

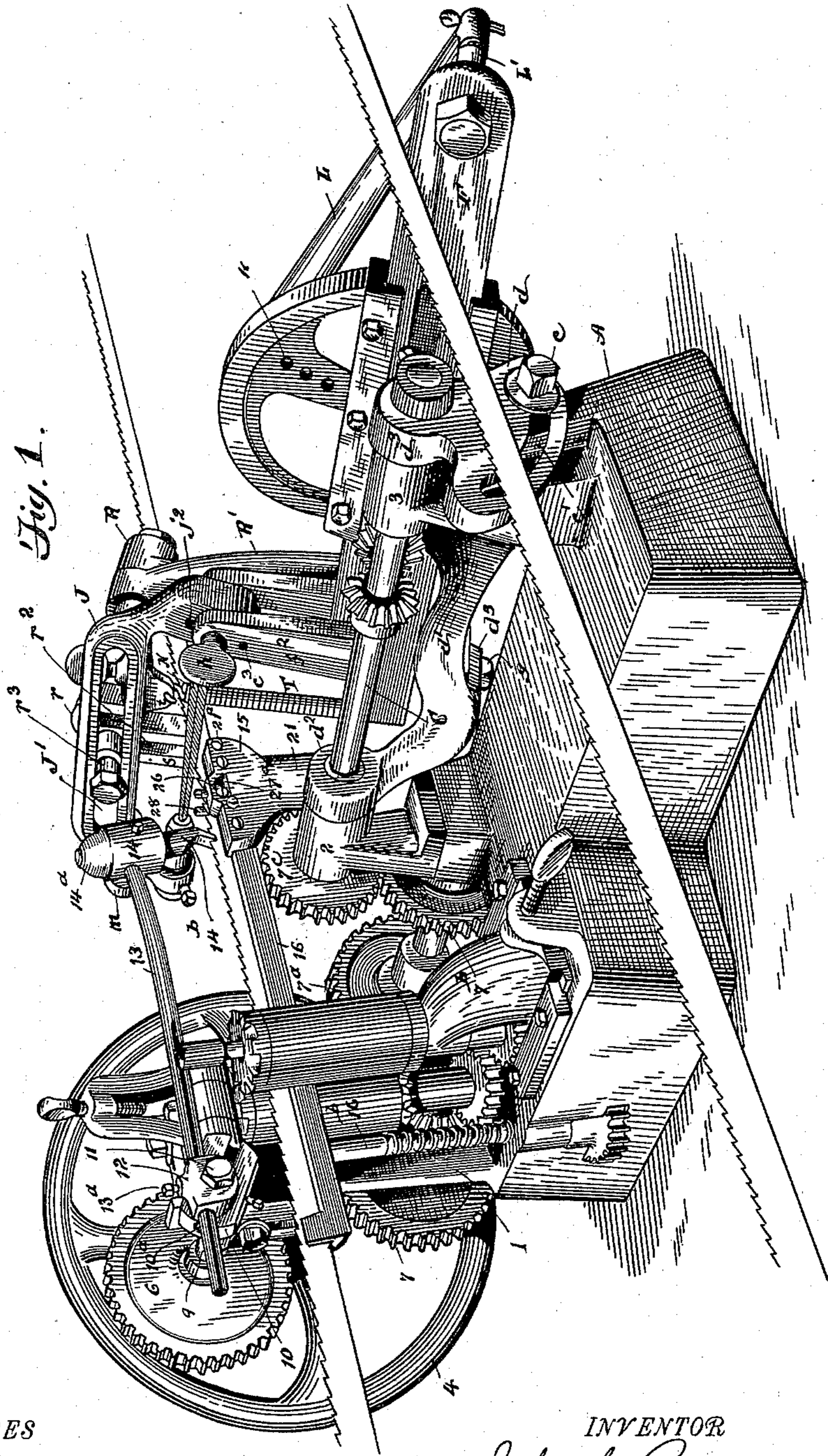
(No Model.)

5 Sheets—Sheet 1.

J. C. BALLEW.
SAW FILING MACHINE.

No. 579,103.

Patented Mar. 16, 1897.



WITNESSES
L. A. Bradford
C. B. Lundy

By

INVENTOR
John C. Ballew.
Parker & Burton

Attorneys.

(No Model.)

5 Sheets—Sheet 2.

J. C. BALLEW.
SAW FILING MACHINE.

No. 579,103.

Patented Mar. 16, 1897.

Fig. 2.

