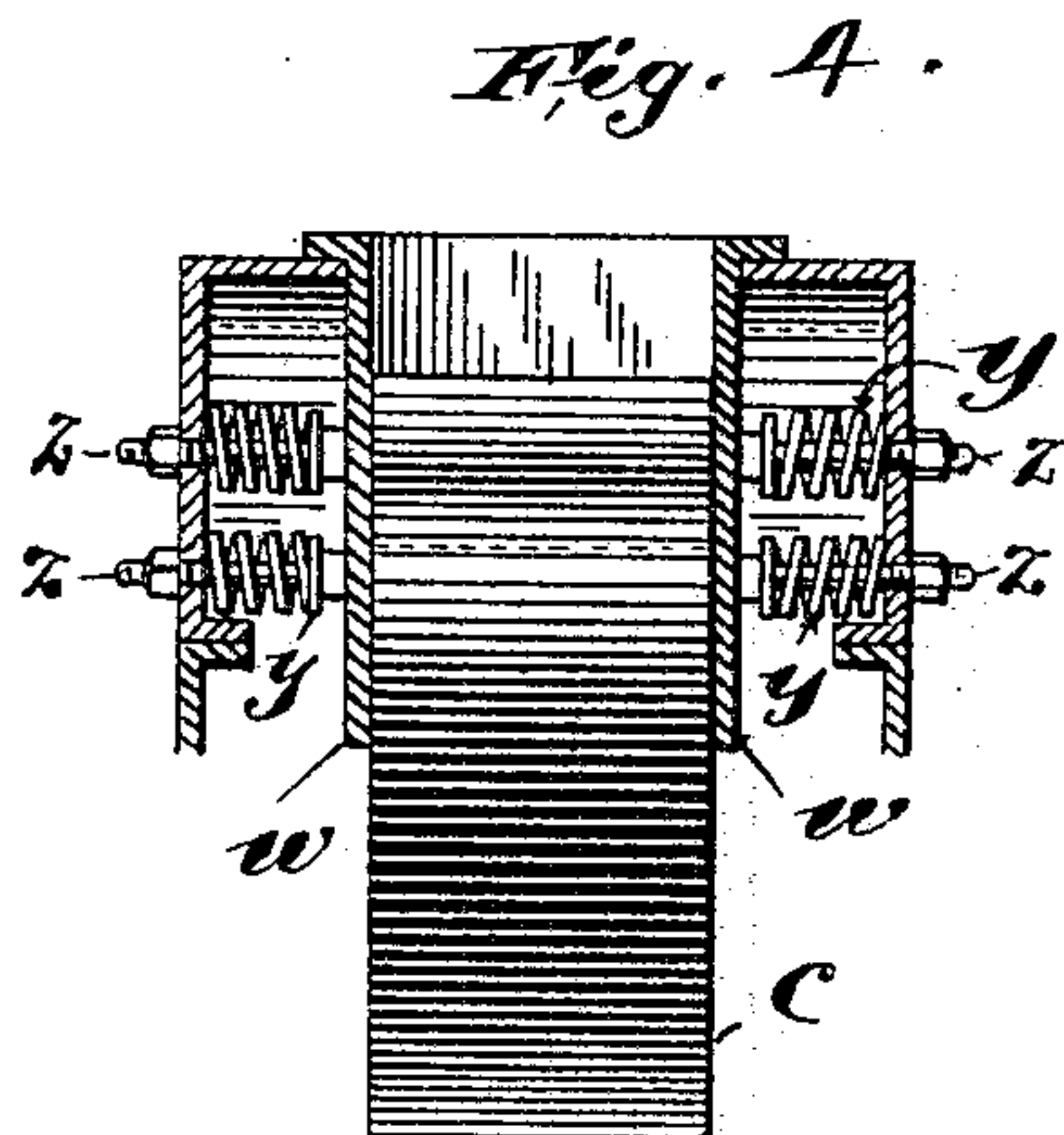
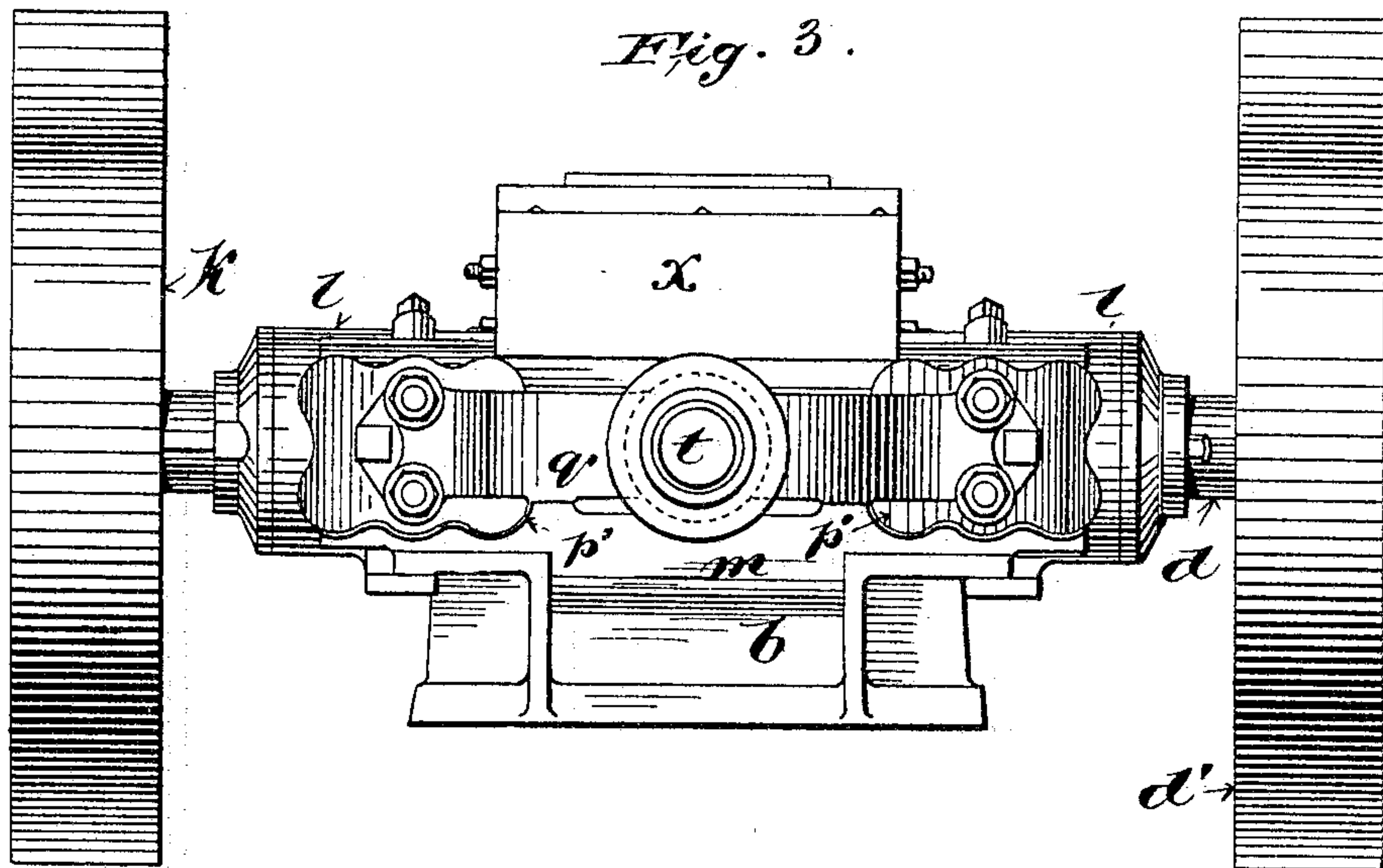
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WITNESSES:
C. H. Benjamin
H. S. Morton

