

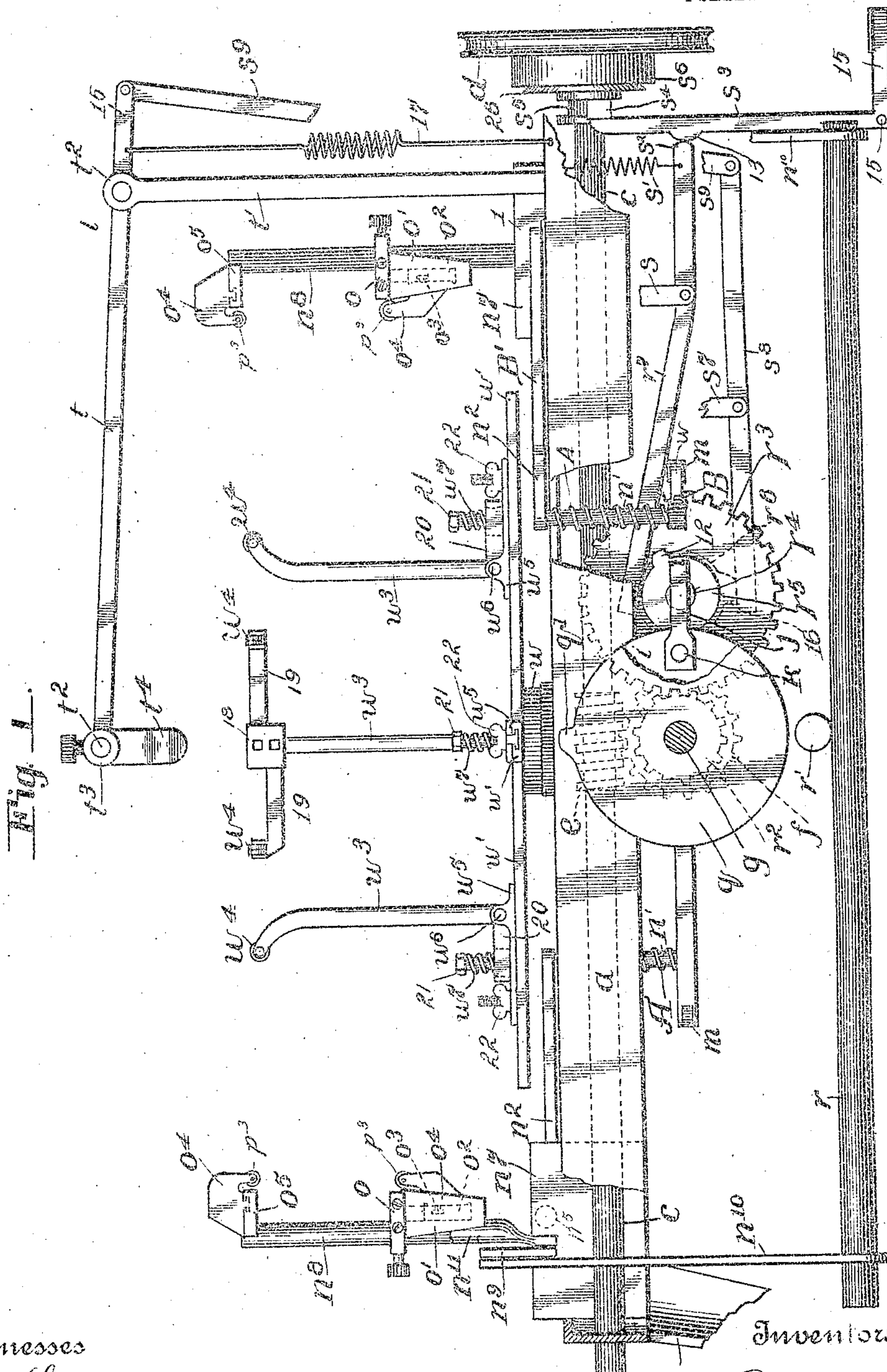
No. 822,480.

PATENTED JUNE 5, 1906.

C. F. ROOT & B. O. CONN.
PAPER PASTING AND TURNING IN MACHINE.

APPLICATION FILED NOV. 14, 1903.

4 SHEETS—SHEET 1.



Witnesses

Wm. Lenoir.

Charles F. Root

Inventors

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by John H. Case
their Attorney

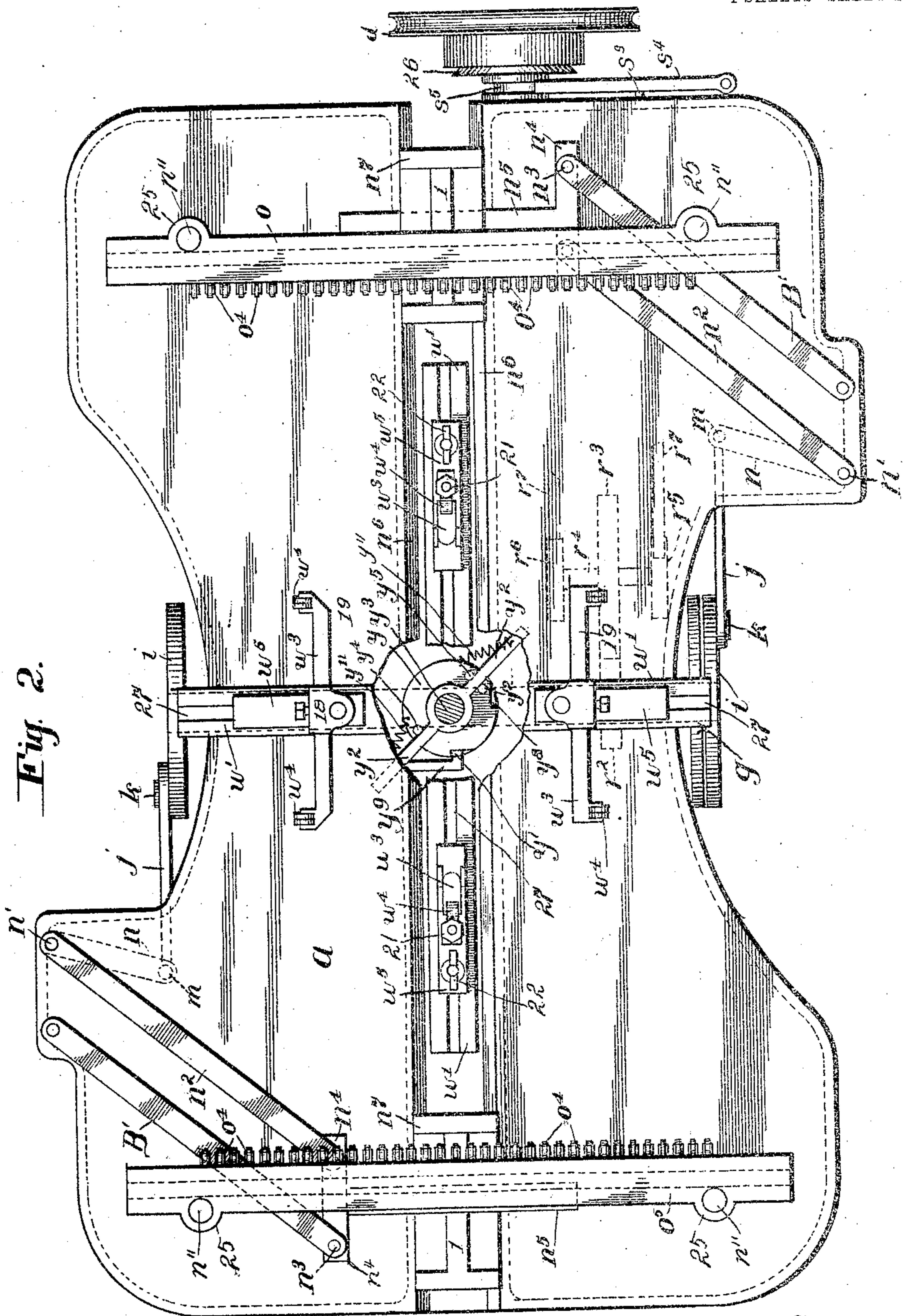
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4 SHEETS—SHEET 2.