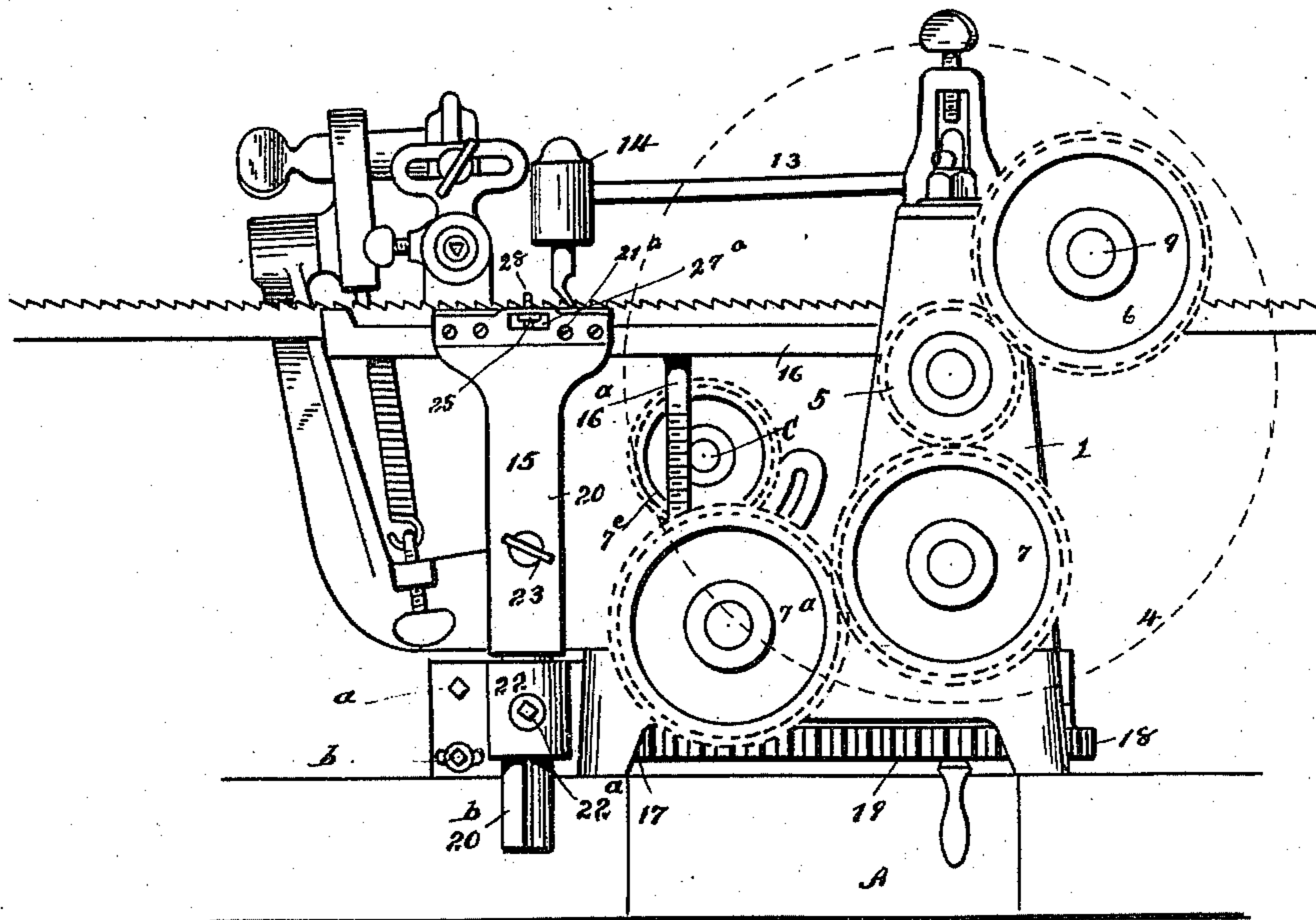
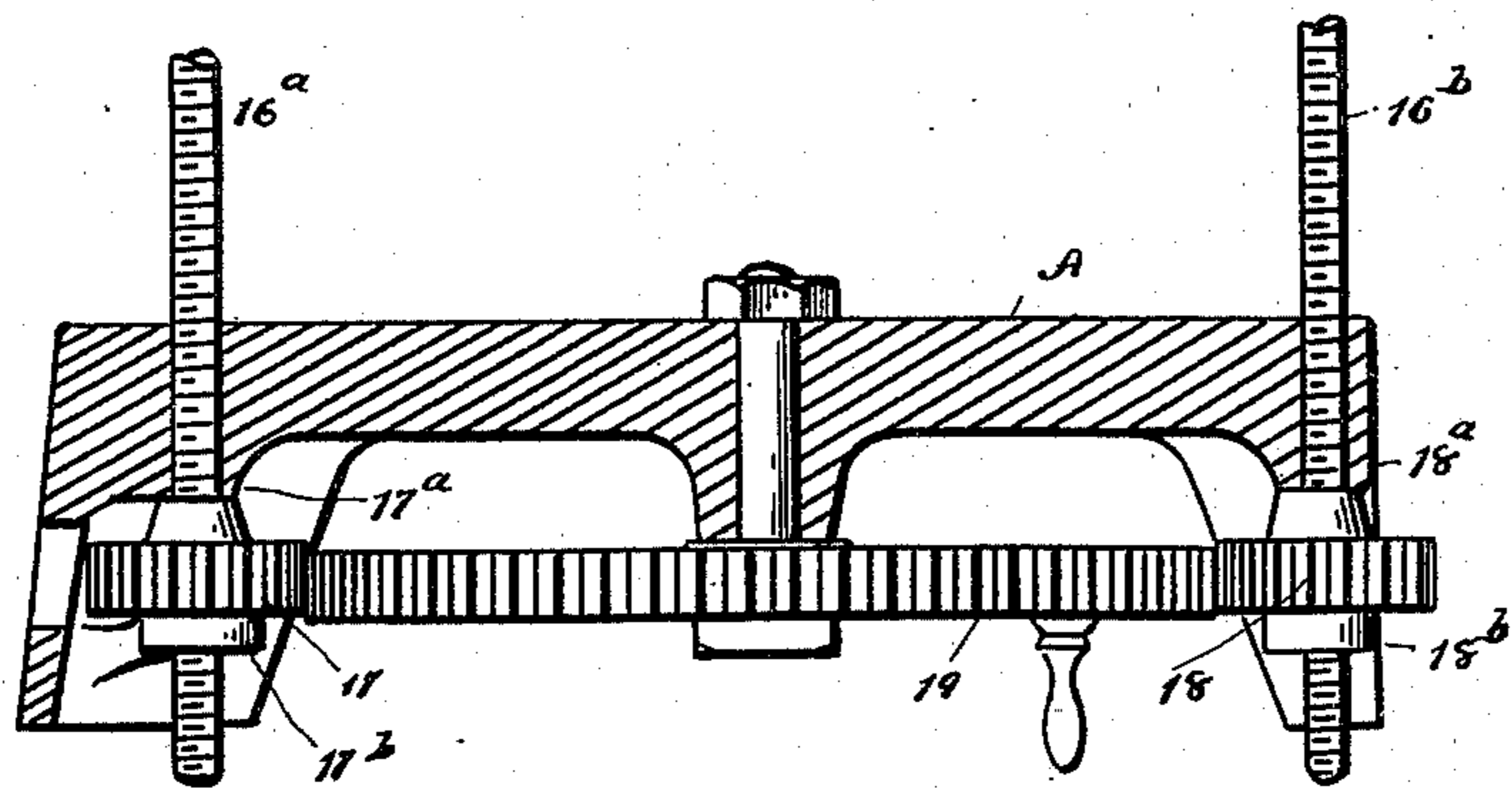


Fig. 3.



WITNESSES

L. H. Bradford
C. B. Lundy

INVENTOR

John C. Ballow
Parker & Burton

By

Attorneys.