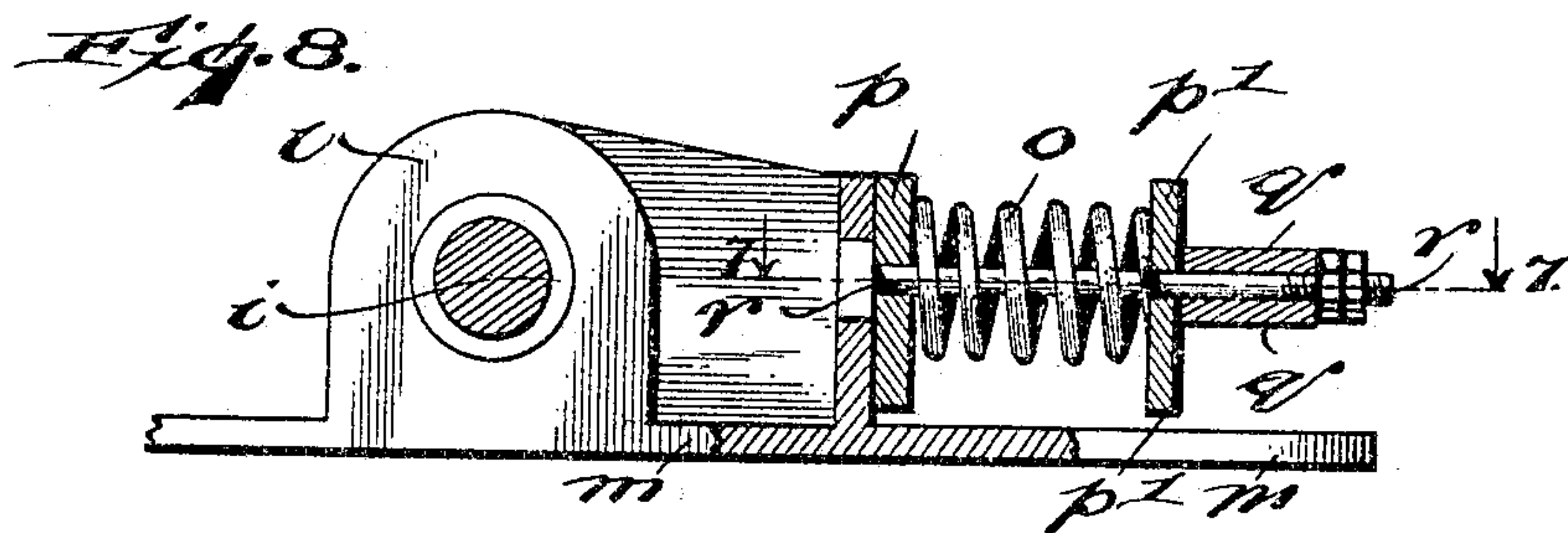
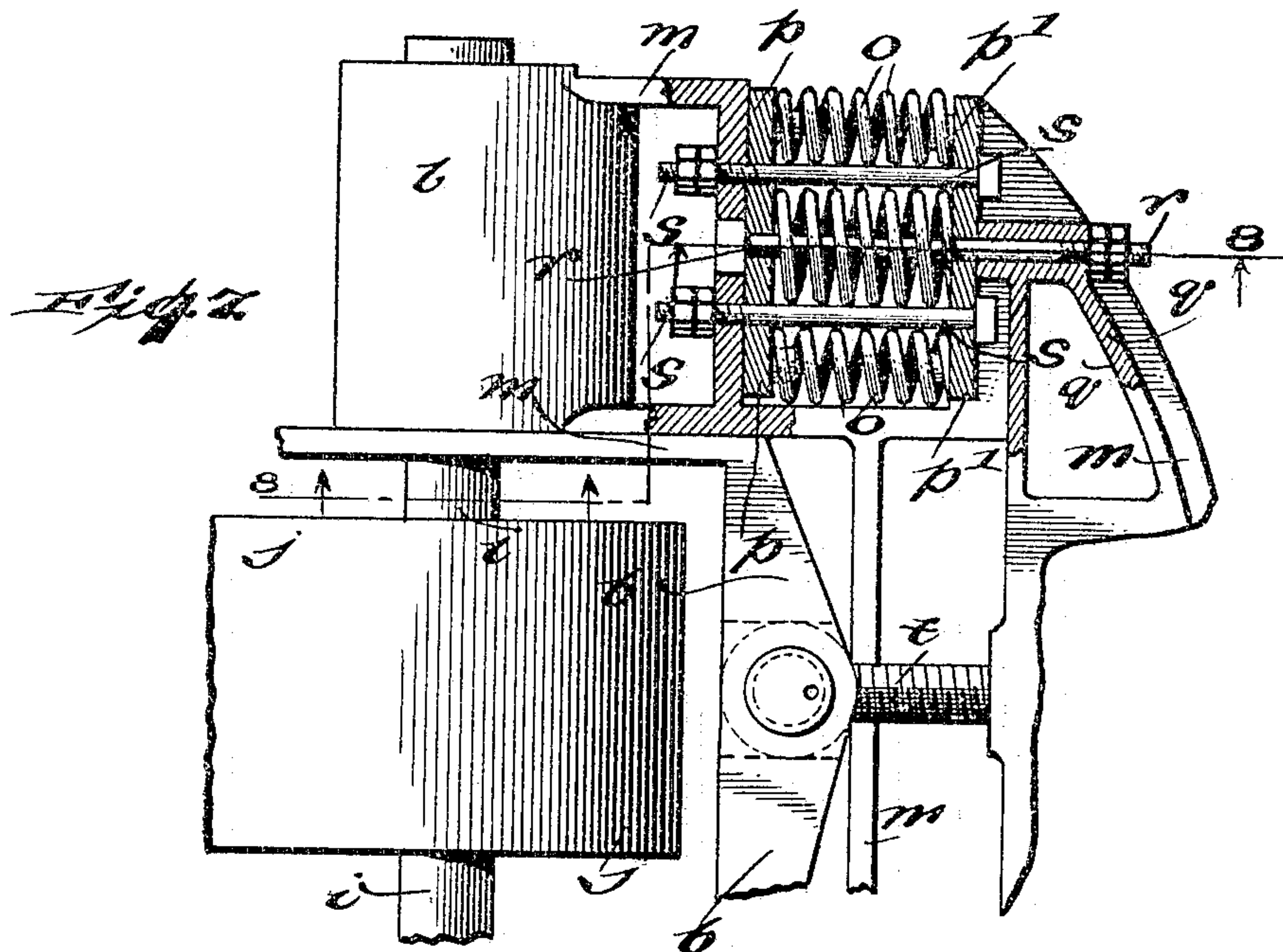
INVENTOR
David Jack Nevill
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3 SHEETS—SHEET 3.