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1 SHEETS—SHEET 3.

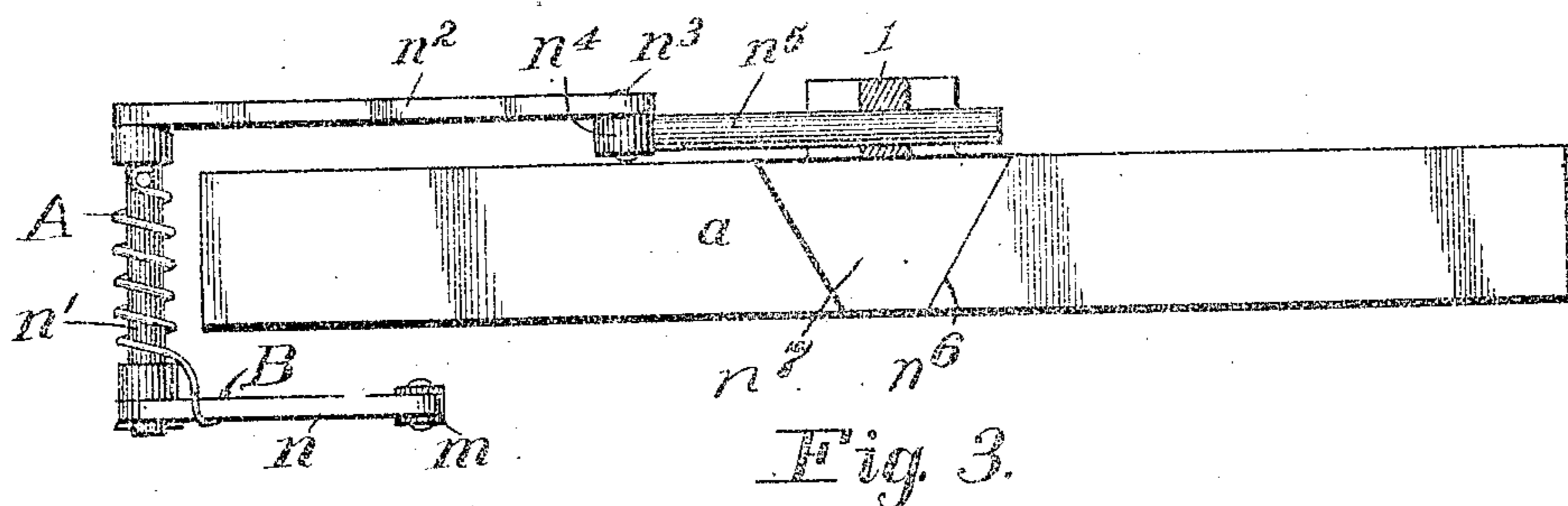


Fig. 3.

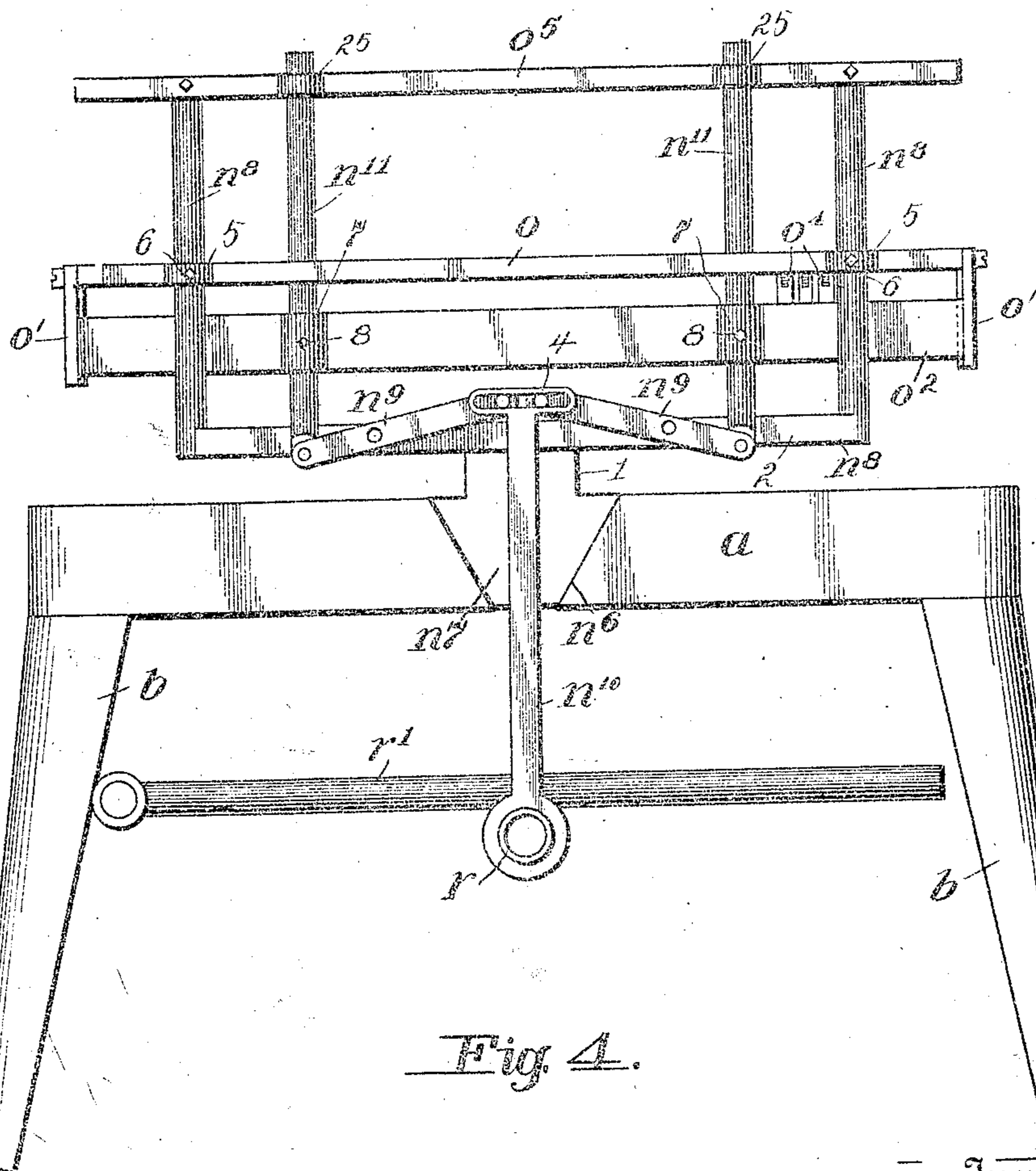


Fig. 4.