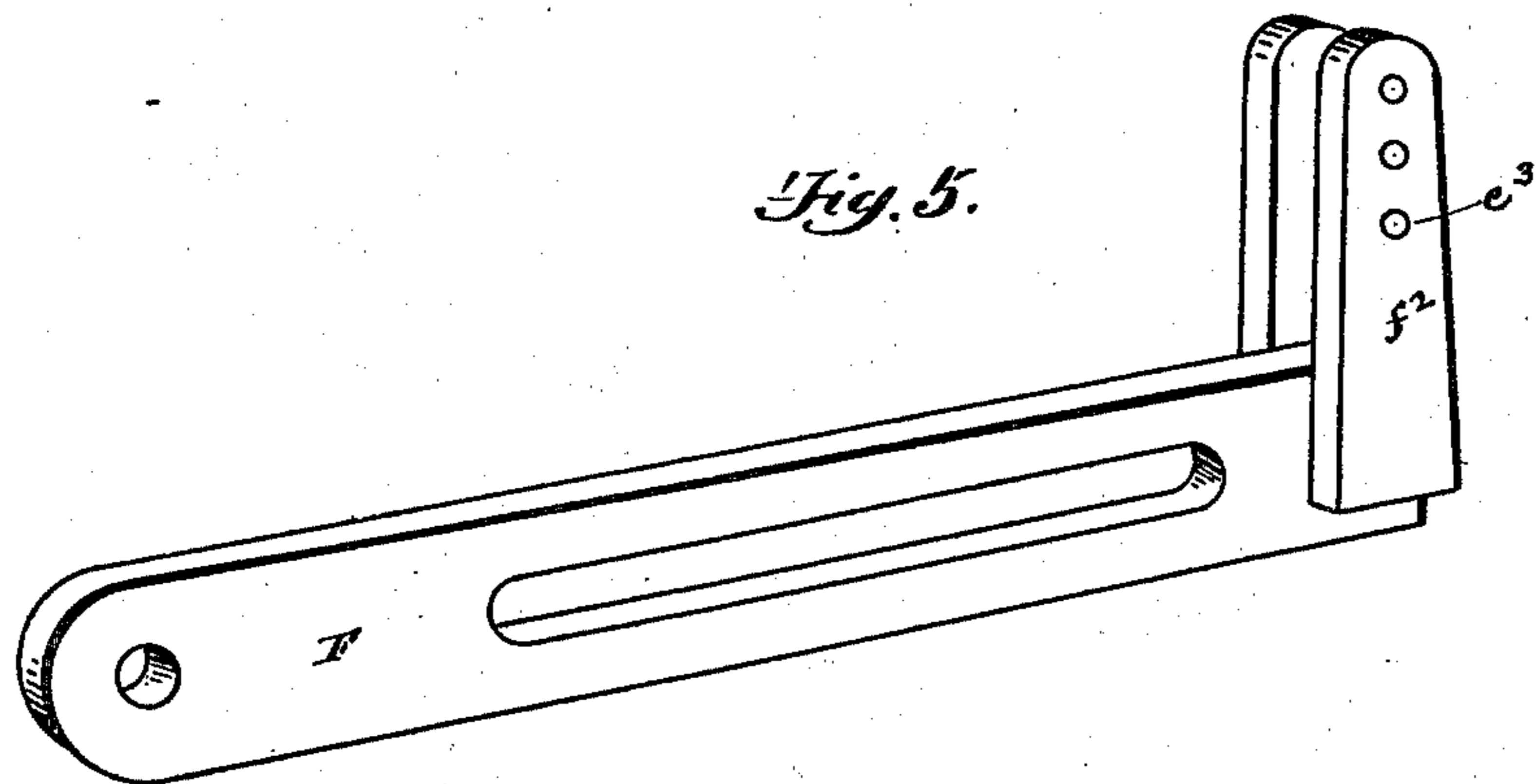
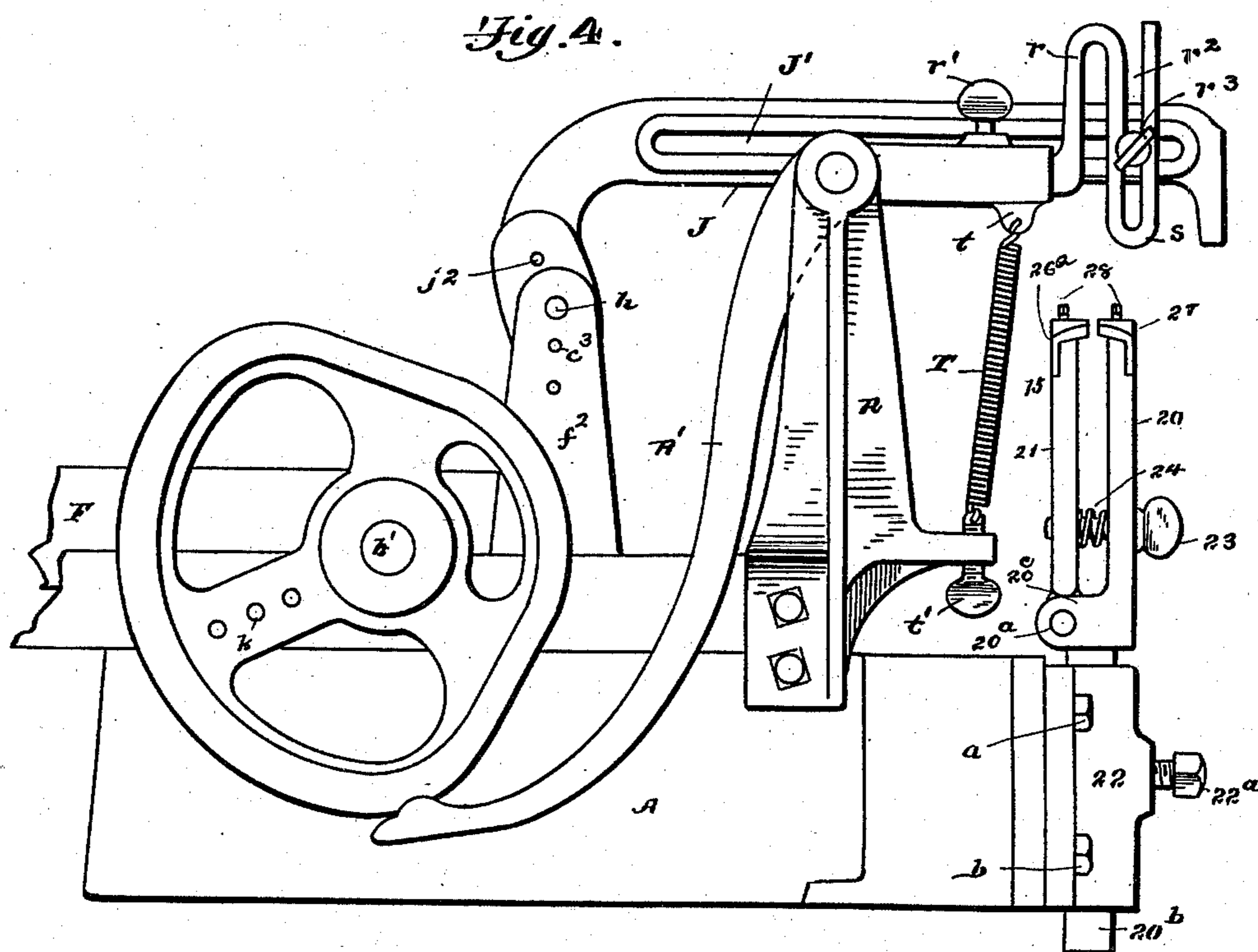
(No Model.)

5 Sheets—Sheet 3.

J. C. BALLEW.
SAW FILING MACHINE.

No. 579,103.

Patented Mar. 16, 1897.



WITNESSES

L. H. Bradford
C. R. Lundy

By

INVENTOR

John C. Ballow
Parker & Burton

Attorneys.

(No Model.)

5 Sheets—Sheet 4.

J. C. BALLEW.
SAW FILING MACHINE.

No. 579,103.

Patented Mar. 16, 1897.

Fig. 6.

