

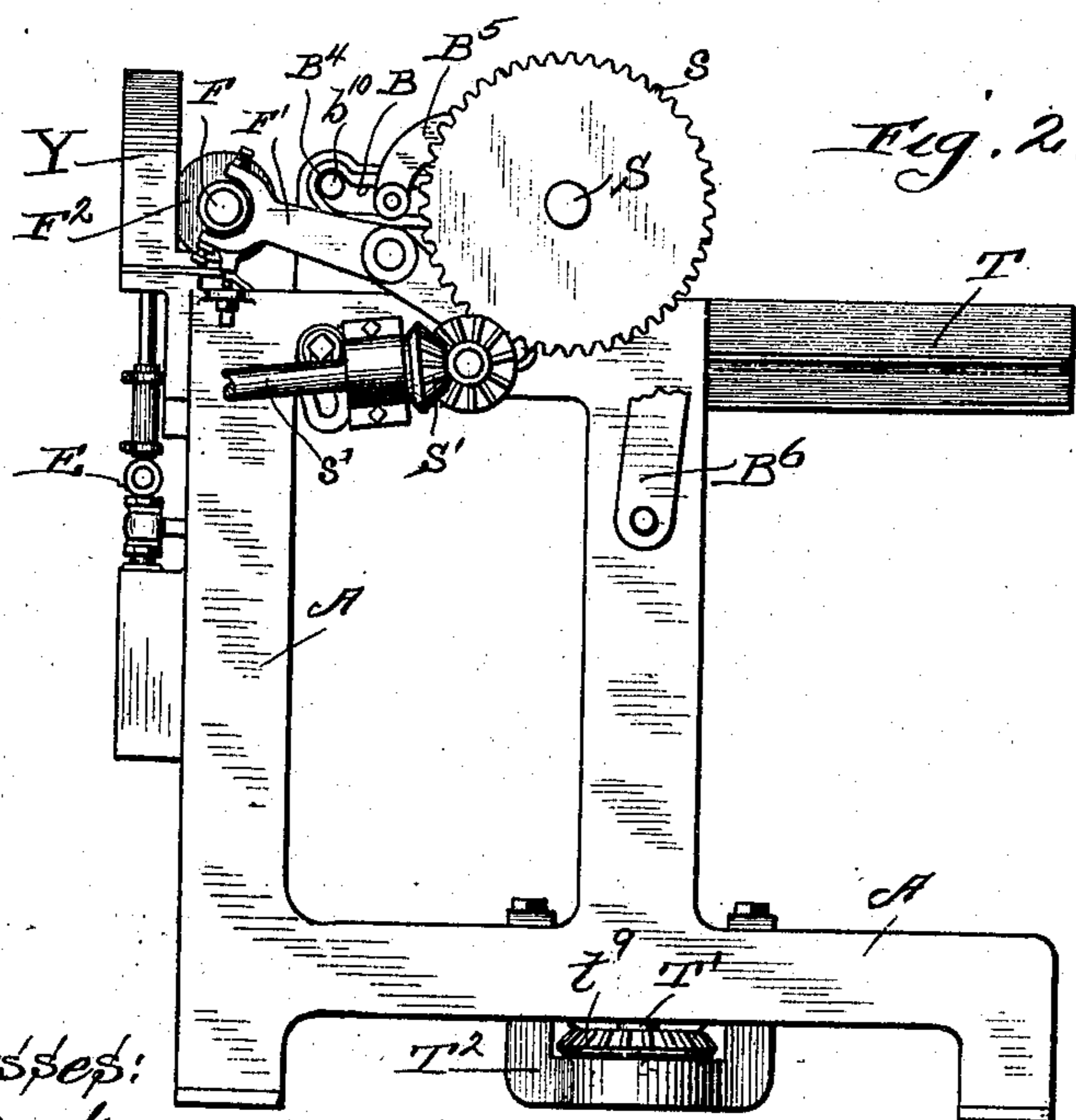
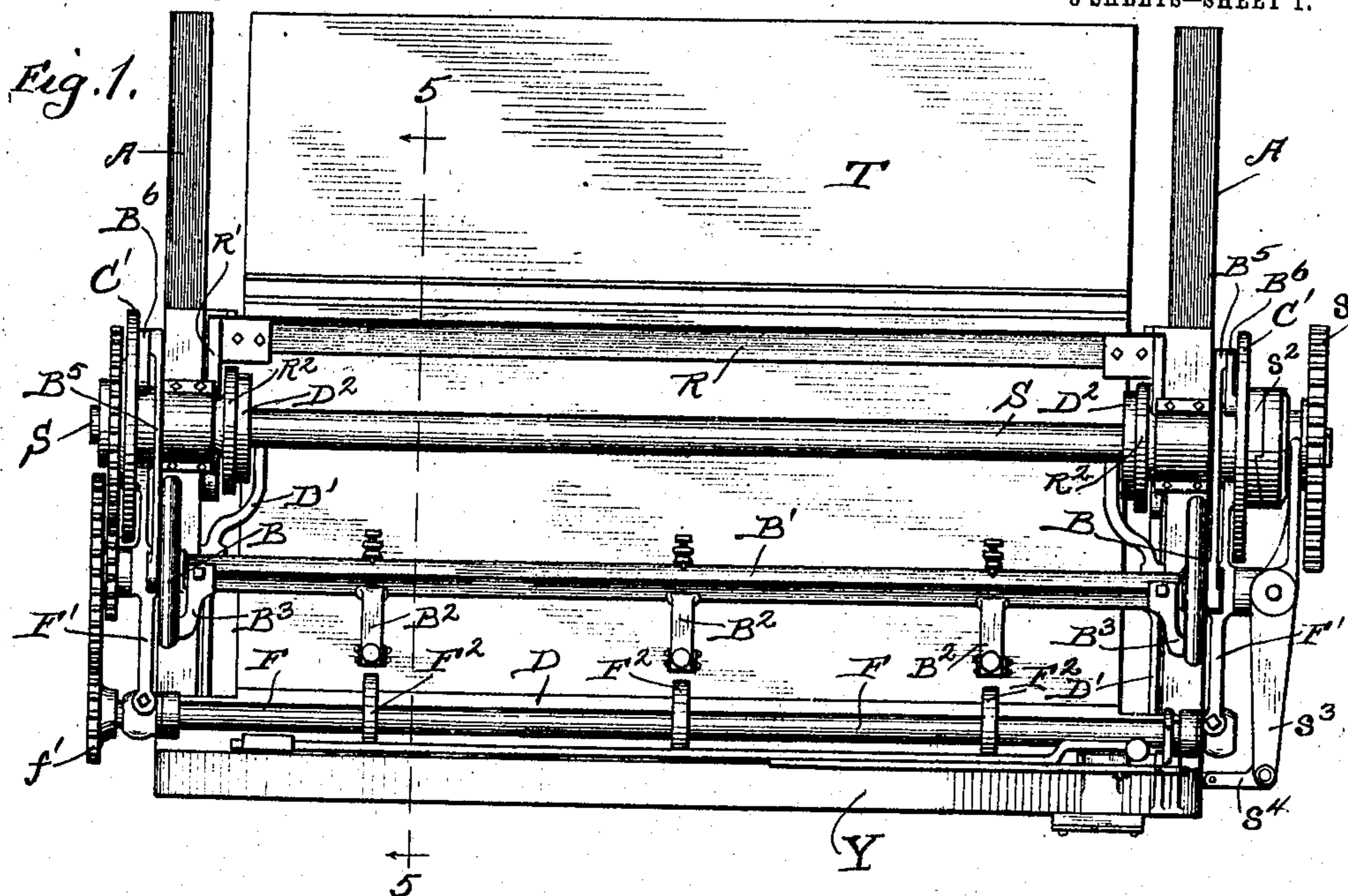
H. C. LA BATT.
SHEET FEEDING MACHINE.

APPLICATION FILED SEPT. 10, 1901. RENEWED FEB. 10, 1908.

899,995.

Patented Sept. 29, 1908.

8 SHEETS—SHEET 1.



Witnesses:
R. J. Jaeger.
R. H. Gustafson.