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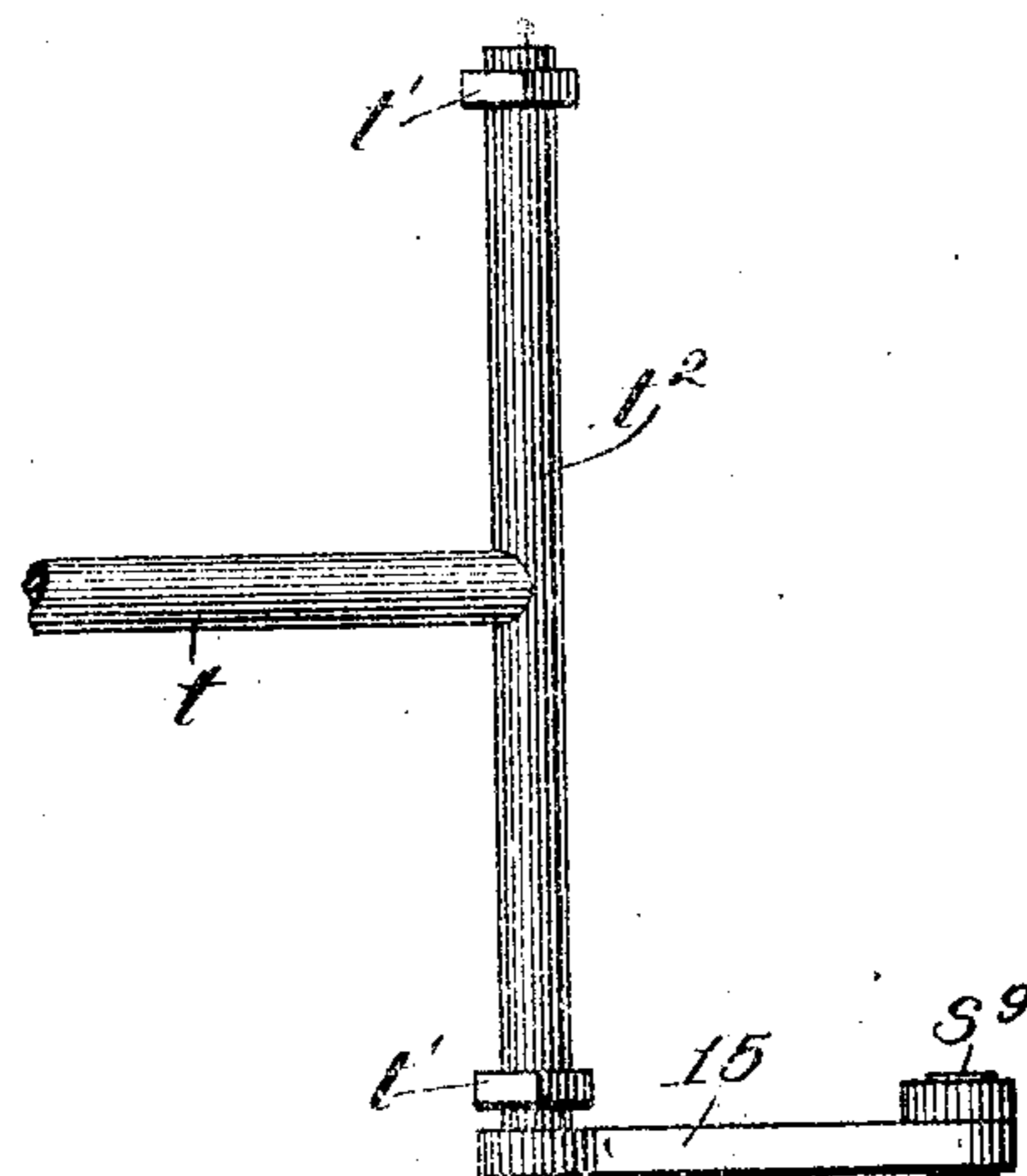