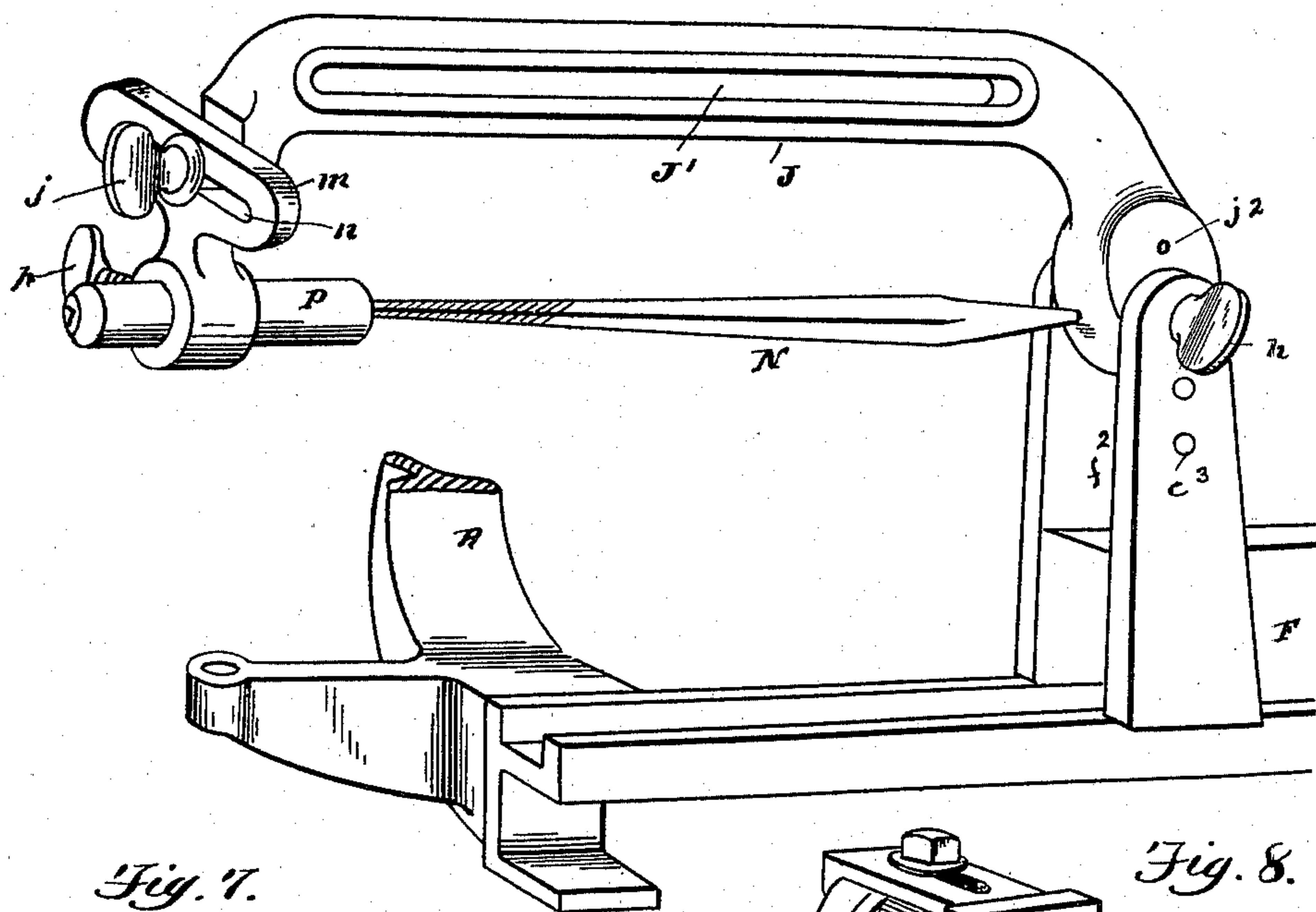


Fig. 7.

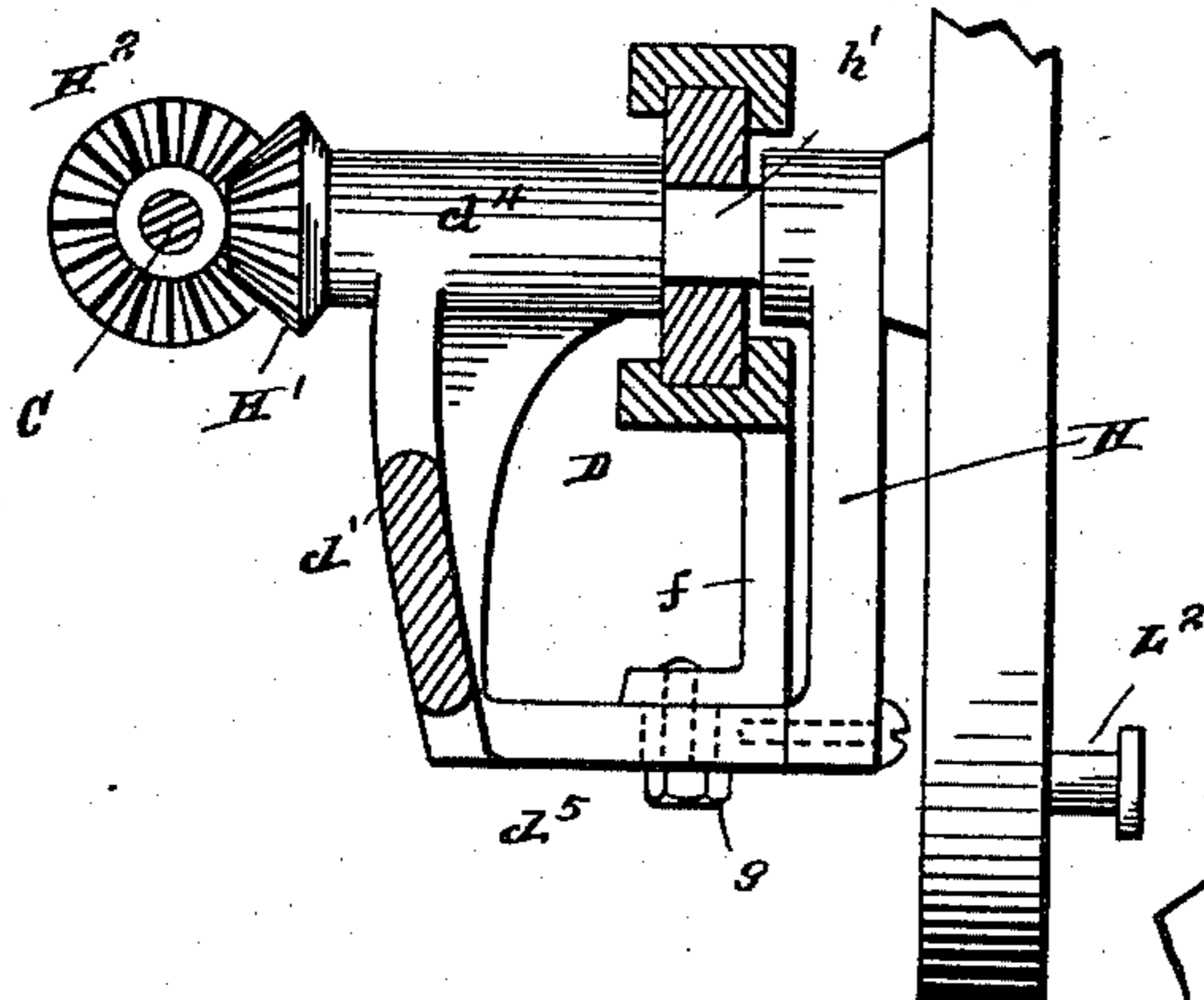
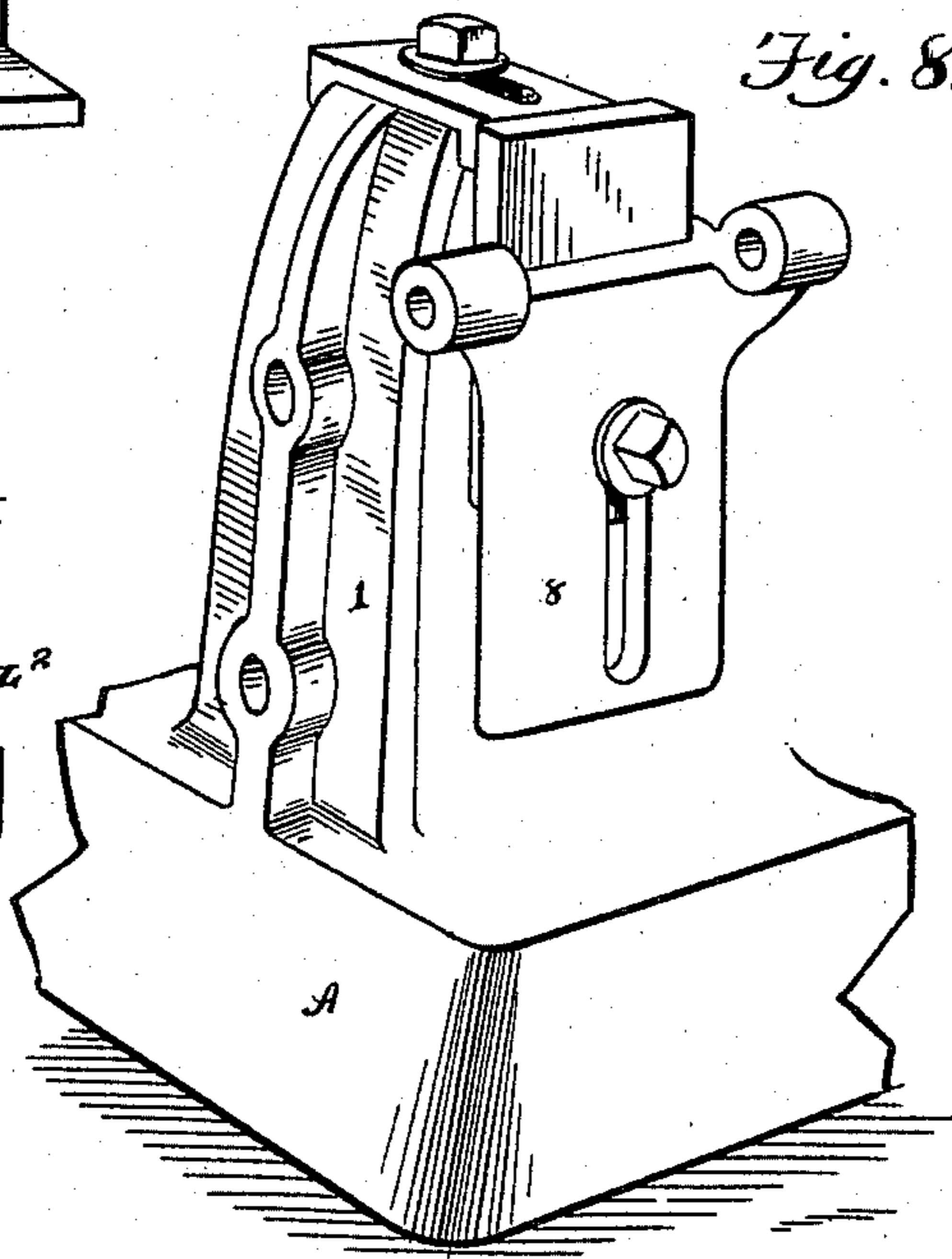