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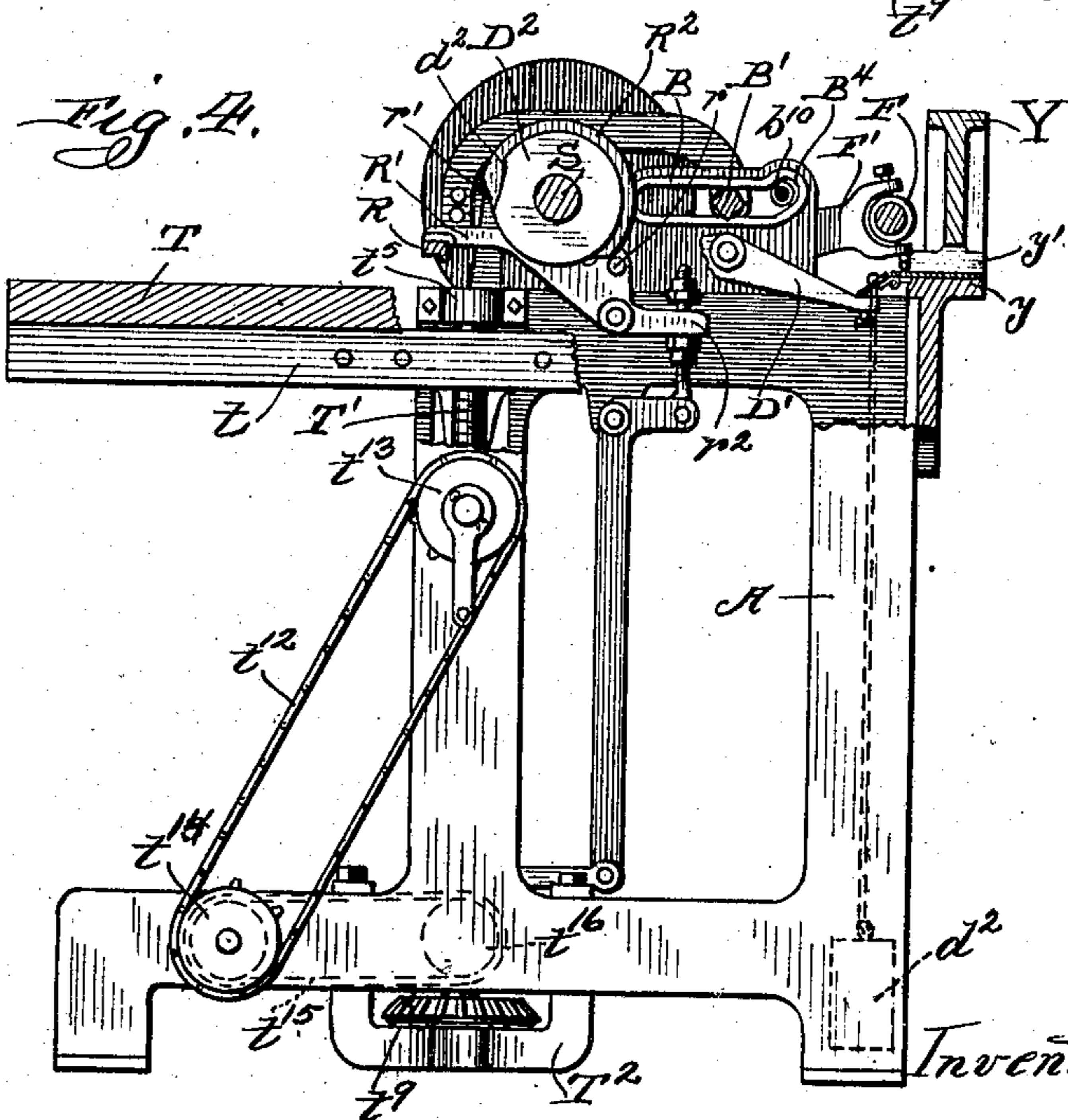
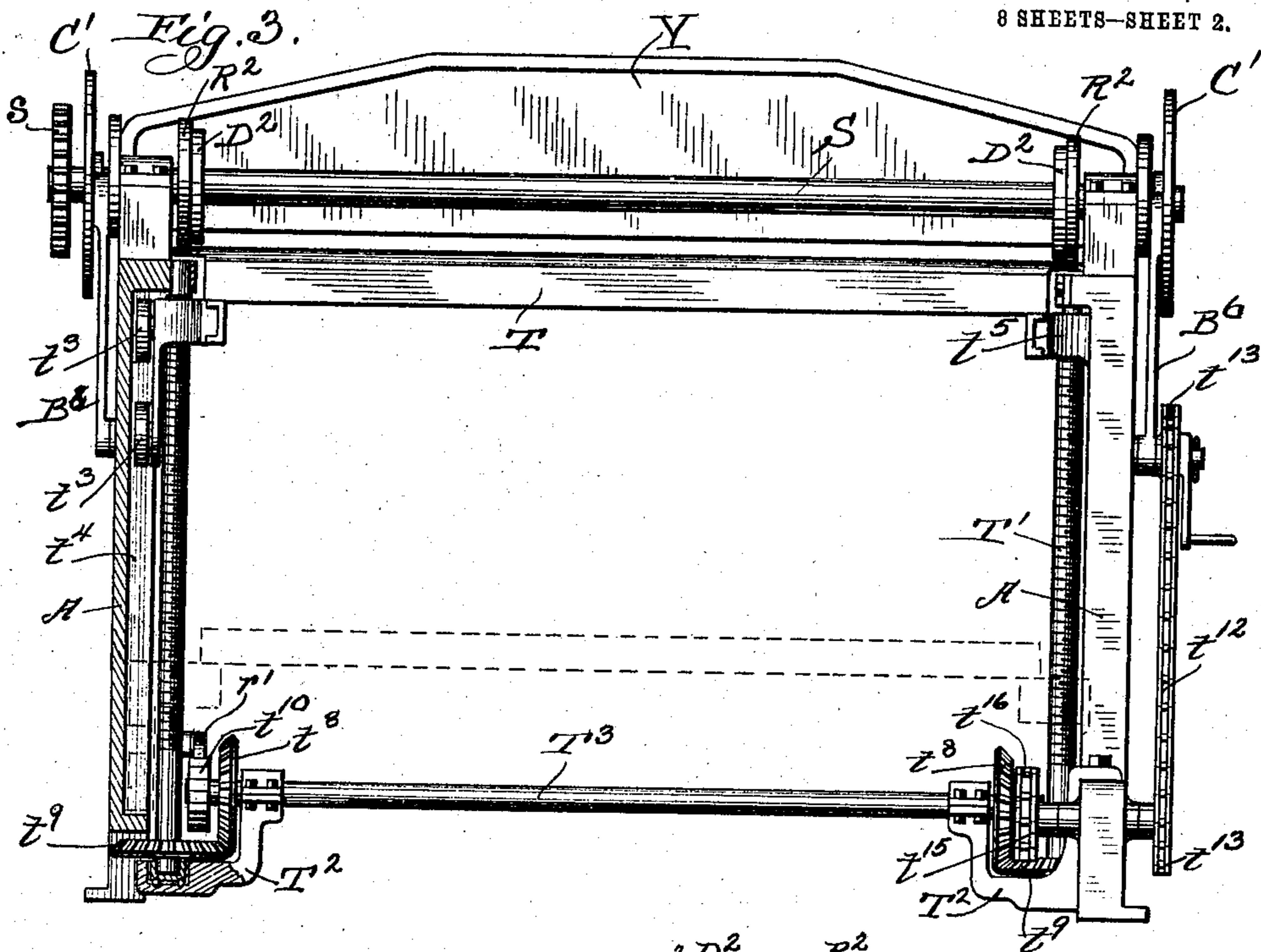
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Witnesses:
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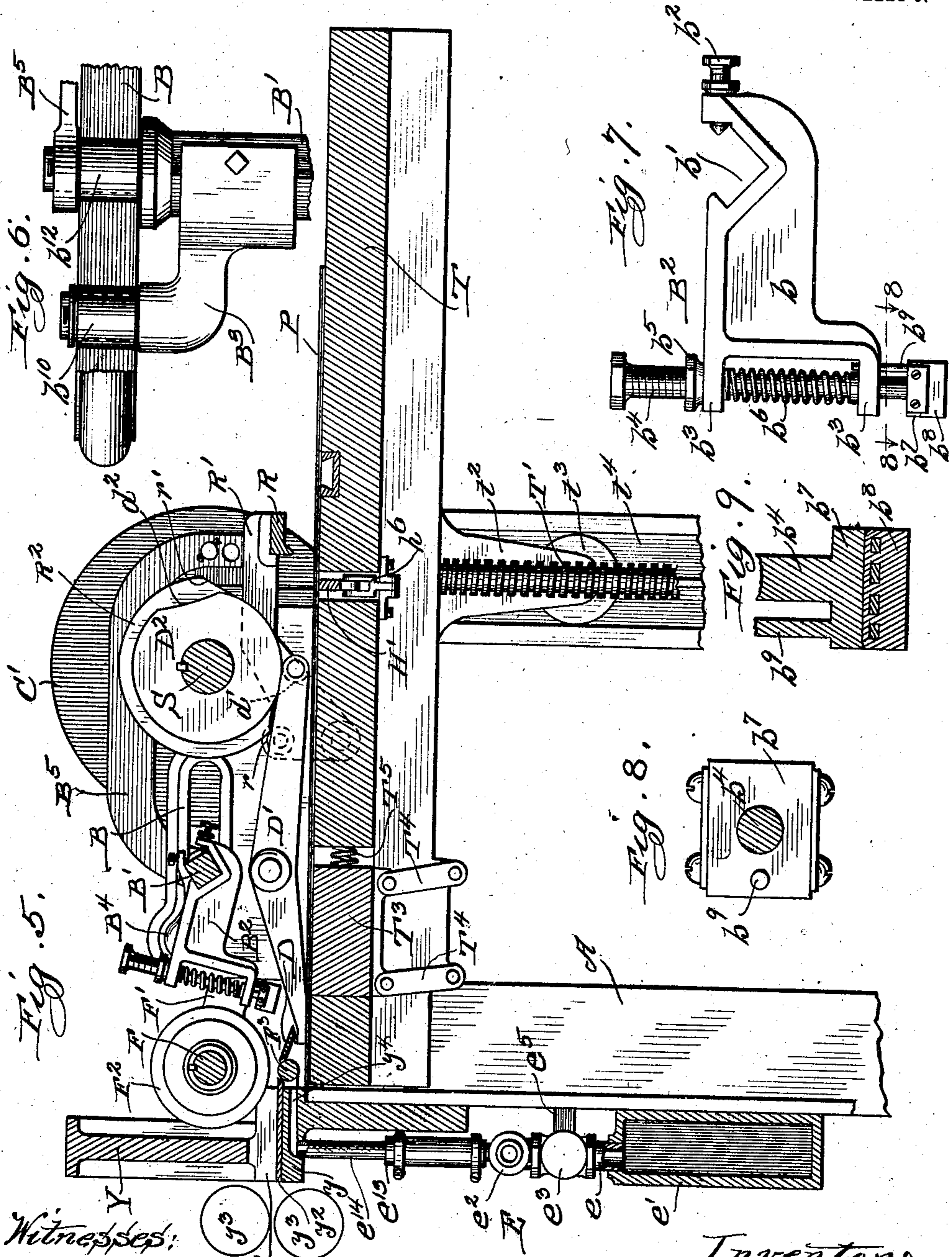
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8 SHEETS--SHEET 3.