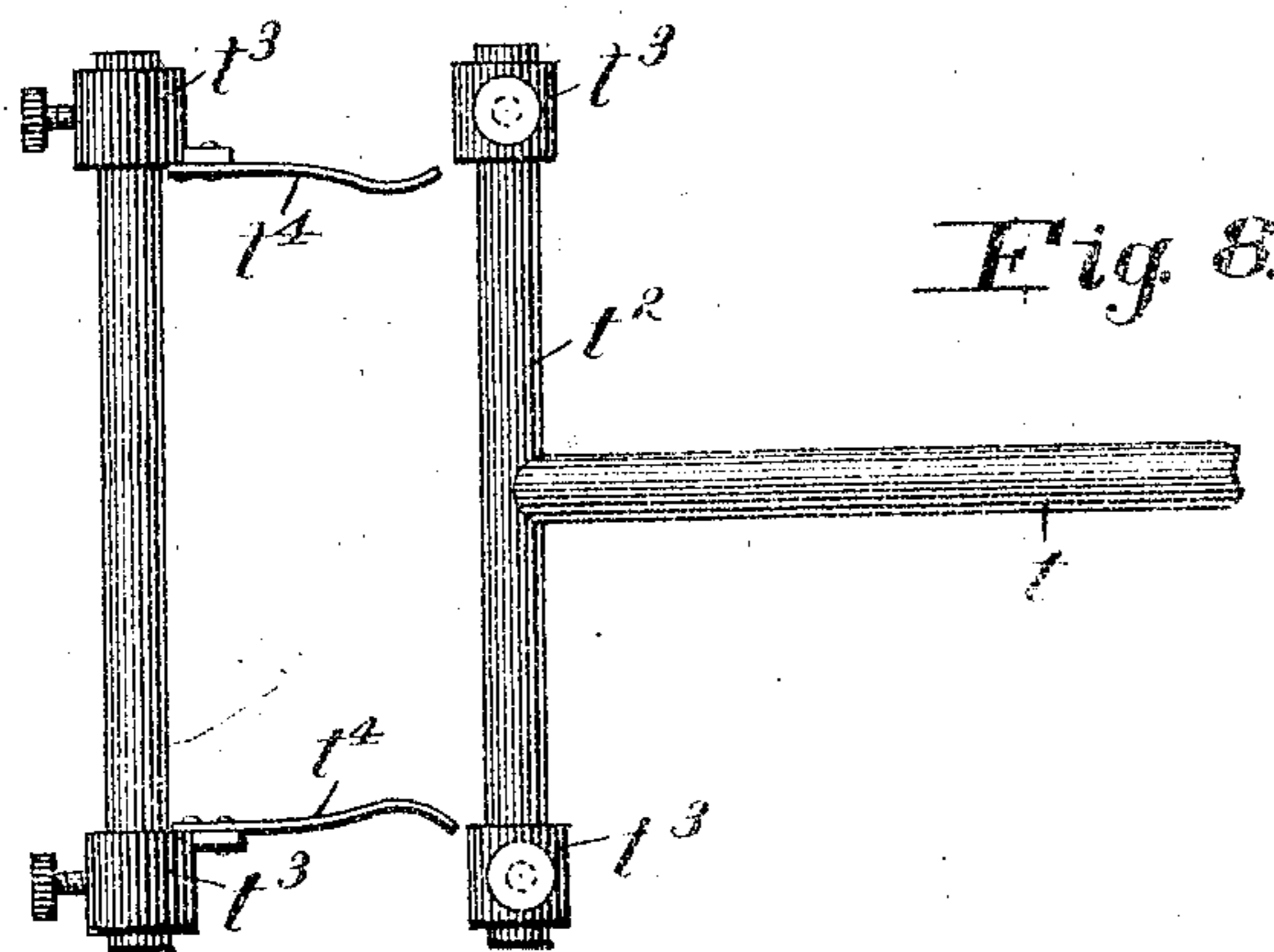
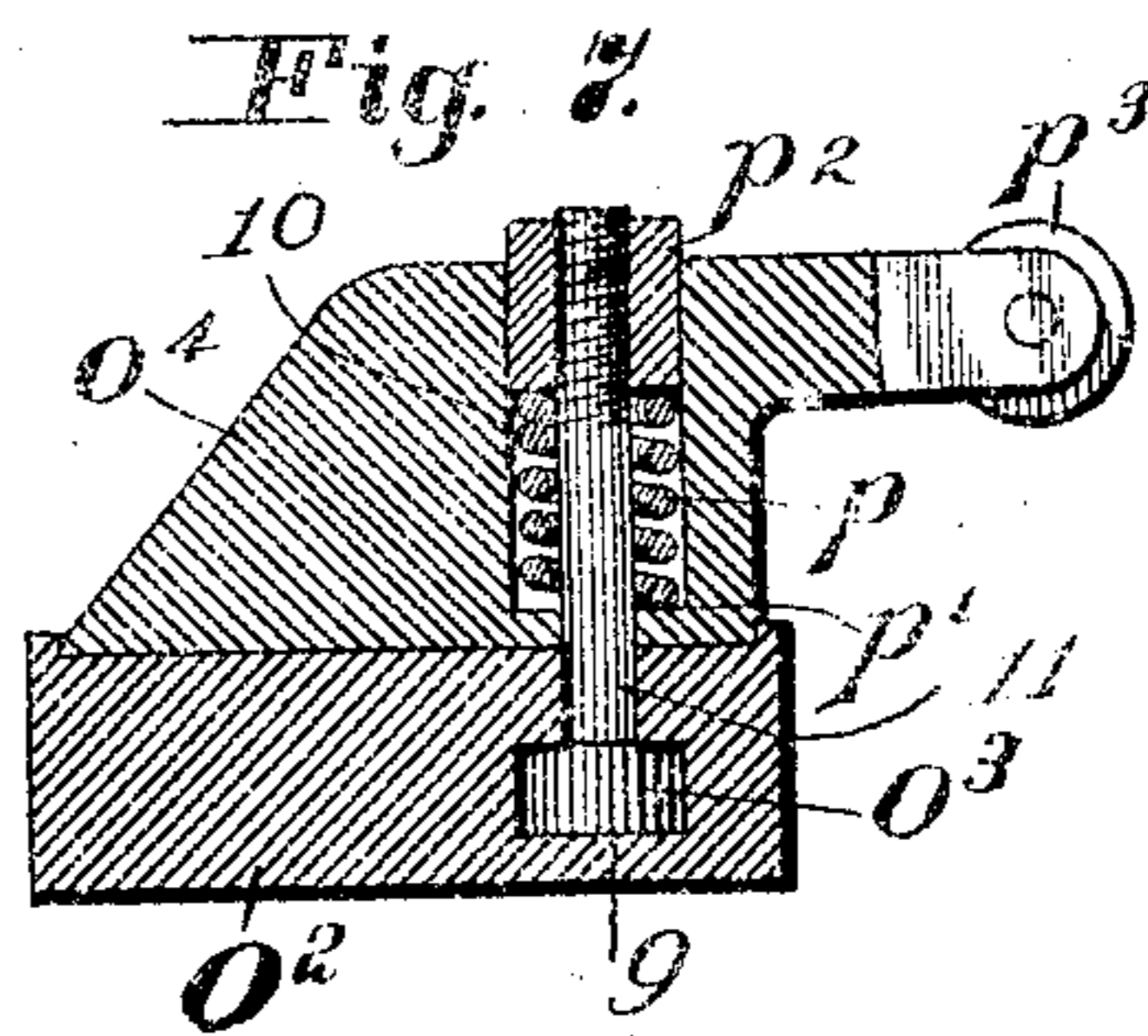
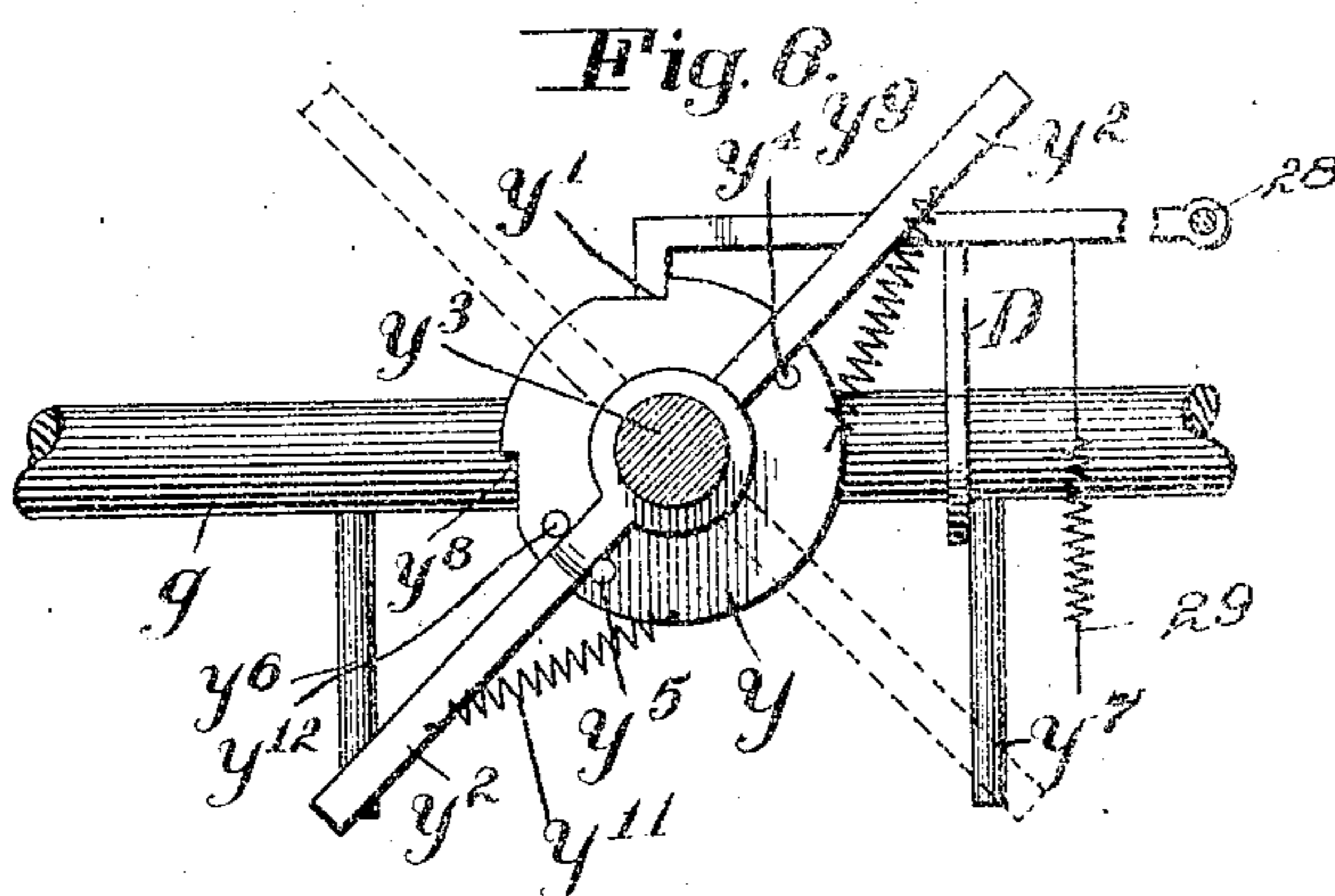