Fig. 8.



WITNESSES
W. B. Bradford
C. M. Lundy

INVENTOR
John C. Ballow
By Parker & Burton
Attorneys.

(No Model.)

5 Sheets—Sheet 5.

J. C. BALLEW.
SAW FILING MACHINE.

No. 579,103.

Patented Mar. 16, 1897.

Fig. 10.

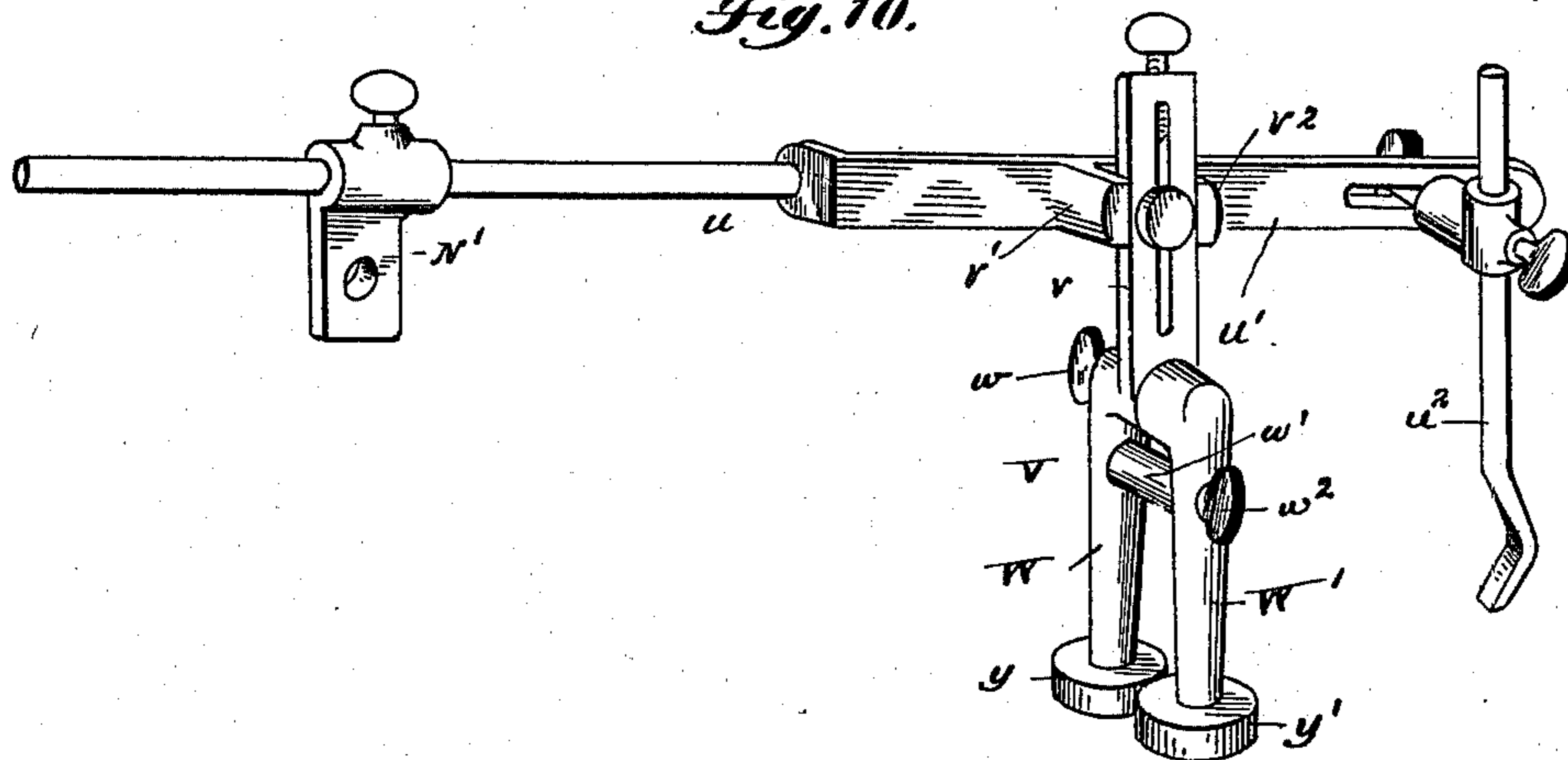
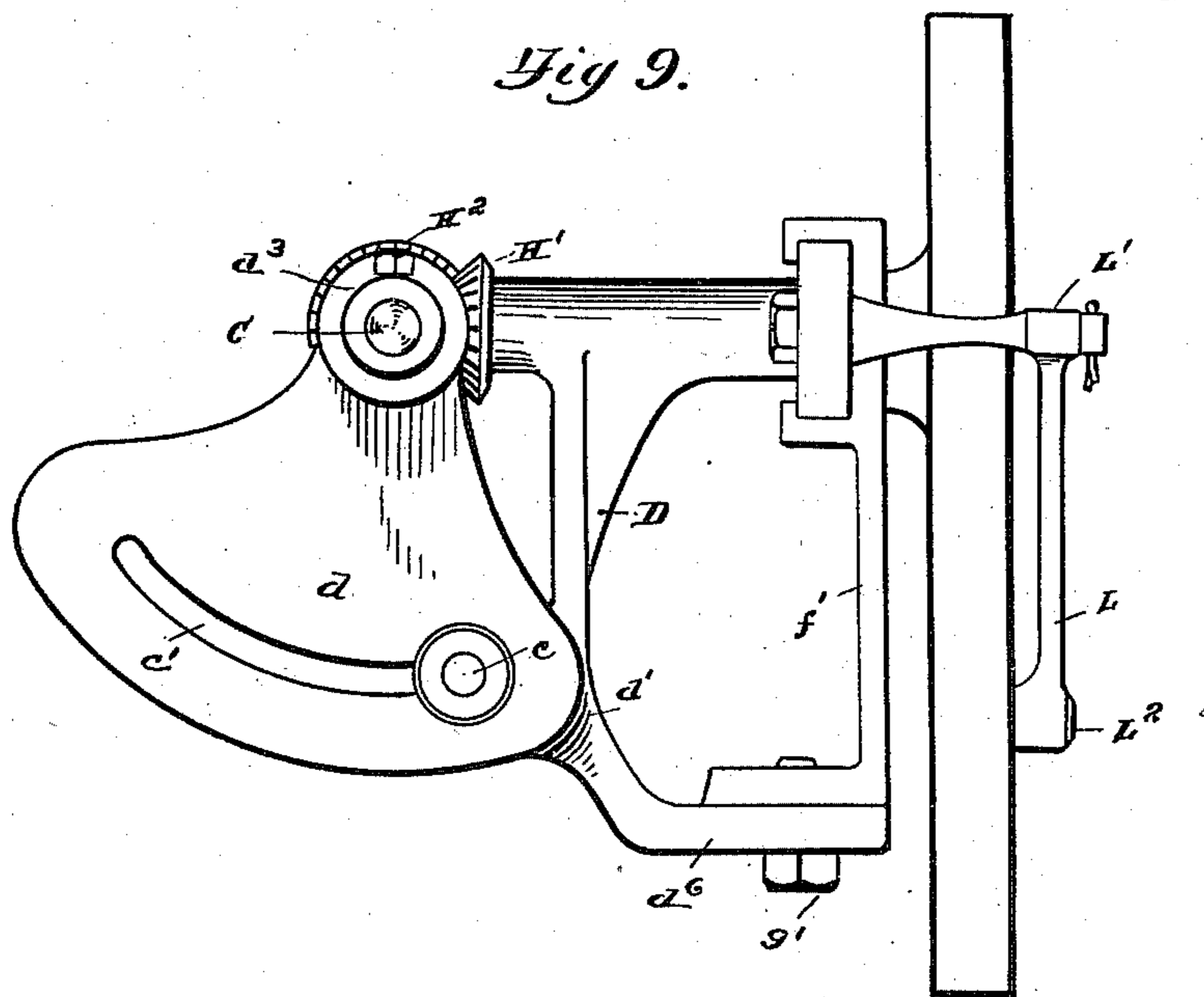