Witnesses:
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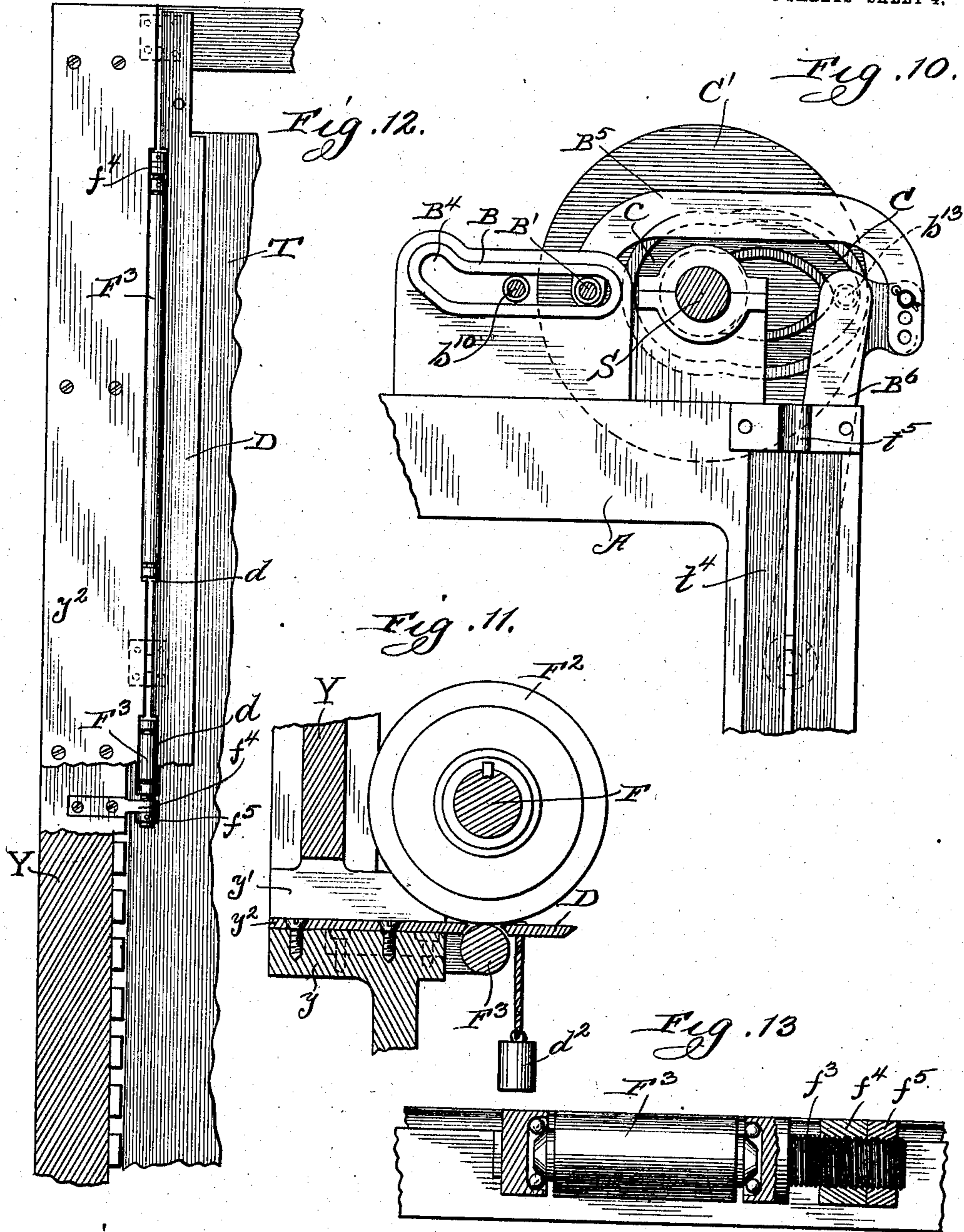
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Witnesses:
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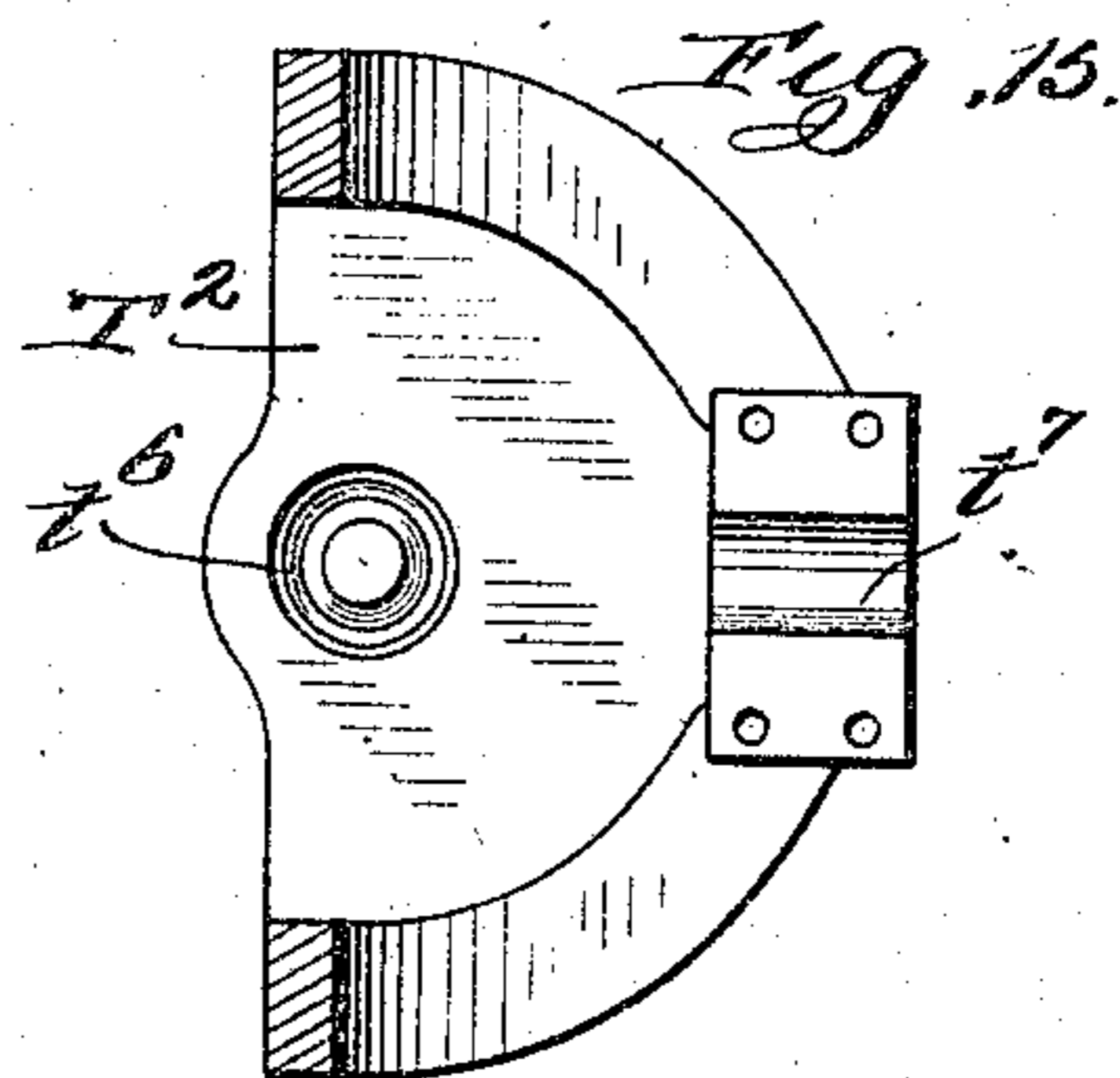
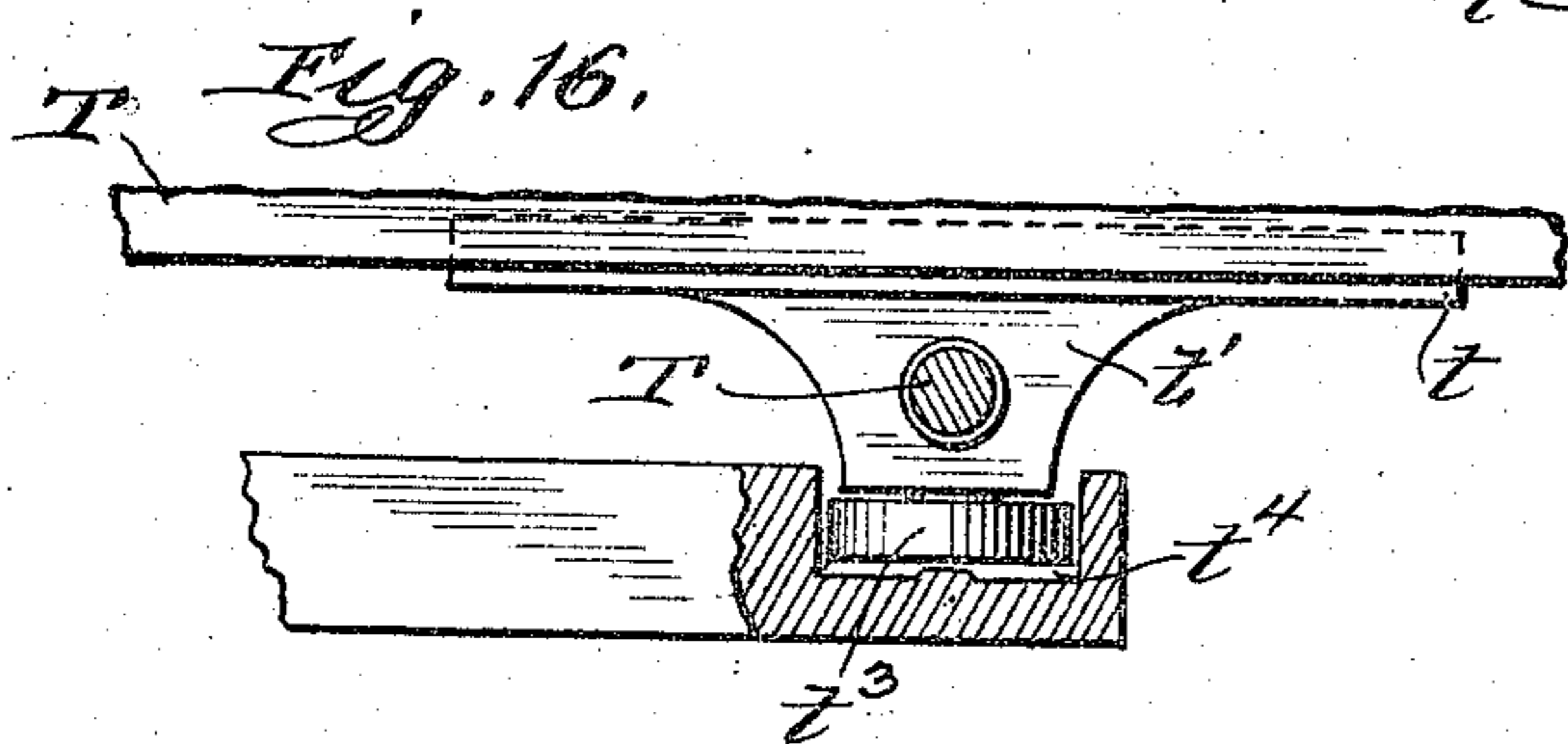
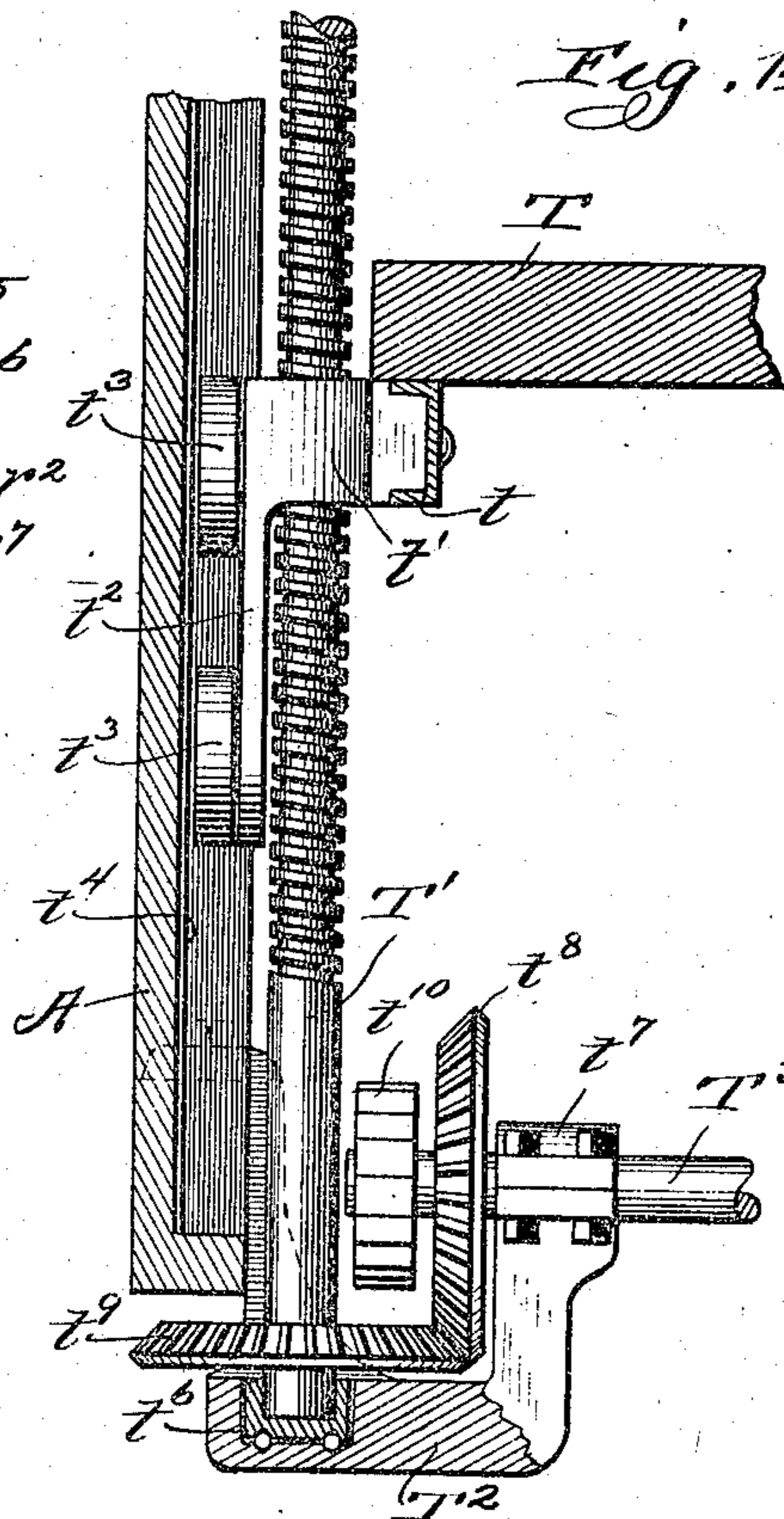
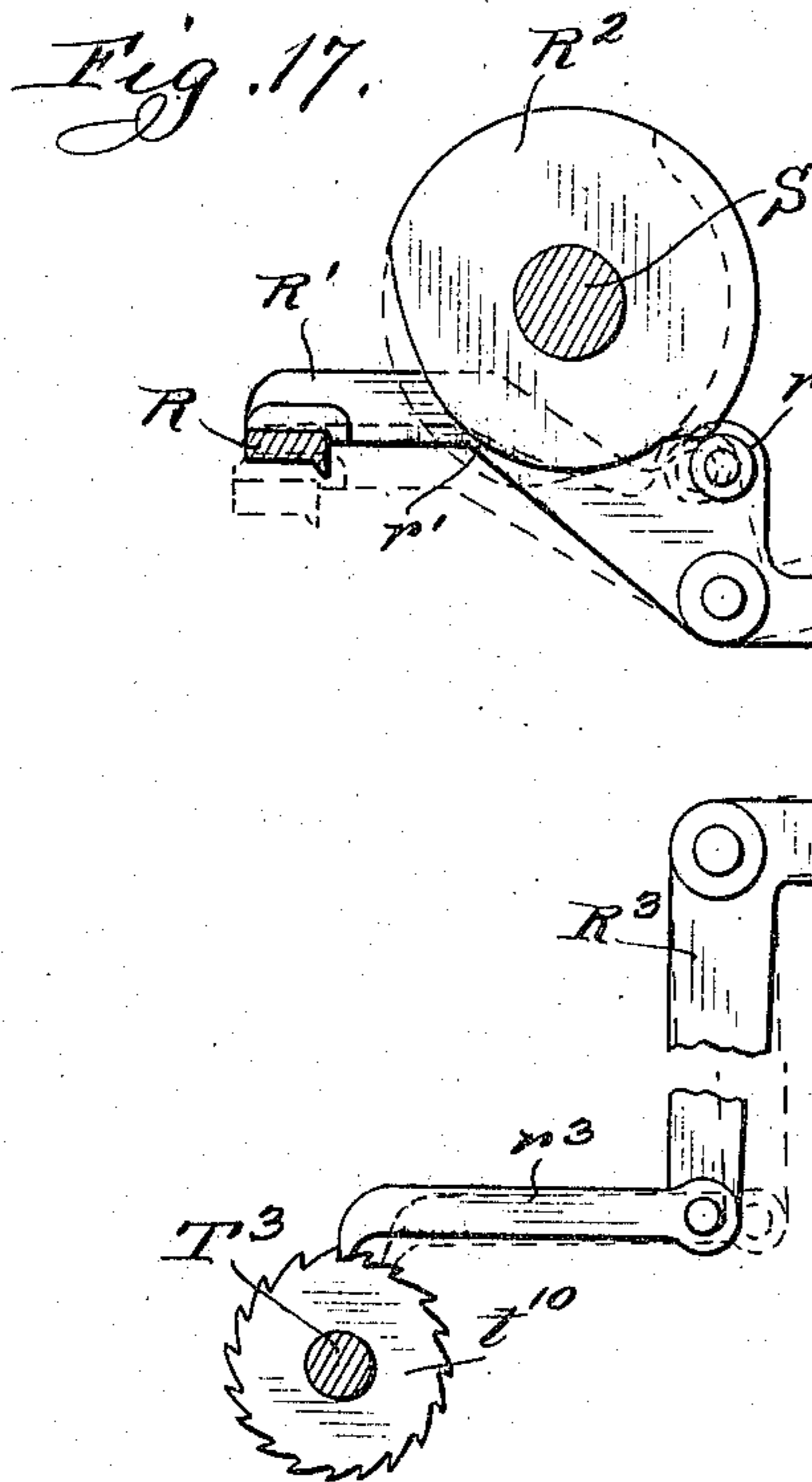
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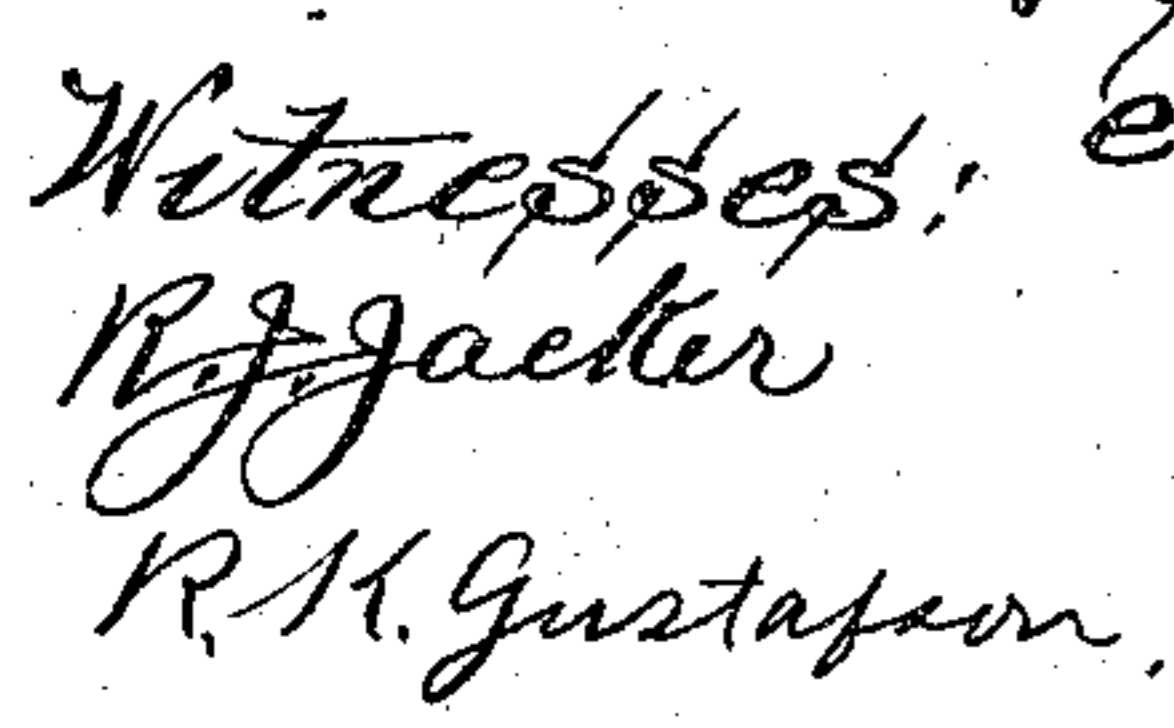
Witnesses:
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APPLICATION FILED SEPT. 10, 1901. RENEWED FEB. 10, 1908.