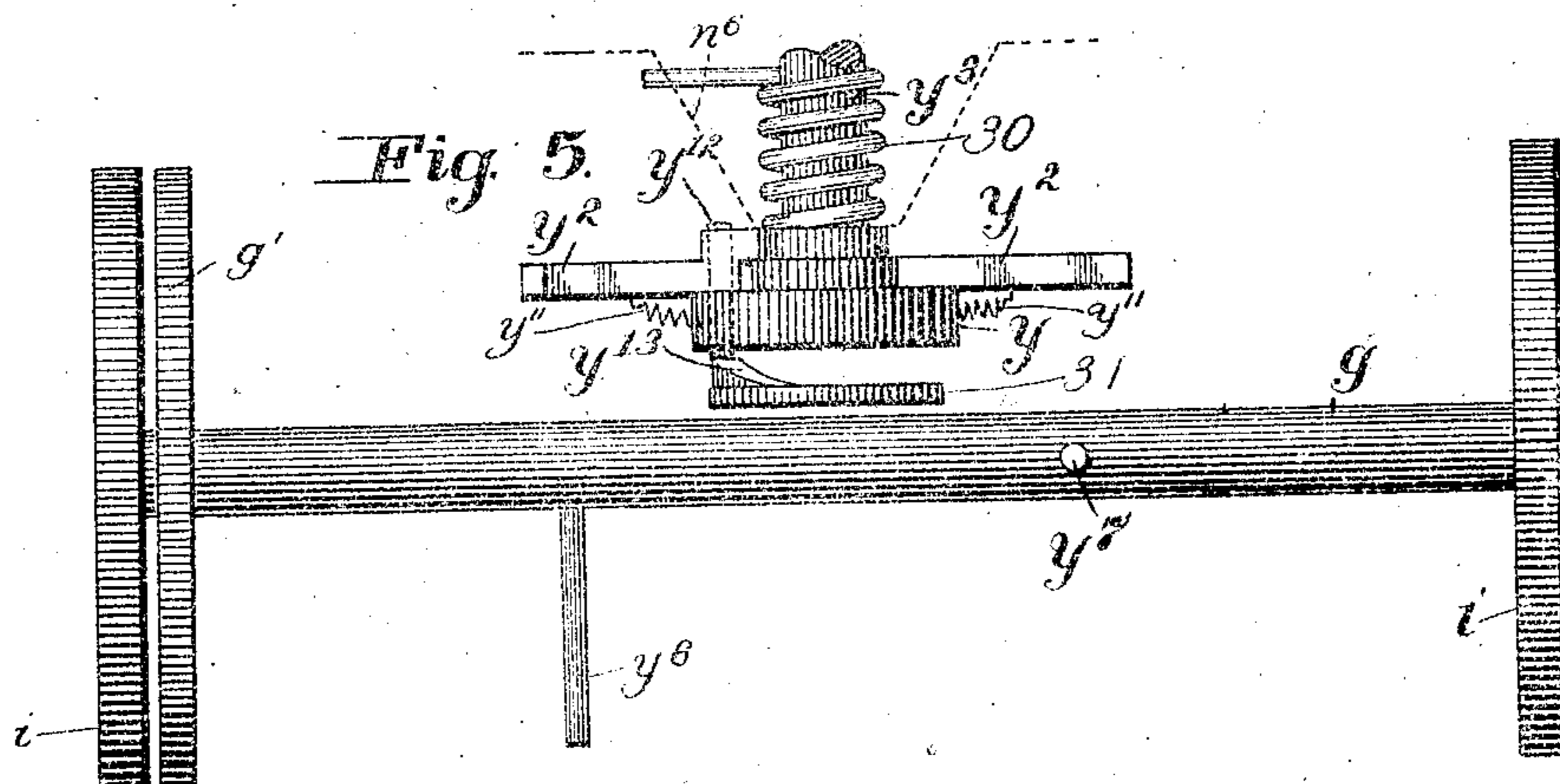
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4 SHEETS--SHEET 4