Fig 9.



WITNESSES

W. H. Bradford
C. B. Lundy

INVENTOR

John C. Ballow
Parker & Burton

By

Attorneys.

UNITED STATES PATENT OFFICE.

JOHN C. BALLEW, OF EVANSVILLE, INDIANA.

SAW-FILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 579,103, dated March 16, 1897.

Application filed January 11, 1896. Serial No. 575,072. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. BALLEW, a citizen of the United States, residing at Evansville, county of Vanderburg, State of Indiana, have invented a certain new and useful Improvement in Saw-Filing Machines; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to saw-filing machines of that class in which a file is carried across the saw by means of an arm which is provided with a four-motion and the saw is fed forward during each backward stroke of the file, and has for its object improvements whereby it may be readily adjusted to file saws differing one from another in pitch or size of tooth, and also whereby it may be adjusted to those saws having teeth of different angles or incline, which difference is found especially between rip and crosscut saws.

The invention consists in the combination and arrangement of the various parts, as hereinafter described, and pointed out in the claims.

I am aware that many efforts have been made on the part of inventors and mechanics to produce a perfect universal saw-filing machine, but I am not aware that any device has yet been made whereby the file may be made to operate upon the throat or face of a tooth of any angle and to clear its point upon the reverse motion. In my improvement I have provided means whereby this result is accomplished, thus avoiding the obstacle which has interfered with the success of other machines of its class.

A better and more perfect understanding of my invention may be had by referring to the accompanying drawings, in which like reference-characters refer to corresponding parts.

In the illustration of my invention I have preferred to show it in connection with my saw-setting device, for which Letters Patent were granted to me November 29, 1887, No. 375,032, employing the same driving-wheel and arranging both devices in such relation to each other that they work in conjunction.

Yet, just as my setting-machine was independent, so also the filing-machine is capable of being employed entirely independent.

In the drawings, Figure 1 shows in perspective my improved saw-filing machine and saw-setting machine assembled in one. Fig. 2 is a front elevation of a combined machine. Fig. 3 is a section through the base, showing the means employed for adjusting the saw-guide. Fig. 4 is a side elevation of the machine as seen from the right of Fig. 1. Fig. 5 is a detail perspective of the sliding pitman. Fig. 6 is a detail perspective of the file-carrying frame, showing the means for securing and adjusting the file. Fig. 7 is a section taken through the sliding pitman, adjustable supporting-frame, and shaft C just inside of the pillow-block 3 of Fig. 1, showing the manner of adjusting the rake of the file. Fig. 8 shows in perspective the supporting-post for the main driving-wheel and gears and also the doubly-adjustable crank-shaft support. Fig. 9 is a rear elevation of the main driving-shaft and the connection between it and the crank-wheel and shows the manner of adjusting the file-actuating frame around the main shaft. Fig. 10 is a perspective view of an improved saw-feeding device.

A indicates the bed of the machine, upon which are supported three posts or pillow-blocks 1, 2, and 3. The post 1 is a part of the saw-setting machine, but is also utilized in the independent filing-machine. The driving-wheel 4 is journaled in the post 1, and on the shaft of this wheel is mounted a pinion 5, that meshes with two gears 6 and 7; also, upon post 1 and adjustably secured thereto is the journal-hanger 8, carrying the crank-shaft 9. Upon the crank-shaft 9 the gear 6 is mounted, upon the rear end of which is secured the slotted crank-plate 10.

12 is an adjustable wrist-block journaled upon the wrist-pin 11, which in turn is adjustably held in the slot 10^a of the block 10. This form of adjustable crank is not new, and although I have preferred to employ it in my machine any other form whereby an adjustably variable throw of the pitman is secured may be adopted.

13 is a pitman-rod secured at one end in the wrist-block 12 by means of the set-screw 13^a,

and at its opposite end it is provided with the pawl 14, which engages with the saw, and which I prefer in this case to make in two parts—a head or tool-holder 14^a and a tool 14^b.