Patented Sept. 29, 1908.

8 SHEETS—SHEET 6.



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8 SHEETS—SHEET 7.

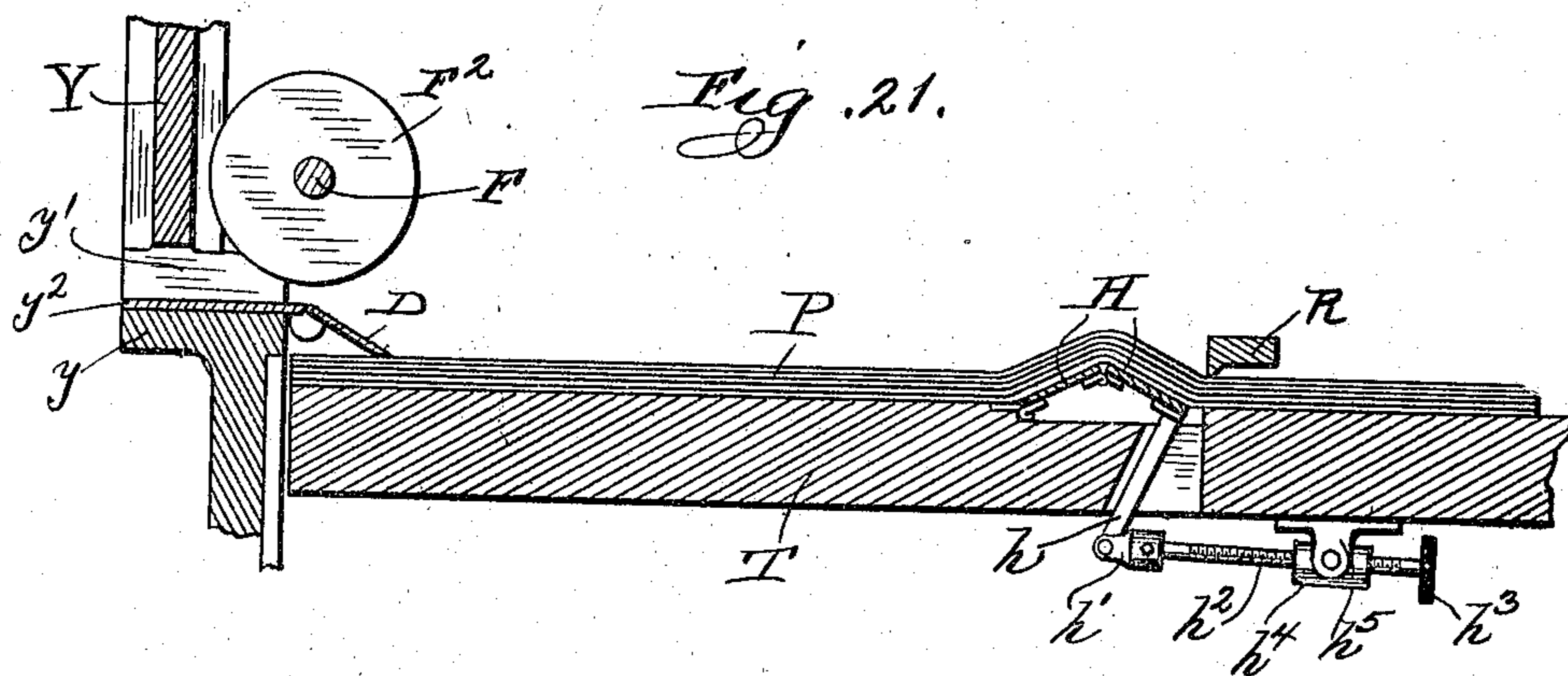


Fig. 22.

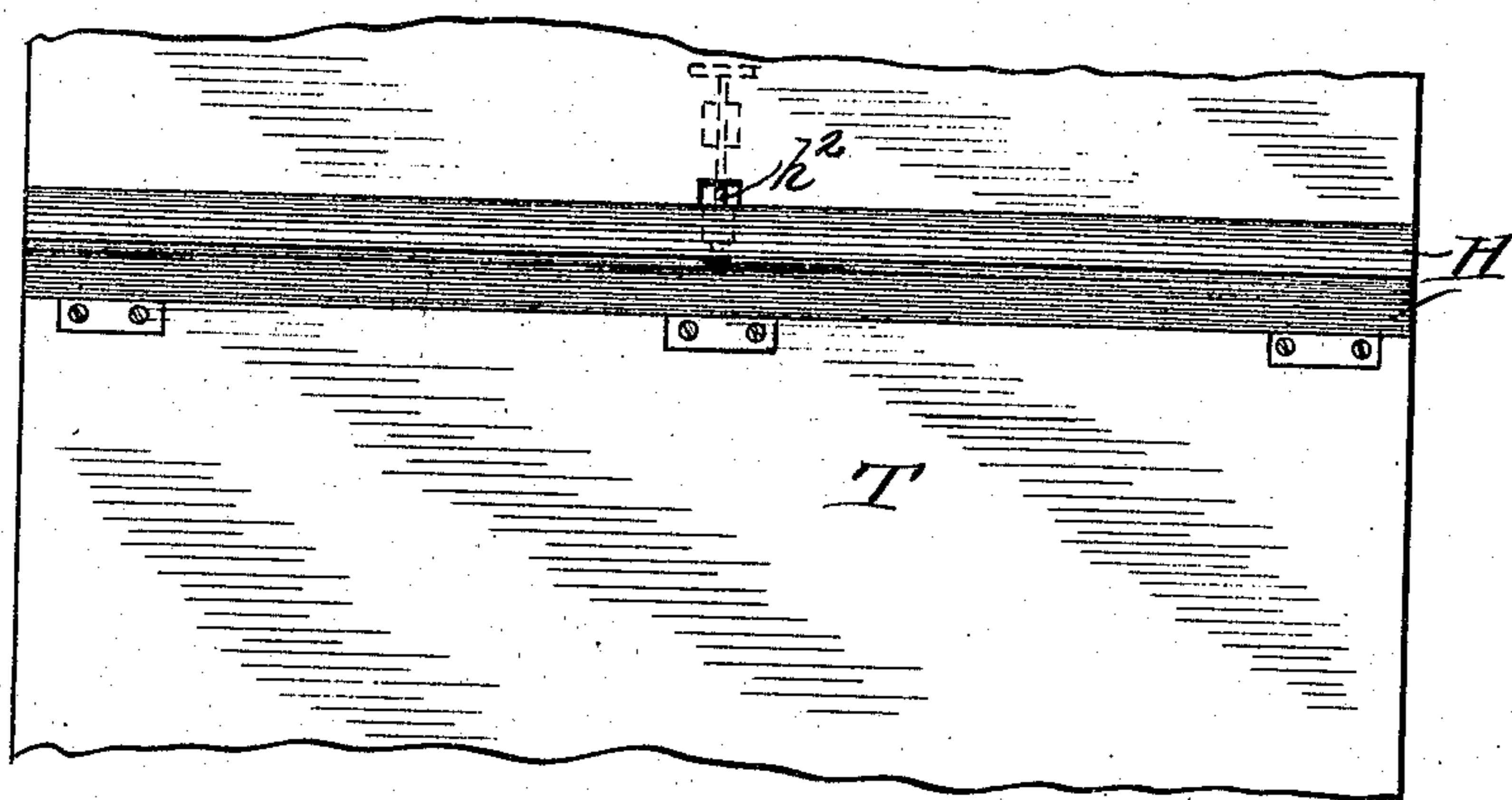
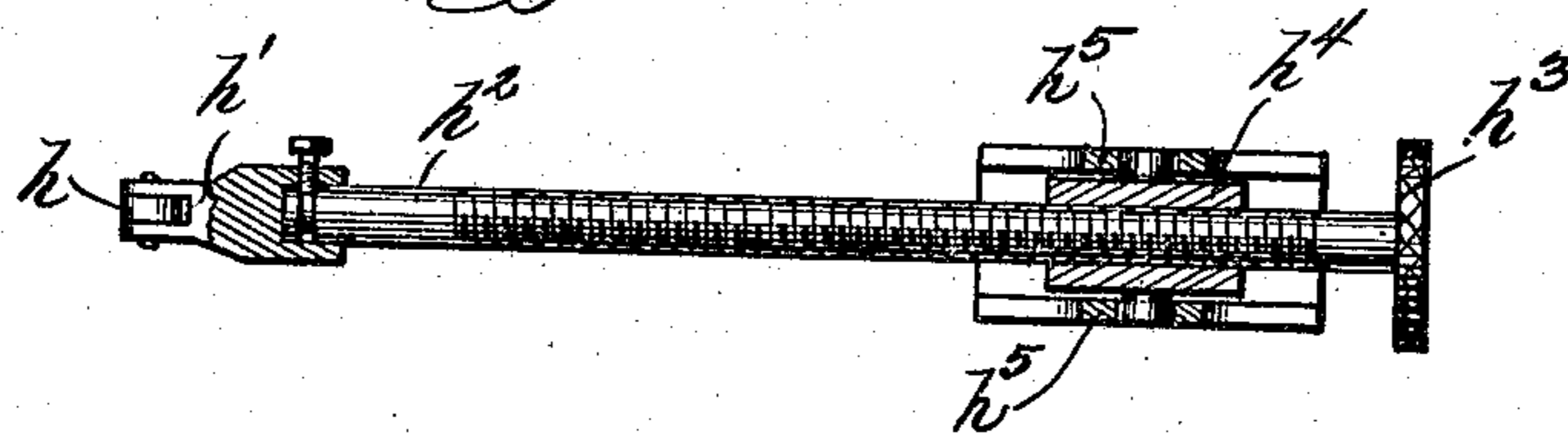