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UNITED STATES PATENT OFFICE.

CHARLES F. ROOT AND BYRON O. CONN, OF MANSFIELD, OHIO.

PAPER PASTING AND TURNING-IN MACHINE.

No. 822,480.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed November 14, 1903. Serial No 181,210.

To all whom it may concern:

Be it known that we, CHARLES F. ROOT and BYRON O. CONN, citizens of the United States of America, and residents of Mansfield, Richland county, Ohio, have invented certain new and useful Improvements in Paper Pasting and Turning-In Machines, of which the following is a specification.

Our invention relates to the manufacture of paper boxes; but it is obvious that it can be used for other purposes.

In the manufacture of paper boxes in order to give them a finished appearance suitable paper is pasted to the exterior or outer surface of the body portion of the box, which is usually composed of pasteboard. In performing this function a margin is left extending above the top and below the bottom of the box, which margin is turned in and pasted to the inner surface of the top of the box and to the bottom of the box. This operation has heretofore been performed by hand. The object of our device is to provide a means for performing this function automatically, thereby insuring uniformity in the work and economy in time and material, by means of which the cost of manufacturing paper boxes is considerably reduced.

We attain these and other objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of the entire machine, parts being broken away to better disclose the mechanism. Fig. 2 is a top plan view of the machine with parts broken away to show the operation of the holder. Fig. 3 is an end view of the connecting bars or levers in detail. Fig. 4 is an end view of the machine, showing the frame and the method of operating the lower series of fingers, which are mounted on a finger-bar. Fig. 5 is a detail view in side elevation of the mechanism used to partially rotate the holder. Fig. 6 is a top plan view of Fig. 5. Fig. 7 is a detail view in cross-section of one of the fingers, showing the method of securing it to the finger-bar through the medium of a collar-bolt which has a coil-spring fitted thereto. Fig. 8 is a top and side view showing the construction of the box-lifter.

Similar characters refer to similar parts throughout the several views.

The bed of the machine *a* and its legs *b* constitute the framework of the machine.

A shaft *c* is journaled in suitable bearings provided in each end of the bed of the ma-

chine and extends longitudinally thereof. Motion is imparted to the shaft *c* through the medium of the sheave-pulley *d*, secured thereto. The shaft *c* carries a worm *e* intermediate its ends adapted to mesh with the worm-wheel *f*, which is secured upon a shaft *g*, suitably journaled at right angles to the shaft *c*.

A crank-wheel *i* is keyed to each end of the shaft *g*. A connecting-rod *j* is fastened at one end to a crank-pin *k*, mounted on each of the crank-wheels *i*. The opposite end of the connecting-rod is secured, by means of a ball-and-socket joint *m*, to a link *n*, the opposite end of which link is journaled to the depending arm *n'* of the bar *n²*, the arm *n'* being journaled in and protruding above the bed *a*. A coil-spring *A* is fitted around the circumference of the depending arm *n'* of the bar *n²*, one end of which spring is securely fastened to the arm and the opposite end *B* of which is looped around the link *n*. This provides a resilient connecting means between the link *n* and the arm *n'* for reciprocating the carriage *n⁷* in the way *n⁶* when motion is transmitted to the shaft *c*, whereby to bring the fingers in position to perform the function of turning in and pasting and returning the carriage when the operation is completed. A bar *B'* is pivotally attached at one end to the bed of the machine, the opposite end of the bar being pivotally secured, by means of a pin *n³*, to one of the arms *n⁴* of a T-shaped rod *n⁵* for the purpose of keeping the carriage from vibrating when it is reciprocated in the way. The bars *B'* and *n²* are parallel, the bar *n²* being the actuating-bar. One end of the bar *n²* is pivotally connected in a similar manner to the other of the projecting arms *n⁴* of the rod *n⁵*. The bed *a* of the machine is provided with a central longitudinally-extending way *n⁶*, into which the lower portion of the carriage *n⁷* is fitted and adapted to reciprocate therein, the rod *n⁵* being secured to and transversely of a rib *l*, formed on the carriage *n⁷*, the way being provided with a carriage at either end thereof. Hence a description of one will suffice for both.

The mechanism described connects the carriages to each of the crank-wheels *i* and when motion is imparted to the shaft *g* through the medium of the shaft *c* the carriages are reciprocated in the way simultaneously toward and from each other. The operating mechanism of one carriage only is described, as

both are operated exactly alike. To the upwardly-projecting rib 1 a frame n^8 is securely attached, the frame comprising a transversely-extending bar 2, provided at either end with upright bars 3 3. Levers n^9 are pivotally journaled intermediate their ends to the transverse bar 2, the inner end of each lever being connected to the transversely-slotted upper end 4 of the vertically-moving arm n^{10} and the opposite ends of the levers being connected to the movable standards n^{11} . A horizontally-extending bar o is provided with boxes 5 5, intermediate its ends, the uprights 3 3 of the frame n^8 passing through the boxes, to which uprights the boxes are adjustably secured at any height by means of the set-screws 6 6. A movable slotted finger-bar o^2 , extending parallel with the bar o and the transversely-extending base 2 of the frame, is likewise provided with sleeves 7 7 intermediate its ends adapted to receive the movable standards n^{11} , the finger-bar o^2 being adjustably held at any desired height on the movable standards by means of the set-screws 8 8. The adjustment of the bar o is regulated with reference to the height of the boxes under treatment, and the finger-bar o^2 may be adjusted in its vertical movement in the hangers o' by means of the sleeves 7 and set-screws 8. Depending grooved hangers o' are secured to the ends of the stationarily-mounted hanger-bar o , the ends of the finger-bar o^2 being received in the grooves in the hangers and being guided thereby during its movements. The finger-bar is slotted, as at 9, Fig. 7, to accommodate the heads of a series of collar-bolts o^3 , adapted to adjustably support a series of fingers o^4 , fitting in the recessed top 24 of the finger-bar. The uprights 3 3 of the frame n^8 support a second stationary finger-bar o^5 , upon which a series of fingers o^4 are adjustably mounted and retained in place by collar-bolts fitted to a T-slot in the same manner as are the fingers secured to the bar o^2 . The upper finger-bar o^5 is provided with sleeves 25 25, in which the standards n^{11} are movably received, the bar o^5 being adjustably secured to the upright bars 3 3 by means of set-screws to admit of a vertical adjustment of the bar o^5 with reference to the height of the boxes under treatment. Each finger is recessed, as at 10, to receive a coil-spring p , which encircles the bolt o^3 , the latter entering the recess through a communicating aperture 11. One end of the spring is supported upon the surface of the annular shoulder p' at the base of the recess, and the opposite end of the spring contacts with the nut p^2 , carried by the upper end of the bolt and fitting in the recess to retain the spring p under tension, thereby retaining the collar-bolts and fingers in position relative to each other on the bar o^2 . This provides for a lateral or rocking motion of the fingers, permitting

them to conform to any irregular or uneven surface of the box. The ends of the fingers project upwardly beyond the bar o^2 and are provided with rollers p^3 to obviate friction. A cam-wheel q is secured to the shaft g between the crank-wheels i , the purpose of which cam-wheel is to provide a means for automatically raising the finger-bar o^2 . The vertically-moving arms n^{10} at each end of the machine support at their lower ends a bar r , which is suspended below the bed of the machine and longitudinally thereof. A cross-bar r' is pivotally supported at right angles to the bar r , upon which latter it is supported. The mechanism described operates the fingers as follows:

When motion is imparted to the shaft g , the cam-wheel q is rotated, bringing the peripheral cam q' carried thereby into contact with the outer end of the bar r' , which is thereby rocked downwardly, depressing the bar r and arms n^{10} and forcing the outer ends of the levers n^9 and the movable standards n^{11} upwardly, thereby raising the finger-bar o^2 in the hangers o' , together with the fingers o^4 , and pasting the margin of the paper covering the box to the interior surface thereof in the manner hereinafter set forth.