WITNESSES:
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UNITED STATES PATENT OFFICE.

DAVID JACK NEVILL, OF SALT LAKE CITY, UTAH.

MACHINE FOR CRUSHING ORES OR OTHER USES.

SPECIFICATION forming part of Letters Patent No. 782,264, dated February 14, 1905.

Application filed February 13, 1902. Serial No. 93,839.

To all whom it may concern:

Be it known that I, DAVID JACK NEVILL, a citizen of the United States, and a resident of Salt Lake City, in the State of Utah, have invented certain new and useful Improvements in Machines for Crushing Ores or other Uses, of which the following is a description accompanied by drawings.

In the crushing of ores by means of rolls it is necessary, in order to avoid the stopping or breaking of the machine, to have one of the rolls yieldingly mounted to permit the passage of foreign substances—such as broken mining-tools, bolts, nuts, and the like—that get in with the ore and masses of congested material that occur in case of overfeeding.

One object of my invention is to provide an elastic stop to receive the shock of the return of said roll after it has yielded for the passage of said substances.

Another object is to provide ready and durable means for relatively adjusting the rolls endwise of their axes.

A third object is to insure proper guidance of the material between the faces of the rolls; and a further object is to provide simple means whereby these various adjustments can be effected without stopping the machine.

The invention will be best understood by an immediate description of its preferred embodiment illustrated in the accompanying drawings.

Figure 1 is a plan view of my machine. Fig. 2 is a side elevation, partly in section. Fig. 3 is a front elevation of the same. Fig. 4 is a transverse section of the hopper. Fig. 5 is a rear elevation of the axial adjusting device, and Fig. 6 is a perspective view of the hood and hopper. Fig. 7 is a fragmentary plan view, partly in section, through the line 7 7, Fig. 8. Fig. 8 is a vertical section through the line 8 8, Fig. 7.

Mounted in stationary bearings upon the frame or housing *b* is a roll *c*, carrying upon one end of its shaft *d* a drive-pulley *d'*, and upon the other end an axial adjusting device is provided to compensate or prevent the tendency of the grinding-surface of the rolls to become grooved or channeled. This is accomplished by moving the roll *c*, with its shaft *d*,

a short distance along its axial line whenever grooving commences, and thereby insuring uniform wear to the rolls. Upon the end of the shaft *d* are a series of annular rings *e*, fitting corresponding grooves in the thrust-block *f*. Cast upon the sides of the thrust-block are trunnions *f'*, journaled in a yoke-lever *g*, which is pivoted to the frame *b*. To the upward extension of one arm of the yoke-lever *g* is attached a screw eyebolt *h*, passing through a lug on the frame of the machine and adjustably locked by the nuts, as shown. By this single bolt the shaft *d* may be adjusted longitudinally in its bearings, thus shifting the roll along its axis. In order that no horizontal pressure from the roll-shaft shall come on the lever *g*, some freedom of play lengthwise of the trunnions is provided, as shown. The yielding roll *j*, carrying on its shaft the driving-pulley *k*, is mounted in bearings *l* in a rigid yoke *m*, which is fitted to slide and be guided upon the frame *b* in a horizontal direction at right angles to the axis of the rolls. Sets of springs *o* are provided between pressure-plates *p p'* in such a way as to allow the roll and its yoke *m* to yield under an excessive resistance between the rolls and to take up the rebound of the roll by allowing the yoke *m* to also yield in the opposite direction—that is to say, toward the roll *c*. This is accomplished in the following manner: The springs *o* press the plates *p p'*, respectively, against the yoke *m* in one direction and against the cross-head *q* in the opposite direction; but bolts *r* restrain the plates *p* from moving toward the roll. A second set of bolts *s*, provided with adjusting-nuts and jam-nuts, bolt the plates *p'* to the movable yoke *m*, so that the plates *p'* will move with the yoke *m* if the yoke is carried by the rebound beyond the normal position for which it is set. The cross-head *q* is adjustably held to the frame *b* of the machine by the screw *t* and the capstar-nuts *u u'*. By merely turning the nuts *u u'* the entire yielding system, including the plates *p p'*, springs *o*, bolts *s* and *r*, and yoke *m*, may be adjusted toward the opposing roll *c* to compensate for wear between the rolls, and such adjustment, it will be seen, does not vary the yielding pressure produced by the springs *o*. The opera-