Fig. 23.



Witnesses:

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8 SHEETS—SHEET 8.

Fig. 24.

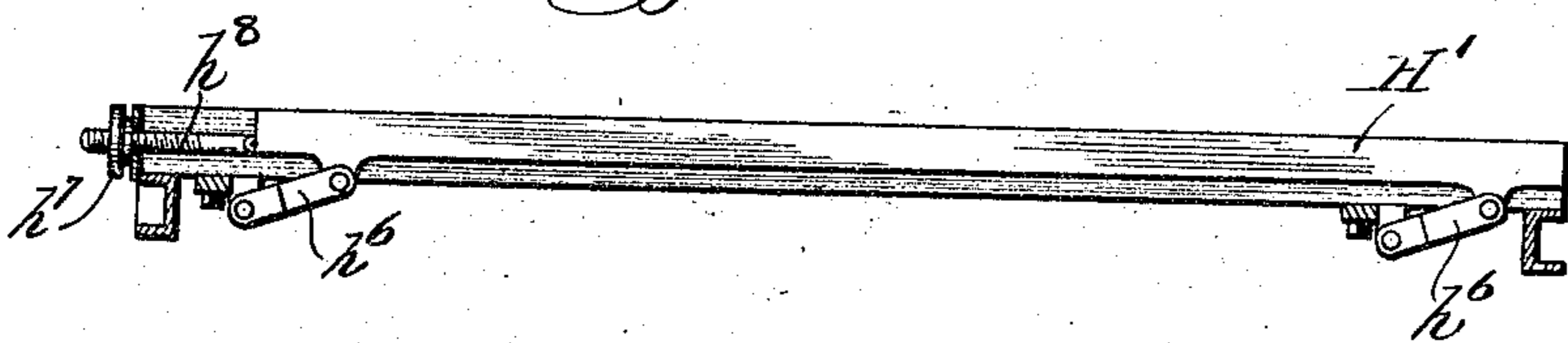


Fig. 26.

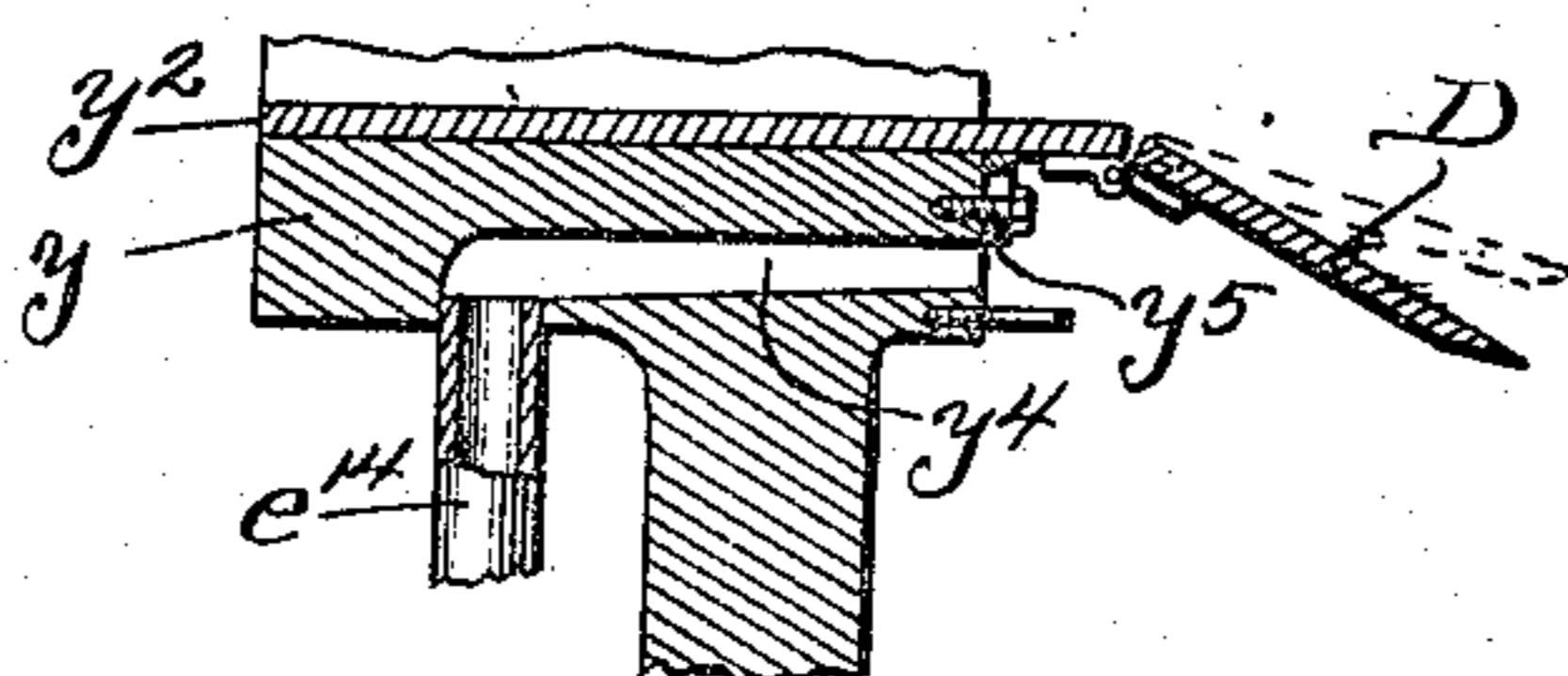


Fig. 25.

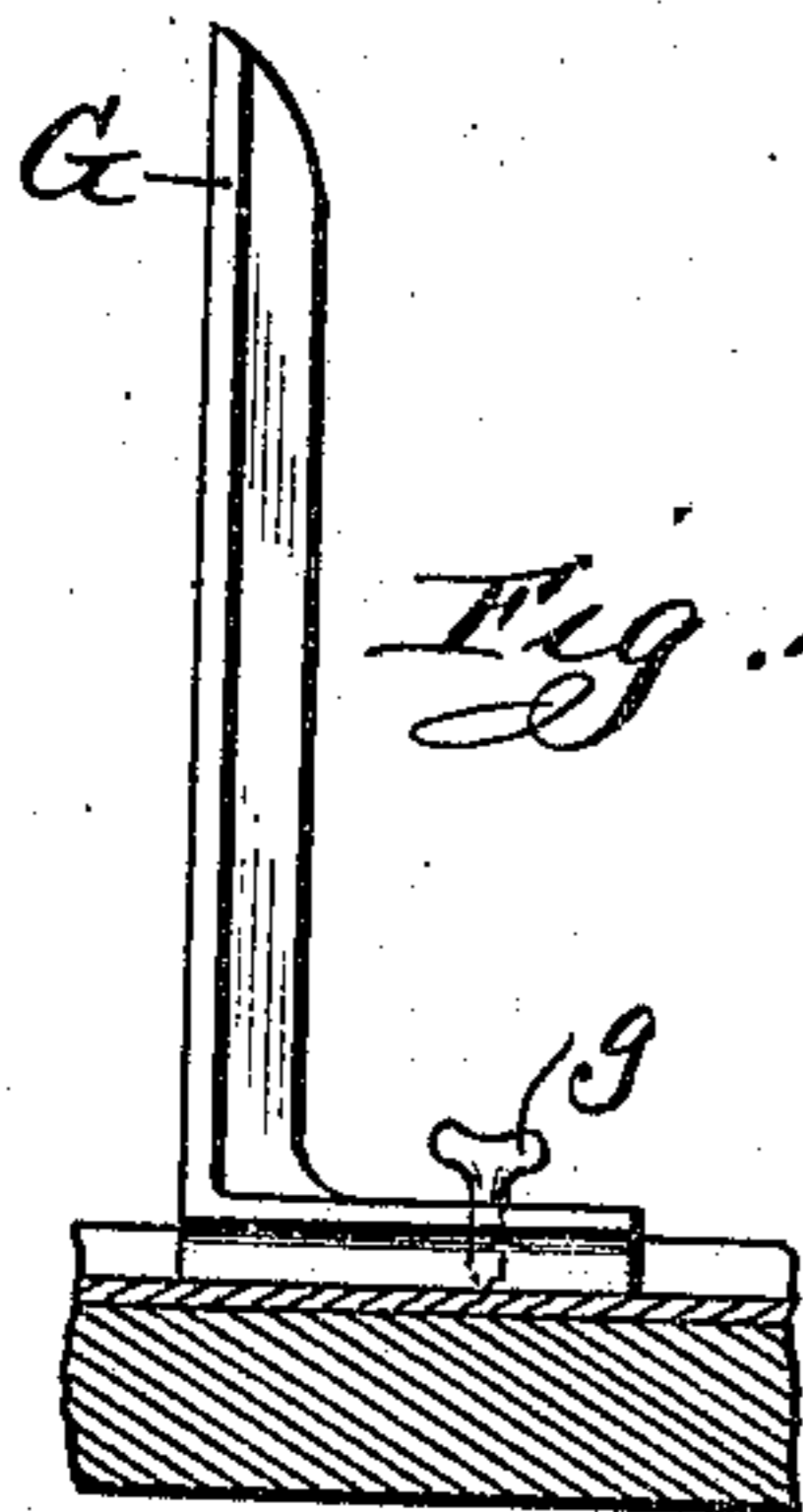


Fig. 27.