A gear-wheel r^2 is keyed to the shaft g and meshes with a gear-wheel r^3 , having one-half the pitch, or in the ratio of two to one. The gear-wheel r^3 is mounted on a suitably-supported counter-shaft r^4 , having the cam-wheels r^5 and r^6 located at either end thereof. A lever r^7 is pivotally supported on a hanger s , depending from the bed. One end of the lever r^7 projects into the path of and is engaged by the cam 12, carried on the cam-wheel, and one end of a coil-spring s' is secured to the lever near its opposite or outer end, thereby holding the inner end of the lever in contact with the periphery of the cam-wheel r^5 . When the cam-wheel revolves, a pressure is exerted against the inner end of the lever r^7 , the opposite end s^2 of which normally contacts with a curved projecting lug 13, carried by a foot-pedal s^3 , the upper end of which has secured thereto a block s^4 , the block received in an annular groove s^5 , formed in the hub of the movable member 26 of a frictional clutch s^6 . The pedal is pivotally supported at its lower end, as at 14, a treadle 15 being provided to admit of the manual operation of the clutch, if desired. The pedal is so pivoted, however, that its weight tends to automatically swing the upper end of the pedal away from the pulley d and withdraw the block s^4 . It is normally prevented from such movement, however, by reason of the engagement of the end s^2 of the lever r^7 with the curved lug 13 of the pedal. As the cam-wheel r^5 revolves the cam 12 is brought in contact with the lever r^7 , thereby moving the end s^2 out of engagement with the lug 13 to permit the pedal car-

rying the movable member 26 of the clutch to swing away from the pulley *d* to release the latter from frictional contact with the shaft *c* upon every revolution of the shaft *r*⁴, which completes the operation of turning in and pasting the margin of the paper covering the box.

A cam-wheel *r*⁶, also secured to the shaft *r*⁴, is provided with a cam 16, adapted to contact with one end of a lever *s*⁸, the lever being pivotally supported intermediate its ends by means of a hanger *s*⁷. The outer end of the lever *s*⁸ is pivotally connected to a bar *s*⁹, which bar extends upwardly and is connected with one end of crank 15. Two standards *t'* *t'* project above the bed of the machine, the upper ends of the standards having journaled therein the base or pivotal rod *t*² of a double T-shaped member which constitutes the lifting-frame. The crank 15 is keyed to this pivotal rod and serves to oscillate it in its bearings in the standards *t'*. The transverse members *t*² *t*² of the double T-shaped frame are connected by means of the rod *t*, the outer free transverse member having collars *t*³ *t*³, adjustably mounted at either end thereof, the collars each carrying a flat spring-finger *t*⁴, slightly curved, preferably, near their lower ends.

When the shaft *r*⁴ is rotated, the cam 16, carried by the cam-wheel *r*⁶ on the shaft *r*⁴, engages and depresses one end of the lever *s*⁸, immediately preceding the action of the cam-wheel *r*⁵, thereby raising the connecting-rod *s*⁹, secured to the opposite end of the lever and operating through the crank 15 to rock the outer free end of the lifting-frame downward. Connected to the crank 15 is a strong spring 17, which normally retains the outer end of the lifting member in elevated position away from the box. When the cam 16 engages the lever *s*⁸, as before set forth, the spring-fingers *t*⁴ are swung downward and brought into engagement with and clasp the outer surface of the box, the spring 17 returning the lifting member to its normal elevated position, together with the box, as soon as the cam 16 leaves the lever *s*⁸ to remove the box from the holder preparatory to removing it from the machine and permitting another box to be placed on the box-holder, now to be described.

Centrally of the bed is rotatably supported a holder *w*, from which the slotted arms *w'* diametrically extend. The holder is preferably secured to the upper end of a shaft *y*³. The arms are provided with inverted-T slots 27, adapted to receive similarly-shaped ribs 17, secured to the bases *w*⁵, to which are pivotally secured the vertical standards *w*³. The upper ends of the standards are flexed outwardly and are provided at their ends with rollers *w*⁴, the rollers adapted to engage the inner surface of the sides of the box, holding it in place while the operation of turning in

and pasting is performed. It will be noted that two of the standards instead of being flexed outwardly are straight, and each is provided with a box 18, adjustably secured thereto, the box provided with oppositely-projecting arms 19 19, adjustably held in the box and provided with rollers at their outer ends, the object of which construction is to afford means for receiving boxes of varying sizes on the standards. The lower portions of the standards *w*³ are each formed with a foot 20, extending at right angles with the body portion, the standards being pivotally secured to the bases *w*⁵ by means of the pins *w*⁶, the feet superimposed upon the bases and yieldingly held in place by the coil-springs *w*⁷, encircling the studs 21, carried by the bases and projecting through slotted apertures in the feet. This construction permits of a lateral play of the standards to accommodate any irregularity in the size or shape of the box. The bases are adjustably secured to the arms *w'* by means of set-screws 22.

The shaft *y*³ is mounted in a washer *y*, provided with the peripheral notches *y'* and *y*⁸, the notches adapted to receive the end of a pawl *y*⁹, pivoted upon a suitably-supported pin 28. The pawl normally rests in the notch *y'* to retain the washer and work-holder steady, the shaft *y*³ having a spring 30 coiled therearound, one end of the spring secured to the shaft *y*³ and the opposite end secured to the bed *a* of the machine. This spring is under a slight tension, tending to rotate the disk *y* and move the work-holder toward the left (in the drawings) and the pawl by engaging the notch *y'* prevents such rotation, the pawl being held in engagement with the periphery of the disk *y* by means of the spring 29. The normal position of the disk is shown in Fig. 6, in which the stud *y*¹² is in engagement with the inclined plane *y*¹³, so as to project above the disk *y* in advance of the arm *y*². It is also to be observed that the tooth of the pawl and the faces of the notches are both squared and squarely engage each other, so that the pawl must actually be forced away by the cam *D* and does not operate as a click or dog. The shaft also carries a cam *D*, adapted to engage the pawl *y*⁹ and release the latter from engagement with the disk *y* just prior to the engagement of the radial pin *y*⁶ with the arm *y*². When the parts are in the position shown in Fig. 6, the loose stud *y*¹² is in engagement with the inclined plane *y*¹³ preparatory to the engagement of the pin *y*⁶ and the arm *y*². Separate and independent arms *y*² *y*¹⁴ are journaled on the shaft *y*³, attached to the washer, and are adapted to rotate on the shaft independent of each other, as shown in Fig. 5. Stud *y*⁴ and *y*⁵ are rigidly secured to the washer *y* and project above its surface, against which studs the loose arms *y*² *y*¹⁴ are normally held by means of the springs *y*¹¹, secured to the arms

and to the disk y . Located beneath the disk y is a stationary arc-shaped inclined plane y^{13} , carried by a washer 31 and adapted to engage the lower end of a long stud y^{12} , loosely held in the disk y and of such a length as to project above the surface thereof when engaged by the inclined plane y^{13} , the loose stud being located slightly in advance of the stud y^5 , so that the arm y^2 is held between the studs y^{12} and y^5 . The shaft g extends beneath the inclined plane y^{13} and transversely of the bed, the shaft being provided with pins y^6 and y^7 projecting radially therefrom and at an angle to each other.