5 This construction enables me to secure a double adjustment, as well as to renew the parts independent of one another.

The mechanism which I have so far described, and which I will refer to as the “saw-
10 feeding device,” enables me to handle saws of a great variety, both in depth of blade and in form of teeth.

In Fig. 1 I have illustrated my machine as employed to file band-saws. These saws may
15 be supported in any suitable and well-known manner, it being common to support band-saws in various devices in a horizontal position, as I have shown. A further support, however, is shown in my machine at 16, which
20 is arranged to guide the saw and to assist in preventing the chattering or vibration that would be caused by the operation of the file. This support 16 is carried upon the vertical rods 16^a 16^b, which are adjustable through
25 the bed A, and are adjusted vertically by means of the nut-pinions 17 18 and hand-gear 19. The lower ends of the rods 16^a and 16^b are threaded and engage in the nut-pinions, which mesh with hand-gear 19, and as the pin-
30 ions are held between the lugs 17^a 17^b and 18^a 18^b their rotation compels a vertical movement of the rods and saw-guide. The saw-guide is grooved to receive the saw and at the same time allow it free and easy movement, and at
35 one end it engages with the vise 15, which forms a continuation of the saw-guide and which takes a more active part in preventing the vibration of the saw under the action of the file.

In order to accommodate saws of different
40 thickness, I construct this vise with two jaws 20 and 21. (See Fig. 4.) One of these jaws 20 forms the upper end of the stem 20^b, which is held in the block 22 by means of the set-screw 22^a and is vertically adjustable therein.
45 The other jaw is hinged at its lower end 20^a to the laterally-extending lug 20^c, formed integral with the jaw 21. To hold the jaws together, I provide the thumb-screw 23, which passes loosely through the jaw 20 and is
50 tapped into the jaw 21. The coil-spring 24 is inserted between the jaws and around the screw to force them open against the action of the screw, thereby assisting in adjusting the saw in place. I have found much difficulty
55 in the use of the ordinary vise for this purpose, as it is essential that the jaws engage the saw-blade with sufficient firmness to hold the saw rigid under the action of the file and at the same time not to grip or pinch it, but
60 allow it a free and easy movement. To avoid this difficulty, I provide the two small rollers 25 and 26, which I have found to be most effective at those points where the faces of the jaws are just tangential to the periphery of
65 the rollers. This arrangement allows the jaws to engage the saw-blade snugly, at the

same time preventing any binding or pinching effect.

For the purpose of durability and economy I prefer to provide the separate jaw-faces 26^a 70 27, which are secured to the upper ends of the jaws 20 21 by means of the screws 21^a, and within the recesses 27^a, which are formed in the separate jaw-faces at points midway between the two ends, I insert the two rollers 75 above mentioned, which are journaled upon the pins 28. These jaws are provided upon their inner engaging faces with overhanging lips that engage the saw-blade just below the throat of the teeth and which faces act with 80 the rollers to engage the saw.

I give the vise a slight lateral adjustment in order to adjust the rolls with reference to the rake of the file. One of the various methods by which this may be accomplished is 85 shown in Figs. 2 and 4, in which the block 22 is secured to the bed by means of the bolts *a* *b*, which pass through the block and are tapped into the bed-frame. The hole *e*, through which the bolt *b* passes, is slotted in a circle 90 around the center of the bolt *a*, so that when it is desired to tip the vise a little to the right or left both the bolts are loosened and the block can then be swung around the bolt *a* until the desired angle is obtained. The 95 bolts are then screwed down to place, when the vise is again in condition for use.

So far I have limited the description of my invention to the saw-feed and its operating mechanism, and I will now take up that por- 100 tion of the machine which has to do with the operation and control of the file and which embodies the essential novelty of my invention.

C is a shaft journaled in the two pillow- 105 blocks 2 and 3. This shaft receives its motion, primarily, from the main driving-wheel 4, which motion is transmitted to the shaft through the medium of the train of gears 7, 7^a, 7^b, and 7^c. The last-named gear, 7^c, is 110 mounted upon the forward end of the shaft C, while the others merely act as idlers. Upon the shaft C is pivoted the frame D, which is adjustable around the shaft and is secured in position by means of the bolt *c* 115 and slotted plate *d* at the rear end of the shaft. The frame D comprises the main body *d'*, the journal-bearings *d*² *d*³ (seen in Fig. 1) *d*⁴, (best seen in Fig. 7,) the plate *d*, and supporting-lugs *d*⁵ *d*⁶. This frame is adjust- 120 able around the shaft upon which it is supported, and it is firmly secured at any desired angle by means of the bolt *c*, which passes through the slot *c'* in the plate *d* and is tapped into the pillow-block 3. Upon the 125 frame D and secured to the lugs *d*⁵ *d*⁶ is supported the entire file carrying and operating mechanism. By means of the adjustment of the frame D around the shaft I am able to give to the file any desired working angle, 130 thus rendering it possible to operate upon the face of the tooth of a rip-saw as readily

as that of a crosscut-saw. The support and guide for the sliding pitman F is provided with two supporting legs or standards $f f'$. (Seen in Figs. 7 and 9.) The standard f rests upon the lug d^5 of the frame D and the standard f' rests upon the lug d^6 . Both standards have their lower ends bent at right angles to the upright portion, through which engage the holding-bolts $g g'$. In the lugs $d^5 d^6$ are formed slots at right angles to the axis of the shaft C, and through these slots pass the holding-bolts above mentioned. It will be observed that by this means the vertical plane of the guide may be shifted laterally to vary the angle with the line of the saw C, thus giving the file more or less rake, as may be desired. The sliding pitman F is provided at its forward end with a pair of upright posts f^2 , having a series of adjusting-holes c^3 at their upper ends, within which is inserted the hinge-pin h , upon which swings the file-carrying frame. The rear end of the file-frame J is also provided with a number of holes j^2 , any one of which may be used as the means of connecting the frame with the posts f^2 , and by means of the several holes in the posts and the several holes in the frame there is not only a considerable range of adjustment, but the adjustment is as fine as is necessary. This adjustment is for the purpose of setting the file to cut an upward bevel on the tooth of the saw, the tang end of the file being set below the tooth or notch between the teeth and the point being above the notch as the file moves forward, constantly rising to a more oblique position, but also constantly cutting that side of the tooth which lies toward the file-reciprocating part of the machine more deeply than it cuts the other side of the tooth. This is especially desirable in giving to the point of the tooth a sharp point.

Four-motion is given to the sliding pitman by the following-described means: Supported at right angles to the main shaft C in the bearing b^4 , which forms a part of the frame D, is a short shaft h' , one end of which is provided with a miter-gear H' , engaging with a similar miter-gear H^2 , mounted on the shaft C. The opposite end of this shaft h' projects through a slot in the sliding pitman and is supported at its outer end by the arm H, through which the shaft passes. Upon the extreme outer end of the shaft is carried the eccentric crank-wheel, in which is a series of adjusting-holes for a purpose to be hereinafter referred to. The pitman L is secured at one end to the sliding pitman by means of the wrist-pin L' and to the crank-wheel by means of the wrist-pin L^2 . It is obvious that as the shaft C rotates motion is transmitted through the miter gears and shaft to the eccentric crank-wheel, thus giving to the sliding pitman a rectilinear reciprocating motion of any desired length, and which may be regulated by the location of the wrist-pin L^2 in the adjusting-holes k of the crank-wheel above referred to.