tion of this portion of the invention is as follows: The roll *j* being set at a given distance from the roll *c*, it will not yield until the pressure between the rolls is greater than the force
 5 exercised by the entire set of springs *o*; but when the pressure does exceed the force of the compression-springs then the yoke *m* is forced back, with the plates *p*, compressing the springs
 10 *o*. As soon as the excessive pressure is relieved the springs *o* force the roll *j* back to its normal position, and the rebound or momentum of the parts may cause the roll and its yoke *m* to return beyond its normal position,
 15 in which case the bolts *s* will withdraw the plates *p'*, with the yoke *m*, to the left of the normal position, Figs. 1 and 2, compressing the springs *o* and taking up the rebound or recoil without shock. To increase the normal
 20 spring-pressure between the plates *p p'*, the springs may be further compressed to any desired amount. For example, to compress them one-half inch more without changing the normal position of the roll-axis the nuts upon the
 25 bolts *s* should be screwed up until the plates *p'* have been drawn one-half inch to the left, shortening the springs *o* to that extent. Then the capstan-nuts *u u'* should be turned until the cross-head *q* is again drawn into close contact with the plates *p'*, and finally the nuts on
 30 the bolts *r* are screwed up until there is no freedom of play between the plates *p* and the cross-head *q*. If the parts are adjusted in the succession mentioned, the yoke *m* will not have been moved; but it is of course possible to
 35 accomplish the same result by a different order of procedure, moving the yoke *m* first to the left and then back by means of the screw *t* to the normal position. It will of course be understood that whenever the plates *p p'* are
 40 pressed toward each other either by the pressure of material or by the recoil they move freely upon the bolts *s* or *r*, as the case may be, for the bolts *s* and *r* are solely tension members. Adjustment for wear on the crush-
 45 ing-faces of the rolls is made by advancing the cross-head *q* by the screw *t* and nuts *u u'*.

In fine crushing with heavy feeds, and especially with wet ore, the ore has a tendency to escape between the sides of the feed-hopper and the end faces of the rolls. To obviate
 50 this difficulty and at the same time to lessen the wear between the parts, the movable side plates *w* are provided within the feed-hopper and hood *x* and are pressed by stiff springs *y*
 55 toward the ends of the rolls *c* and *j*, as shown in Fig. 4. The tension of said springs is such as to allow the side plates to yield under excessive pressure. The action of the springs
 60 *y* is limited by the restraining-bolts *z*, the nuts of which should be turned up until the plates *w* touch lightly, but do not press against the rolls. This reduces wear and friction, and as the plates wear away the bolts *z* are loosened
 65 to compensate therefor.

From the foregoing it will be seen that the

invention provides that all the adjustments that are necessary to compensate for the wear of the crushing-faces shall be made at one point while the machine is in motion and in
 70 such a manner that the most incompetent or inexperienced operator cannot possibly get the shafts out of alinement; second, it provides that the movable roll and bearings after rebound shall be brought to rest against an
 75 elastic stop; third, it provides an end thrust-bearing by means of which one roll-shaft and roll can be moved longitudinally in its bearings while the machine is in motion by the
 80 operation of a single screw; fourth, it provides adjustable and renewable side plates that can be conveniently adjusted while the machine is in motion and which are arranged
 to yield under excessive pressure and return to their place after passage of the obstruction.

Having now described the invention in the
 85 most approved form now known to me, I specify as the characteristic features, without enumerating manifest modifications that may be made, the following:

1. In a machine for crushing ores, &c., the
 90 combination with a pair of rolls and a movable bearing at each end of one of said rolls, of a spring for each of said bearings, two pressure-plates which are independently movable and between which the spring is supported,
 95 and means for transmitting the movement of the bearings in one direction to one of the plates, and means for transmitting the movement of the bearing in the opposite direction to the other plate, and an adjustable
 100 rigid abutment for the plates farthest from the bearing, substantially as set forth.

2. In a machine for crushing ores, &c., the combination with a pair of rolls, and a movable bearing at each end of one of said rolls,
 105 of a spring for each of said bearings, two independently-movable pressure-plates between which the spring is supported, one of said plates normally abutting against the movable bearing, and adjustable tension members between
 110 the other plate and the bearing, substantially as set forth.