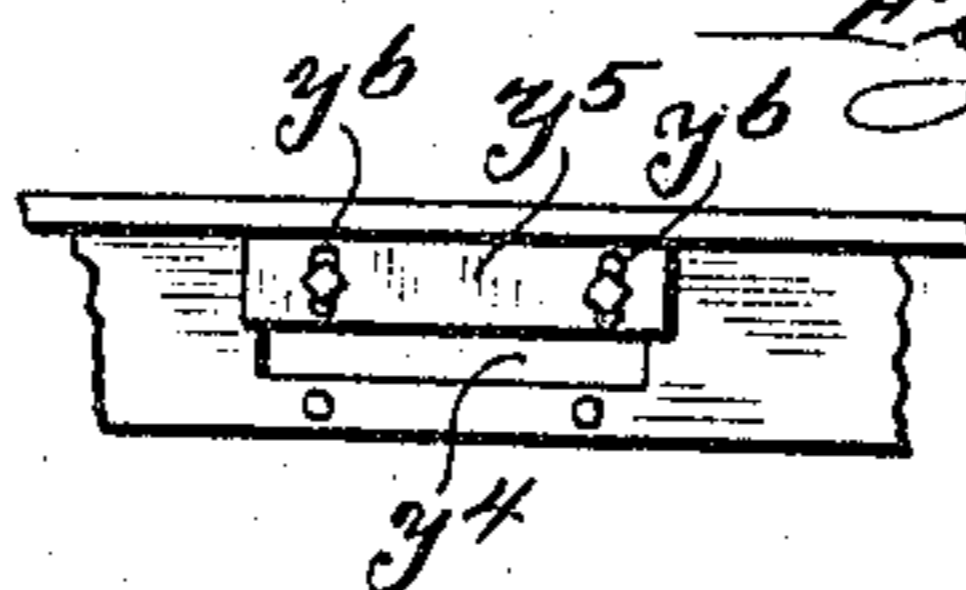
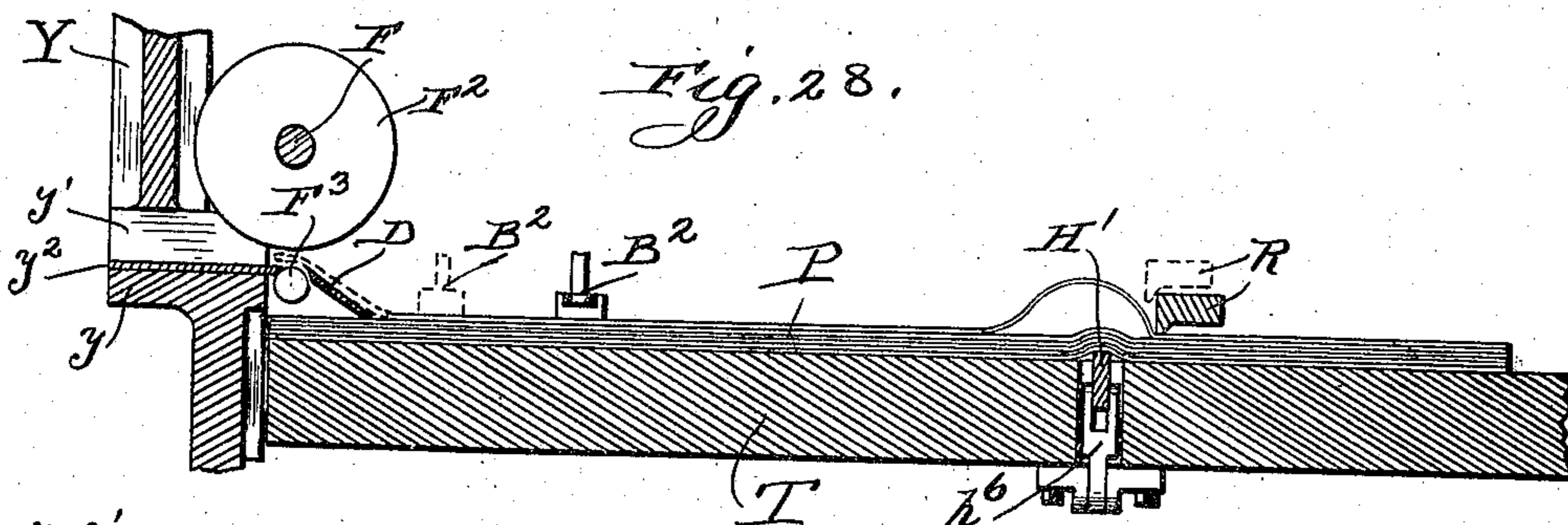


Fig. 28.



Witnesses:

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UNITED STATES PATENT OFFICE.

HOMER C. LA BATT, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM J. HERRICK, OF CHICAGO, ILLINOIS.

SHEET-FEEDING MACHINE.

No. 899,995.

Specification of Letters Patent.

Patented Sept. 29, 1908.

Application filed September 10, 1901, Serial No. 74,877. Renewed February 10, 1908. Serial No. 415,227.

To all whom it may concern:

Be it known that I, HOMER C. LA BATT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Feeding Machines, (Case No. 1,) of which the following is a specification.

This invention relates to machines designed to successively feed sheets of paper one at a time from a pile or stack to printing, ruling, folding, and like machines, the principal object of the invention being to provide novel and improved means for positively engaging the top sheet at or near its front edge, whereby to arch or buckle the top sheet and deliver the same to any suitable feeding-off mechanism.

Another object of my invention is to provide new and improved means for injecting an air-blast under the top sheet, to overcome any tendency of the same to stick or adhere to the stack of sheets.

Another object of my invention is to provide improved feeding-off mechanism, whereby the top sheet is moved more or less after the operation of the bucklers has effected its preliminary separation from the stack.

Another object of my invention is to provide improved means to automatically adjust the paper-table to the level required for effecting the preliminary separation of the top sheet by the bucklers.

Other objects of my invention will be apparent from the subjoined description and from a consideration of the operations and functions of the mechanism embodying my invention.

In order that my invention may be fully understood, I will first describe the same with reference to the accompanying drawings, and afterwards point out the novelty thereof more particularly in the annexed claims.

In the accompanying drawings, Figure 1 is a top plan view of a sheet feeding-machine embodying my invention. Fig. 2 is a side elevation thereof on the side at which power is applied, certain parts being shown broken away. Fig. 3 is a rear elevation of the same. Fig. 4 is a side elevation, the view being taken on the side opposite to that shown in Fig. 2, and some of the parts being shown in section for clearness of illustration. Fig.

5 is a sectional elevation through the machine, this view however being on an enlarged scale. Fig. 6 is a part plan and part sectional view of part of the buckler-shaft and one of its guide-ways. Fig. 7 is a detail side view of one of the bucklers detached from the buckler-shaft. Fig. 8 is a sectional view on the line 8-8 of Fig. 7. Fig. 9 is a sectional view of the buckler-foot. Fig. 10 is a detail elevation of the mechanism for reciprocating and controlling the movement of the buckler-shaft. Fig. 11 is a sectional elevation showing the feeding-off mechanism and some of its associated parts. Fig. 12 is a top plan view of the face-plates of the yoke and the feeding-off rollers, parts being broken away for purposes of illustration. Fig. 13 is a detail view, partly in section, showing the means for mounting the feeding-off rollers on the yoke of the machine. Fig. 14 is a detail elevation of one side of the machine illustrating the means employed to maintain the paper-table at the desired level. Fig. 15 is a detail top view of the bearing-box of Fig. 14. Fig. 16 is a detail view, showing in section part of the frame and in plan one of the guide-rollers and one of the brackets of the paper-table. Fig. 17 is a detached side elevation of the means for transmitting motion from the main shaft to the table-raising mechanism. Fig. 18 is a side view of part of the machine showing the means for raising and lowering the feeding-off shaft and for controlling the air-supply valve. Fig. 19 is a top plan view of certain parts shown in Fig. 18. Fig. 20 is a front view of part of the air-blast mechanism. Fig. 21 is a longitudinal sectional view of the paper-table, showing a supplemental or sub-buckler to facilitate the arching or buckling of the paper. Fig. 22 is a top plan view of part of the table and sub-buckler of Fig. 21. Fig. 23 is a detail view, partly in section, of the means to operate the sub-buckler of Fig. 21. Fig. 24 is a view in side elevation of a modified form of sub-buckler. Fig. 25 is an elevation of one of the guides on the paper-table. Fig. 26 is a detail sectional view of the yoke showing one of the air-blast ports and valves. Fig. 27 is a front view of one of the adjustable air-valves, and Fig. 28 is a longitudinal sectional view of the paper-table and some of its associated parts, showing the relative positions of the bucklers and retaining-bar

by full and dotted lines at different stages of operation.

The stack or pile of sheets P to be fed to the printing-press, folder, or other machine, is mounted upon an automatically-adjustable table T, which is positioned to keep the top sheet normally slightly below the upper surface of a cross-bar y . This bar comprises a part of a heavy front yoke Y, which is mounted on the frame A of the machine and is provided with a passage y' extending nearly the length thereof and through which the sheets are fed. The opening is provided with a face-plate y^2 , upon its lower side, over which the sheets are fed to the printing-press rolls y^3 , or other suitable machine.

The supporting frame A is provided in rear of the yoke with journal-boxes in which a suitable through-shaft S has its bearings. The shaft carries a suitable spur-wheel s , to which power is transmitted from any suitable source of supply. For practical purposes I prefer to take the power from the press or folder with which the feeder is associated, and for this purpose I may employ suitable intermediate connections, such for example as are shown at S' in Fig. 2, in which the shaft s' transmits power to the main-shaft S from the folder or press by means of intermediate bevel-gears shown therein. The drive-wheel s is mounted loosely on the shaft and is adapted to transmit power thereto by means of a suitable clutch s^2 , which is adapted to be operated by any suitable mechanism through a clutch-lever s^3 to stop and start the machine.

In front of the shaft S the frame is provided with suitable standards, in which suitable slots are provided forming guide-ways B, which receive and support the buckler-mechanism for effecting the preliminary separation of the top sheet from the stack. This latter mechanism embraces a rod or shaft B', extending across the machine intermediate the yoke and main-shaft, and adapted to be reciprocated in said guides by mechanism hereinafter described. The rod B' is preferably square in cross-section, and is provided at intervals with archers or bucklers B². These bucklers are preferably in the form of fingers, and consist of blocks b , such as shown in Fig. 7, provided with an open groove or channel b' in its top edge near its rear and shaped with an overhanging lug to engage the rod B', to which it is held by a suitable set-screw b^2 . The bucklers are adjustable along the rod and may be set at any desired points, whereby they may be placed to bear upon the un-inked portions of the sheets. Each of the bucklers has front ears b^3 , suitably perforated to receive a screw-bolt b^4 , which is held in adjustable position in the ears by a set-nut b^5 . A spring b^6 surrounds the screw-bolt and bears between the upper ear and a shoulder near the

lower end of the bolt, to hold the bolt to its work with spring-pressure, to give the pad at the lower end of the same sufficient frictional hold upon the sheets to move the top one thereof. Each bolt is provided at its lower end with a foot b^7 , which carries a suitable pad b^8 to engage the top sheet. The foot has a guide-stem b^9 , which passes through the lower ear b^3 , and holds the foot in position with relation to the finger. A suitable rocker-arm B³ is rigidly secured upon the shaft or rod B', near each end, and is provided with a lateral projection carrying an anti-friction roller b^{10} , which enters one of the guides B and is adapted to be projected within an angular or cam extension B⁴ at its front end to rock the shaft B', when the latter is at its outer end of its movement or stroke, for the purpose of raising the pads of the bucklers from engagement with the sheets. This operation is timed in the cycle of the machine to occur when the buckler has arched the top sheet and returned it to the front normal line of the stack.