The file N is carried in the frame J, which is hinged at its rear end upon the pin h , supported in the vertical standards at the forward end of the sliding pitman. This file-frame is of a construction somewhat similar to that of a saw-frame, having an arched back, the file occupying the position of the saw-blade. The detail construction and means of supporting and adjusting the file in this frame differ somewhat from that of the saw and will need a fuller description. Both ends of the frame are inclined downward, forming an arch, and at the forward end is provided an adjustable T-shaped part m . This T-shaped part is slotted longitudinally in its upper bar at n and terminates at its lower end in a bearing, within which is supported the block P, and this is secured in place by means of the thumb-screw p . The T-shaped part is held to the forward face of the frame J by means of the thumb-screw j , which passes loosely through the slot n and is tapped into the frame. The file is supported between the rear downward-extending portion of the frame J (which is provided with a hole to receive the shank of the file) and the adjustable block P. In order that the file may be lifted upon its return motion, I provide the following means: At that side of the machine upon which the eccentric wheel is located a bracket R is secured to the guiding-frame for the sliding pitman, which carries at its upper end a hinge-pin, upon which is supported the rocker-arm R' . The forward end of this rocker-arm, which in the position as shown in Fig. 4 extends forward and parallel with the file-carrying frame, is recessed to receive the slotted holder r . This holder is provided with a stem which is adjustable within the recess and secured by means of the thumb-screw r' . It is also provided with a double gooseneck $r s$, (the equivalent of a vertically-slotted head,) which crosses the slot J' , and by means of the two crossed slots the parts may be adjusted as may be desired. The pin r^3 is held securely in the slot r^2 of the holder r , and is loose in the slot J' , so that the frame J can reciprocate, but is held vertically with respect to the rocker-arm R' . That point of it which is for the time in immediate engagement with the pin r^3 rises and falls with the forward end of the rocker-arm R' . The rear end of the rocker-arm R' is carried downward and backward and engaged with the periphery of the eccentric wheel.

In case the weight of the file and its carrying-frame should not be found heavy enough to give to the file sufficient abrading effect I provide the coil-spring T, which is secured at its upper end to the lug t , formed upon the forward under side of the rocker-arm, and at the other end secured to an adjusting-screw t' , which is held in a lug extending laterally from the bracket R.

From the foregoing description the operation will be readily understood.

When it is desired to file a saw, the pitman-rod 13 and pawl 14 may be swung back out of the way at the same time the file-frame is lifted and the saw adjusted in place. When the saw-guide and vise have been properly adjusted, the pawl may be lowered to engage the teeth of the saw and the file-frame allowed to descend until supported by the rocker-arm. Should it be found desirable to cut under the face of the tooth, or, in other words, to give it a little more angle, the bolt *c* is loosened, whereupon the entire saw-filing mechanism may be adjusted around the shaft C until the file has been brought to the proper angle.

As has been pointed out above, the file and pawl receive their motion primarily from the same source, and their operating parts are so adjusted with relation to one another as to produce a feeding motion to the saw while the file is upon its return stroke, and when the file is upon its forward cutting stroke the pawl is moving back to engage another tooth. I have found in the use of this saw-feeding device that the adjustment of the crank-pin 11 must be very accurate in order to avoid carrying the tooth too far or not far enough to engage the file. To obviate this, I have provided the device shown in Fig. 10. In employing the attachment shown in Fig. 10 the eye-plate N' takes the place of the eye-block 12 on the crank-pin 11, the pitman-rod 13 and the pawl 14 also being replaced by the pitman-rod *u* and pawl *u*² and the friction device V. The operation of the pawl 14 is essentially the same as that of the pawl *u*², and it will not be necessary to describe in detail its construction. The friction device V is adjustably secured to the pitman-rod *u*'. This frame consists of the vertical slotted portion *v*, which engages between the lugs *v*' *v*², that are formed upon one side integral with the pitman-rod. At the lower end of the slotted part *v* and forming a continuation thereof are two depending legs W W'. One at least of the legs is made in a separate piece from the slotted part *v* and is adjustably held to the main part *v*' by means of the thumb-screw *w*. A roller *w*' is mounted upon the pin *w*² and is held between the legs W W'. This roller is adapted to rest upon the upper face of the teeth and to carry the pawl over their points. At the lower end of each of the legs W W' is journaled a horizontal friction-roller *y* *y*'. These rolls are adjusted to snugly engage both sides of the saw-blade and, assisted by the action of the roller *w*', force the saw back while the file is in the process of cutting. By this means the necessity for delicate adjustment of the crank-pin 11 is avoided, for if the tooth should be carried a little too far and the file be then lowered to engage it the friction-rollers, acting upon the saw during the backward movement of the saw-feeding device, will force the saw back until the face of the tooth has been brought against the edge of the file.

What I claim is—

1. In a saw-filing machine, the combination of a main shaft, a reciprocating frame pivotally mounted on said shaft and adapted to carry a file, means whereby the frame may be adjusted around the shaft and secured when adjusted, and means actuated from the main shaft and adapted to actuate the reciprocating frame, substantially as described.
2. In a saw-filing machine, the combination of a saw-guide, a reciprocating file-carrying frame, means adapted to reciprocate the frame, means adapted to produce a rising-and-falling motion of the file-frame, and means whereby the obliquity of the rising-and-falling motion to the horizontal plane of the saw may be changed, substantially as described.
3. In a saw-filing machine, the combination of a saw guide and clamp, a file-carrying frame, means whereby said file-carrying frame is reciprocated, means for lifting the file and holding it out of engagement during its backward movement, and means whereby the angle between the horizontal plane of the saw and the plane through which the file is adapted to rise may be changed, substantially as described.
4. In a saw-filing machine, the combination of a saw-guide, a pivotally-supported file-frame guide, a file-frame adapted to be carried upon said file-frame guide, means whereby a four-motion is imparted to said file-frame, means whereby the tang end of said file-frame can be vertically adjusted and means for adjusting the file-frame guide around the pivot center, substantially as described.
5. In a saw-filing machine, the combination of a saw-guide, a reciprocating file-frame, means whereby the tang end of the file-frame can be vertically adjusted, and means for adjusting the file-frame around an axis that is at right angles to the path of the saw parallel with said file, substantially as described.
6. In a saw-filing machine, as a means for feeding the saw forward, a reciprocatory rod provided with a pawl, means adapted to adjust the pawl both vertically and longitudinally with respect to said rod, a friction-grip adapted to engage the saw and press it against the file, substantially as specified.
7. In a saw-filing machine, in combination with a reciprocating rod provided with a pawl adapted to feed the saw forward, a friction-grip adapted to engage the saw, and means for adjusting the grip vertically with respect to the rod, substantially as specified.
8. In a saw-filing machine, the combination with a saw-guide, a pivotally-supported file-carrying frame, means whereby a four-motion is imparted to said file, means for adjusting the file-frame guide around the pivot center of said pivotally-supported file-carrying frame, and means whereby the horizontal angle of said saw with said plane of motion may be varied, substantially as described.
9. In a saw-filing machine, the combination with a saw-guide and its support, of a file-

carrying frame supported upon a pivot center, means whereby said file is given a four-motion in a plane at right angles to said saw-guide, means for adjusting the file-frame
5 guide around the pivot center and means for operating said file-carrying frame, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

JOHN C. BALLEW.

Witnesses:

D. W. BRADFORD,
FRANCES CLOUGH.