3. In a machine for crushing ores, &c., the combination with a pair of rolls and movable bearings for one of the rolls, of an adjustable
 115 cross-head, a pair of pressure-plates for each bearing one plate of each pair abutting against the cross-head and the other plates against the respective bearings, springs between the
 120 plates of each pair, and adjustable tension members between the bearings and the respective pressure-plates abutting against the cross-head, substantially as set forth.

4. In a machine for crushing ores, &c., the combination with a pair of rolls and movable
 125 bearings for one of the rolls, of an adjustable cross-head, a pair of pressure-plates for each bearing one plate of each pair abutting against the cross-head and the other plates against the respective bearings, springs between the
 130 the respective bearings, substantially as set forth.

plates of each pair, adjustable tension members between the bearings and the respective pressure-plates abutting against the cross-head, and means for adjusting the said tension members, substantially as set forth.

5 5. In a machine for crushing ores, &c., the combination with a pair of rolls and a movable bearing at each end of one of said rolls, of two independently-movable plates one of which
10 normally abuts against the bearing, a rigid support against which the other plate abuts, springs between said plates, and means independent of the bearing for limiting the movement of the pressure-plate abutting the bearing
15 in one direction while permitting it to move in the opposite direction, substantially as set forth.

6. In a machine for crushing ores, &c., the combination with a pair of crushing-rolls, and
20 movable bearings for one of said rolls, of a pair of pressure-plates for each bearing, springs between the plates of each pair and means independent of the bearing for limiting the movement of each plate in one direction while
25 permitting it to move in the opposite direction, substantially as set forth.

7. In a machine for crushing ores, &c., the combination with a pair of crushing-rolls, and movable bearings for one of said rolls, of a pair
30 of pressure-plates for each bearing, springs between the plates of each pair, means for adjusting the plates of each pair relatively to each other to vary the tension of the springs, and means independent of the bearing for limiting the movement of each plate in one direction while permitting it to move in the opposite direction, substantially as set forth.

8. In a machine for crushing ores, &c., the combination with a pair of rolls, and a movable
40 bearing at each end of one of said rolls, of two independently-movable plates, one of which normally abuts against the bearing, a rigid support against which the other plate abuts, springs between the plates, means independent
45 of the bearing for limiting the movement of the pressure-plate abutting the bearing

ing in one direction while permitting it to move in the opposite direction, and means independent of the first said means for limiting the movement of the other plate away from the
50 bearing while permitting it to follow and partake of the movement of the bearing toward its opposing roll, substantially as set forth.

9. In a machine for crushing ores, &c., the combination with a pair of crushing-rolls, and
55 movable bearings for one of said rolls, of a pair of pressure-plates for each bearing, springs between the plates of each pair, means independent of the bearing for limiting the movement of the pressure-plate abutting against
60 the bearing in one direction while permitting it to move in the opposite direction, and means independent of the first said means for limiting the movement of the other plate away
65 from the bearing while permitting it to follow and partake of the movement of the bearing toward its opposing roll, substantially as set forth.

10. In a machine for crushing ores, &c., the combination with a pair of crushing-rolls, and
70 movable bearings at each end of one of said rolls, of a pair of pressure-plates for each bearing, springs between the plates of each pair, means for adjusting the plates of each pair relatively to each other to vary the tension of
75 the springs, means independent of the bearing for limiting the movement of the pressure-plate abutting against the bearing in one direction while permitting it to move in the opposite direction, and means independent of the
80 first said means for limiting the movement of the other plate away from the bearing while permitting it to follow and partake of the movement of the bearing toward its opposing roll, substantially as set forth.
85

Signed this 30th day of December, 1901, at Salt Lake City.

DAVID JACK NEVILL.

Witnesses:

OLIVER J. EGGLESTON,
ARTHUR R. PARSONS.