The shaft or rod B' carries anti-friction rollers b^{12} at its ends in the guide-ways, and is reciprocated in its guides by means of arms B⁵, secured to the ends thereof and projecting rearwardly to engage the upper ends of links B⁶, which are pivoted at their lower ends to the rear uprights of the frame. The links and arms are adjustably connected, as shown in Fig. 10, for the purpose of regulating the length of the stroke of the bucklers. The upper end of each link is provided with an outwardly extending pin b^{13} , which enters and engages a heart-shaped cam-way or groove C upon the inner face of a cam-disk C', fast on the shaft S. As shown in Fig. 10 a portion of this cam-way is concentric with the axis of the shaft S, as at c , the arrangement being such that the cam is operative on its pin for about one-third of the revolution of the shaft.

By this organization and arrangement of parts, the bucklers travel back and forth over the stack of sheets on the table. The relations of the parts, when the buckler-shaft is at the forward end of its stroke, are shown in Fig. 5, and the positions of the parts, when the shaft is at the opposite end of its stroke, are shown in Fig. 10. When the buckler-shaft is in the position shown in Fig. 5, the pads at the ends of the fingers are raised, by reason of the co-action of the rocker-arms with the cam-extensions of the guides. As the cam-wheels C' revolve, the shaft B' is retracted, and when the rocker-arms engage the horizontal portions of the guides, the pads of the bucklers are held in engagement with the top sheet of the stack, as shown by dotted lines in Fig. 28, by a light pressure due to the springs b^6 . As the shaft B' travels rearwardly in its guides,

towards the position shown in Fig. 10, the pads are drawn back in a horizontal line to the position of full lines in Fig. 28, and the top sheet is arched or buckled against the retaining-bar R, which has been held down to its position of full lines in Fig. 28 during the rearward movement of the bucklers by mechanism hereinafter described. This rearward movement of the pads withdraws the front edge of the top sheet from beneath the blade D, and the subsequent forward movement of the pads, coincident with the rise of the retaining-bar and the fall of the blade, as hereinafter fully described, pushes the front edge of the paper upon the blade D, and thence into the bite of the feeding-off mechanism, as shown in dotted lines in Fig. 28.

The feeding-off mechanism comprises a shaft F which is revolvably mounted in journal-boxes carried in yokes in the front ends of cam-levers or arms F', which are pivoted to the standards on the frame below the guides B. The rear end of each arm carries a lateral lug, preferably provided with an anti-friction roller f, which engages the periphery of one of the cam-wheels C', by which the shaft F is normally maintained in raised position to separate the co-acting members F² and F³ of the feeding-off mechanism, as shown in Fig. 5. The cam-disk C' is provided with a peripheral depression or reduced portion c², whereby the cam-arms F' are permitted to drop at their front ends during a portion of the revolution of the disks to lower the shaft F, to permit the feeding-off members F² and F³ to maintain coöperative relation, as shown in Fig. 11, this operation being timed in the cycle of the machine to occur after the shaft B' has moved forward to bring the top sheet to the position of the dotted lines of Fig. 28, and succeeding the raising of the pads by the cam-ways B⁴.

The shaft F is rotated by a gear-wheel f' on one end thereof, which is suitably driven by intermediate gear from the shaft S, as shown in Fig. 1, the arrangement being such that the gear f' engages with its intermeshing gear in any position of the levers F'. The shaft is provided with a longitudinal key-way, as shown in Fig. 11, and each feeding-off disk F² is provided with a suitable feather to enter the same. Suitable means of any well-known form may preferably be employed to allow the disks to be adjustably set along the length of the shaft, whereby they may operate upon the margins or other desired portions of the sheets.

The disks F² are adapted to co-act with rollers F³, mounted in the yoke of the frame, these parts constituting the feeding-off mechanism, and the bite of the disks and rollers is regulated by a suitable set-screw adjustment, as at f² in Fig. 18. The rollers F³ are mounted on ball-bearings in boxes

in the lower inner edge of the yoke Y, with their peripheries in operative relation with the face-plate y² thereof. One of the bearing-boxes is mounted on a screw-rod f³, having a threaded engagement with a bracket f⁴ on the yoke and held in adjustment by a binding-nut f⁵, all as shown in Fig. 13.

A paper-blade D is pivoted to the face-plate of the yoke on the frame, and is cut away along at its front edge as at d, to provide openings to expose the peripheries of the rollers F³. The blade rests at its ends upon the front ends of cam-levers or cam-arms D', which are pivoted to the inner faces of the standards on the frame, and are acted upon at their opposite ends to hold the blade normally raised from the stack of sheets, as shown in Fig. 5, by suitable cam-disks D² mounted on the main shaft S. These disks have uniform peripheries for the greater portion of their diameters, to engage the lateral anti-friction rollers d' on the inner ends of the arms, and each is provided with a peripheral cut-away or flattened or reduced portion d², which permits the inner end of the associated cam-arm D' to rise, and allow the blade D to be drawn by its weight d² down upon the paper. This action is timed to occur when the top sheet has been buckled or arched by the rearward movement of the bucklers. The flat portions d² are of sufficient extent to allow the blade to remain in its down position until the top sheet has passed slightly upon the blade by the forward movement of the bucklers, at which time the blade is raised by the action of the disks D² and allows the continued forward movement of the bucklers, while moving the top sheet, to straighten any lower sheets that may have been misplaced.

A retaining-bar R, which is adapted to bear upon the top surface of the stack or pile during a portion of the operation of the machine, is attached to the rear ends of suitable cam-levers R', which are preferably of the form shown in Figs. 4 and 17, and are pivoted to the frame below the standards and in front of the main-shaft. Each of the levers is provided with an anti-friction roller r, on its rear upper corner, which is acted upon by a cam-disk R², mounted on the main-shaft S, as clearly shown in Figs. 4 and 17. The disks R² are provided with cut-away or reduced portions r', which do not operate upon the rollers r, thereby permitting the levers or arms R' to fall during a portion of their revolutions to allow the bar R to engage the stack. The action of the cams R² upon the levers R' is such and is so timed in the operation of the machine that the retaining-bar is held up until the top-sheet is withdrawn from beneath it, and the bar is then lowered at the time the bucklers begin their backward movement.

Suitable mechanism is provided for auto-

matically adjusting the paper-table T to the
 desired level to maintain the top-sheet with-
 in the field of operation of the bucklers.
 This is preferably accomplished by project-
 5 ing one of the cam-levers R' forwardly be-
 yond its pivot in the shape of an arm or tail-
 piece r^2 by which suitable table-raising de-
 vices are operated. The table T is prefer-
 ably supported by means of suitable brack-
 10 ets t , which have a suitably tapped body t'
 and a depending side t^2 , which is provided
 with guide-rollers t^3 , as clearly shown in
 Figs. 14 to 16. The guide-rollers t^3 are
 15 adapted to enter and traverse vertical guide-
 grooves or ways t^4 in the rear uprights of
 the frame, and the brackets are raised and
 lowered by means of suitable threaded con-
 nections with screw-shafts T', which are
 20 held in suitable bearings at the upper end of
 the frame and are supported at their lower
 ends by suitable ball-bearings in a bearing
 or step-box T². Each step-box is provided
 with a suitable circular groove t^6 to receive
 25 the balls of its associated bearing, and is
 suitably bolted or attached to the frame of
 the machine to support the screw-shafts T'
 and provide end-thrust bearings therefor.
 Each of the boxes is provided on its inner
 side with a bearing t^7 for a through-shaft
 30 T³, which is provided near its ends with
 bevel-wheels t^8 meshing with similar wheels
 t^9 upon the ends of the shafts T', whereby
 when the shaft T³ is rotated the screw-shafts
 T' are operated to raise or lower the table.

35 The shaft T³ is rotated to raise the table
 by any suitable means, and preferably by
 connections from the cam-levers R' of the
 retaining-bar R. For this purpose one end
 of the shaft T³ is provided with a ratchet-
 40 wheel t^{10} , adapted to be intermittently ro-
 tated by means of a pawl r^3 , mounted on the
 vertical arm of a suitable angle-lever R³,
 which is pivoted upon the frame of the ma-
 chine, and has its horizontal arm r^4 provided
 45 with a screw-rod r^5 , which passes through a
 suitable opening in the arm r^2 and is pro-
 vided with screw-nuts r^6 and r^7 above and
 below the arm r^2 , respectively, and adapted
 to be adjusted along the screw-rod for the
 50 purpose of regulating the movement or
 throw of the pawl.

When the retaining-bar drops upon the
 stack of paper, the tail-piece r^2 engages the
 nut r^6 , and moves the parts to the position
 55 shown in dotted lines in Fig. 17, whereby,
 when the enlarged or cam-portions of the
 disks R² act upon the antifriction rollers r ,
 the tail-piece is caused to strike the nut r^7
 to force the bolt r^5 down and throw the
 60 lower end of angle-lever R³ forward to
 turn the ratchet t^{10} to raise the paper-table.
 This raising of the paper-table takes place
 when the top-sheet is being withdrawn from
 the pile.

65 The paper-table may be normally oper-

ated, as by a chain or belt t^{12} running over
 suitable pulleys t^{13} and t^{14} , and transmitting
 motion to the shaft T³ by a second belt or
 chain t^{15} engaging a pulley t^{16} thereon.

From a consideration of the above dis- 70
 closure it is apparent that the preliminary
 separation of the top-sheet or the buckling
 or arching thereof occurs during the rear-
 ward movement of the bucklers, at which
 time the retaining-bar R is held firmly upon 75
 the top of the stack of sheets by means of
 the weight thereof, the reduced portions of
 the cam-disks R² permitting the cam-arms
 R' to drop forward, and at the same time
 the paper-blade D is raised by means of the 80
 cam-arms D' being held depressed at their
 rear-ends by the cam-disks D². When the
 bucklers have drawn the front-edge of the
 sheet from beneath the blade, the latter is
 lowered, and at the finish of the forward 85
 movement of the bucklers, the retaining-bar
 is raised, so that the rear end of the top-sheet
 may pass from beneath the retaining-bar
 and its front end may pass over the paper
 90 blade D. These operations take place dur-
 ing the movements of the bucklers, and after
 the bucklers are raised from contact with the
 top-sheet by their cam-grooves B⁴, the feed-
 ing-off mechanism engages the top-sheet, the
 95 cams c^2 being located to permit the shaft F
 to drop at this time. It is apparent that the
 length of feed by the feeding-off mechanism
 may be adjusted by varying the length of
 these cams.

A suitable air-blast device E is arranged 100
 at the front of the machine, and the supply-
 pipe e thereof, leading from the reservoir e'
 to the distributing coupling e^2 , is controlled
 by a quick-acting valve e^3 , which is opened
 and closed by means of a link e^4 , operated by 105
 intermediate connections from one of the
 cam-disks C'. The link e^4 is connected at
 one end to a rocker-arm e^5 which is mounted
 on the lower end of a suitable rock-shaft e^6 ,
 supported in bearings upon one side of the 110
 frame, and having at its upper end a rocker-
 arm e^7 , provided with a pin e^8 adapted to be
 engaged by the forked end of an operating
 lever e^9 mounted upon the frame. The lever
 115 e^9 has an anti-friction roller e^{10} at its rear
 end, which is held in the path of a face-cam
 c' on one of the disks C', by a suitable
 spring-connection e^{12} . The valve e^3 is nor-
 mally held closed by means of the spring e^{12}
 acting through the intermediate connecting 120
 means, and is opened when the cam c' strikes
 the roller e^{10} . The cam c' is arranged to
 open the valve for any desired length of
 time, whereupon it is again closed by the re-
 traction of the spring e^{12} , and the relation 125
 of these parts to the other organizations of
 the machine is such that the valve is opened
 after the bucklers have risen from engage-
 ment with the top-sheet and after the feed-
 ing-off mechanism has engaged the top- 130

sheet. The distributing coupling e^2 is preferably provided with any suitable number of nipples e^{13} to which suitable lengths of tubing e^{14} are attached. The under-surface of the yoke of the frame is provided with a corresponding number of ports or vent-openings y^4 , located beneath the face-plate and blade, and to which the tubes lead. The ports are controlled by suitable valves y^5 , adapted to be held in adjustment with relation thereto by any suitable means, such as the screw-nuts y^6 . This matter is illustrated in Figs. 18, 19, 20, 26 and 27.

A suitable guide G is held on one edge of the table on one side of the pile or stack of paper, as clearly shown in Fig. 25, for the purpose of evening up the sheets of the stack. The guide is adjustably held by any suitable means such as the thumb-nut g .

An auxiliary of sub-buckler may be provided, for the purpose of buckling or arching the stack or pile of sheets to the rear of the bucklers, and operates to increase the tendency of the sheets to arch under the operation of the buckler-fingers above described. Some arrangement providing a sub-buckler is particularly desirable in cases of heavy stock, such as cardboard.

I have shown two forms of sub-bucklers, the first being illustrated in Figs. 21, 22 and 23, and the second being shown in Fig. 24, each operating in substantially the same manner. The preferred form is illustrated in Fig. 21, and in this exemplification of this feature of my invention I provide a pair of plates H , which are pivoted to each other and one of which is pivoted at its front edge to the top of the paper-table. The free edge of the rear plate is rigidly mounted upon a suitable link h , which passes through the center of the table and is pivoted in the front end of a block h' , in which a suitable screw-rod h^2 is rotatably mounted, the outer end of the rod being provided with a handle h^3 and engaging a suitably tapped collar h^4 , which is pivotally mounted in bracket-arms h^5 . The sub-buckler H is adjusted to arch or buckle the paper by screwing the rod through its bearing-block h^4 .

The sub-buckler shown in Fig. 24 consists of a suitable transverse bar H' , which is pivoted upon parallel swinging links h^6 , attached at their lower ends to suitable lugs on the table and passing through slots in the table. The buckler is operated by means of a suitable thumb-nut h^7 engaging a screw-threaded rod h^8 which is attached to one end of the bar H' .

The clutch s^2 may be operated to stop the machine by any suitable mechanism. I have shown a device for automatically effecting this result, consisting of the movable section T^3 of the paper-table, which is mounted on parallel links T^4 and is pressed forward by a spring T^5 . When the supply of sheets is ex-

hausted, the bucklers will draw the section rearwardly, and cause an angle-lever (not shown) connecting to the clutch-lever s^3 by a link s^4 to operate the lever to throw the clutch. This feature forms no part of the present invention, but is covered in a companion application, Serial No. 74878, of even date herewith.

The organization for arching or buckling the paper provides a simple and efficient means for attacking the sheets at or near their front edges, instead of at their rear as is usual, whereby feed of the sheets to the other parts is more effective. The strength of the action of the pads may be adjusted by the set-screws thereof, and also the length of their throw to increase or diminish the buckling or arching of the paper may be regulated. The form of bucklers may be varied, the essential feature of my invention in this respect being the reciprocating and rocking shaft or rod having bucklers to attack the front edge of the stack and buckle the paper in the back stroke from beneath the blade and move it upon the blade at the forward stroke.

The blade D holds the stack in position, and is raised to permit the withdrawal of the top-sheet and the smoothing out of any displaced under sheets, by the action of the bucklers.

The retaining-bar holds the paper in position while the sheets are being buckled, and also measures the level of the paper on the table to keep the top-sheet at the proper height for the bucklers by its control of the table-raising mechanism.

Claims:

1. In a sheet-feeding machine, the combination with a paper-table, of a reciprocating buckler-shaft, guides for the shaft having integral horizontal and inclined portions, rock-arms on the shaft slidable in the horizontal portions and adapted to enter the inclined portions, and bucklers on the shaft.

2. In a sheet-feeding machine, the combination with a paper-table, of a reciprocating buckler-shaft, guides therefor having horizontal body-portions and upwardly inclined front end-portions, front rock-arms in the shaft having lateral projections slidable in the said body portions and adapted to enter the end-portions, and bucklers on the shaft.

3. In a sheet-feeding machine, the combination with a paper-table, of a buckler-shaft, guides therefor having horizontal body-portions and upwardly inclined portions at their front ends, rock-arms on the shaft having lateral projections to co-act with the inclines of the guides, rearwardly extending arms on the shaft, cam-links connected to the arms, and cams to operate the links.

4. In a sheet-feeding machine, the combination with a paper-table, of a buckler-shaft, horizontal guides therefor having front in-

clines, rock-arms on the shaft to co-act with the inclines, arms on the shaft, links adjustably connected to the arms, and cams to rock the links.

5 5. In a sheet-feeding machine, the combination with a paper-table, of a main-shaft, cam-disks on the shaft, of a buckler-shaft having rock-arms, horizontal guides therefor having upwardly inclined front-ends, and links connected to the buckler-shaft and
10 operated by the disks.

6. In a sheet-feeding machine, the combination with a paper-table, a main-shaft, disks on the shaft having cam-grooves, of
15 a buckler-shaft having lateral rock-arms, horizontal guides having upwardly inclined front-ends, arms on the shaft, links connected to said arms and having pins in the cam-grooves.

20 7. In a sheet-feeding machine, the combination with a square-shaft, of bucklers comprising bodies having square channels in their top edges and overhanging lugs adapted to engage said shaft, set-screws to secure
25 the same thereon, and pads.

8. In a sheet-feeding machine, the combination with a paper-table, and a reciprocating and rocking shaft, of bucklers adjustable thereon, and comprising ears, a screw-
30 bolt yieldingly mounted in said ears, and a set-nut to adjust the bolt.

9. In a sheet-feeding machine, the combination with a paper-table provided with standards near its front end, and horizontal
35 guides in the standards having upwardly inclined front ends, of a reciprocating buckler-shaft in the guides having rocker-arms entering the horizontal guides and engaging the inclines at the forward stroke of the
40 shaft, and means to reciprocate the shaft.

10. In a sheet-feeding machine, the combination with a paper-table provided with standards near its front end, and horizontal
45 guide-slots in the standards having upwardly inclined front ends, of a buckler-shaft extending through the slots, rocker-arms on the shaft adapted to engage the inclines at the forward stroke of the shaft, arms on the ends of the shaft extending
50 rearwardly, links connected to said arms having lateral pins, and rotating disks having cam-grooves to receive the pins.

11. In a sheet-feeding machine, the combination with a frame having a yoke provided
55 with a sheet-passage, a paper-blade pivoted to the yoke, and guides on the frame and having cam portions, of a buckler-shaft and rock-arms in the guides, means to reciprocate the shaft, and means to raise the blade
60 as the shaft moves rearwardly.

12. In a sheet feeding machine, the combination with a paper table, of a feeding off mechanism located above the paper table at the front end thereof and comprising idler
65 rollers and cooperating disks, and a pivoted

blade normally resting on the stack of sheets and over which the top sheet passes to the feeding off mechanism.

13. In a sheet-feeding machine, the combination with a frame having a yoke provided
70 with a sheet-passage, and a main-shaft, of bucklers to effect the preliminary separation of the top-sheet, and feeding-off mechanism comprising revoluble co-acting parts, whose bite is substantially in the vertical line of the
75 front edge of the stack of sheets, and means to operate the same from the main-shaft.

14. In a sheet-feeding machine, the combination with a frame having a yoke provided
80 with a feed-passage, a paper table and a main-shaft, of means to effect the preliminary separation of the top-sheet, feeding-off mechanism comprising rollers mounted on the yoke over the front end of the table, disks above the rollers, a pivoted blade nor-
85 mally resting on the stack of sheets and for guiding the top sheet after the preliminary separation thereof between the rollers and the disks, a revoluble shaft for the disks, and means to raise and lower the
90 shaft comprising cam-arms at the ends thereof and cam-disks on the main-shaft.

15. In a sheet-feeding machine, the combination with a frame having a yoke provided
95 with a paper-passage, and a main-shaft, of means to effect the preliminary separation of the top-sheet, feeding-off mechanism to receive the forward edge thereof from the preliminary separating means, and comprising
100 feed-rollers mounted in the frame in proximity to the paper-passage of the yoke, a pivoted blade normally resting on the stack of sheets and adapted to guide the top sheet upon the preliminary separation thereof to the feeding off mechanism, a revoluble shaft
105 having feed-disks, cam-arms to raise and lower the shaft, and disks on the main-shaft provided with reduced peripheral portions in the path of the arms.

16. In a sheet-feeding machine, the combination with a paper-table, and main-shaft
110 above the same, of a reciprocating and rocking buckler-shaft, a pivoted retaining-bar, a feeding-off mechanism comprising separable revoluble members, cam-disks on the main-
115 shaft, links having pins entering cam-grooves in the disks to operate the buckler-shaft, cam-arms controlling the feeding-off device from the main-shaft, and cam-levers to raise the retaining-bar.

17. In a sheet-feeding machine, the combination with a paper-table, a main-shaft, and preliminary separating means, of a pivoted
120 retaining-bar adapted to bear on the stack of sheets during the preliminary separation of the top sheet, cam-levers in which the bar is mounted, and disks on the shaft to positively raise the bar.

18. In a sheet-feeding machine, the combination with a paper-table, a main-shaft, and
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means to buckle the top-sheet, of a pivoted retaining-bar adapted to bear on the stack of sheets during the preliminary separation of the top sheet, cam-levers in the ends of which the bar is mounted, and disks on the shaft to positively raise the bar and having reduced portions to permit the bar to drop to engagement with the stack of sheets.

19. In a sheet-feeding machine, the combination with a paper-table, a main-shaft, and means driven from the shaft to buckle the top-sheet, of a pivoted retaining-bar adapted to bear on the stack of sheets during the preliminary separation of the top sheet, levers in which said bar is mounted to fall by gravity, and cam-disks on the shaft to operate said levers to positively raise the bar.

20. In a sheet-feeding machine, the combination with a paper-table, a main-shaft, and means operated by the shaft to buckle the top-sheet, of a pivoted retaining-bar in rear of the buckling means and adapted to bear on the stack of sheets during the buckling of the top sheet, levers in which said bar is mounted, disks on the shaft operating to positively raise said levers and having reduced portions to permit the levers to drop.

21. In a sheet-feeding machine, the combination with a paper-table, screw-rods having threaded connection therewith, and a shaft having bevel-gear connections with the screw-rods, of a retaining-bar, pivoted cam-levers to raise the bar, a tail-piece on one of said levers, a ratchet-wheel on the shaft, a pawl to move the ratchet, and an angle-lever connected to the pawl at one end and to the tail-piece at the other.

22. In a sheet-feeding machine, the combination with a paper-table, screw-rods having threaded connection therewith, and a shaft, bevel-gears between the shaft and rods, and a ratchet-wheel on the shaft, of a retaining-bar, pivoted cam-levers to raise the bar, a tail-piece on one of the levers, a screw-bolt passing through tail-piece and

having upper and lower nuts adjustable thereon, a pawl to move the ratchet in one direction, and an angle-lever between the pawl and screw-bolt to transmit motion from the latter to the former.

23. In a sheet-feeding machine, the combination with a paper-table, of a buckler-shaft, means to reciprocate the shaft, means to rock the same, and bucklers on the shaft with a paper-table, a feeding-off device comprising rollers, and disks mounted in swinging cam-arms, and cam-disks to operate the arms, one of the disks having a face-cam, of an air-blast device, a valve therefor, and a valve-operating lever in the path of the face-cam.

24. In a sheet-feeding machine, the combination with a paper-table, a feeding-off device comprising fixed rollers and disks mounted on pivoted arms, and cam-disks having reduced peripheral portions to permit the disks to drop, one of the disks having a face-cam in rear of its reduced portion, of an air-blast, a valve therefor, a valve-operating lever in the path of the face-cam, and a spring to retract the lever.

25. In a sheet-feeding machine, the combination with a paper-table, of a sub-buckler comprising a vertically movable plate, and means to adjust the plate above the plane of the table.

26. In a sheet-feeding machine, the combination with a paper-table, of a sub-buckler comprising pivoted plates secured at one edge to the table, a screw-rod below the table and movable longitudinally thereof, and a link secured to the rod and passing through the table to rigidly engage one of the plates.

In testimony whereof I affix my signature in presence of two witnesses.

HOMER C. LA BATT.

Witnesses:

R. K. GUSTAFSON,
JOSIAH McROBERTS.