When the shaft g is rotated, the pin y^6 is brought into engagement with the arm y^2 , the cam D having just previously engaged the pawl y^9 to release the disk y , rotating the washer 7, which carries the holder w until the arms y^2 y^{12} are in the positions shown by the dotted lines in Fig. 6, when the notch y^8 is brought in contact with the pawl y^9 , by means of which the holder is retained in place until the work is finished, the length of the pin y^6 being predetermined, so that it will wipe past the arm y^2 when the pawl engages the notch y^8 . The termination or lowest point of the inclined portion of the washer is also reached and the pin y^{12} drops down out of the way of the arm y^2 . On the succeeding rotation of the shaft g the cam D contacts with the pawl, forcing it out of contact with the notch y^8 to release the washer upon which the holder is mounted, and the holder is rotated in the opposite direction by means of the coil-spring 30, which has been placed under greater tension when the arms were rotated to their dotted-line position, bringing the holder back to its original position shown in Fig. 6, the holder making a quarter-turn only in each direction. When the holder is returned to its normal position, the pin y^{12} is brought back into engagement with the inclined surface y^{13} and raised into position in front of the arm y^2 .

The pin y^7 is used for the purpose of retarding the movement of the holder when the latter is returning to its original position, which is accomplished by the arm y^{14} contacting with the pin y^7 upon the release of the holder by the pawl and cam, the spring 30 causing arm y^{14} to bear against the pin y^7 as the latter is rotated until the pawl reengages the notch y^8 .

The operation of our device is as follows: The carriages n^7 n^7 are fitted in a suitable way formed in the bed of the machine and are reciprocated simultaneously toward and from the holder by means of the mechanism first described, the holder being journaled centrally of the bed of the machine and being partially rotated as above described in performing the function of turning in and pasting. The box to be treated is first covered with paper, leaving a margin projecting above and below the box, and is then placed in an

inverted position upon the upright standards w^3 , which are secured to and carried by the holder, the standards having rollers w^4 journaled in the ends which are adapted to contact with the interior surface of the box and retain it snugly in position. The standards are adjustably secured to the holder to provide a means for holding any size or shape of box. When movement is imparted to the carriages, they move forward in the way toward the holder, and in approaching the box the fingers mounted on the stationary standards turn in and paste the projecting margin of the paper to the bottom of the box, which completes the turning in and pasting of the margin projecting over the bottom of the box, since the paper is coated with an adhesive and the rolls p^3 in their ends bend the margin of paper over and press it down on the bottom of the box. The lower series of fingers which are mounted on the movable supports engage and turn the margin of the paper in at right angles with the top of the box and immediately subsequent thereto an upward movement is transmitted to the fingers, as described, to turn the margin of paper upward and press it against the inner surface of the top of the box to paste it thereto.

The movable finger-bar o^2 is raised primarily by reason of the engagement of the cam q' with the cross-rod r' , which latter as soon as released is brought back by gravity, the weight of the finger-bars o^2 o^2 operating thereon through the levers and links n^9 n^{10} . In rising the edges of the box are received between the upturned fingers o^4 and the face of the bar o , the downward movement of the bar occurring when the cam q' has passed the cross-bar r' , and the continued rotation of the shaft g causes the return or simultaneous back movement of the carriages to their normal positions at the ends of the table through the connecting-bars, levers, and posts hitherto set forth. As the shaft g approaches the end of its second rotation the cam-tooth 16 wipes the lever s^8 to cause the lifting-bar to move downward against the tension of the spring 17, bringing the spring-finger t^4 down over the box, the further rotation of cam-wheel r^6 moving the cam-tooth 16 away from the lever s^8 to release the latter and permit the tension of spring 17 to raise the lifting-bar and the box being treated. Simultaneously with this latter movement the cam-tooth 12 engages the lever r^7 to rock it out of engagement with the lug 13 and permit the treadle-standard s^3 to move the clutch member 26 away from clutch member s^6 , thereby stopping the machinery. The completed box is then removed from the fingers t^4 , and a second box is placed over the upper ends of the standards w^3 and the treadle 15 depressed to bring the clutch members once more into engagement.

In practice the momentum or inertia of

the gearing carries the cam 12 past the lever r^7 , so that the spring s' brings the end of the lever r^7 back into engagement with the lug 13 to cause a practically continuous operation of the machine with but the slightest possible stoppage or halt.

Upon the commencement of the second rotation of shaft g , the disk y being in its rotated position with the pawl y^9 engaging the notch y^8 , the cam D wipes against the pawl to release the disk y and permit its return to the position shown in Fig. 6 by the tension of spring 30, and the pin y^7 is engaged by the loose arm y^{14} to restrain the disk from a too rapid rotation, the speed of the disk y being brought down to that of the shaft g . The pin y^6 engages the arm y^2 at the beginning of the rotating movement of the disk and rotates the arm y^2 against the tension of spring y^{11} and with relation to the disk y imparting no movement to the disk by reason of the fact that the stud y^{12} is at its lowest position. At the time the notch y' of the disk is engaged by the pawl y^9 the pins y^6 y^7 wipe past the arms y^2 and y^{14} , and the tension of spring y^{11} operates to return the arm y^2 to its normal position against stud y^5 . At the commencement of the succeeding rotation of shaft g the cam D engages pawl y^9 to release disk y and immediately subsequent thereto the pin y^6 engages the arm y^2 in the manner heretofore set forth to rotate the disk y , during the rotation of which the pin y^7 is brought into engagement with the arm y^{14} , forcing the latter backward against the tension of its spring y^{11} until the pawl has engaged notch y^8 of the disk, at which time the pins y^6 y^7 wipe past the arms y^2 y^{14} and the spring y^{11} returns arm y^{14} to its normal position against the stud y^4 .

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A pasting and turning-in machine comprising an axially-rotatable work-holder, and paper turning-in and pasting mechanism, the turning-in and pasting mechanism comprising a carriage, a plurality of series of turning-in and pasting fingers mounted on the carriage, certain of the series of fingers being stationarily secured to the carriage, the remaining series of fingers being movably supported on the carriage and means for actuating the movably-supported fingers in a direction transversely to the direction of movement of the carriage and during the engagement of the stationary fingers with the work, for turning in and pasting the paper interiorly of the work, and means for bodily moving the turning-in and pasting mechanism toward and from the work.

2. A turning-in and pasting machine comprising a work-holder, a carriage movable toward and from the holder, a frame mounted on the carriage, a plurality of series of turn-

ing-in and pasting fingers supported by the frame, one series of fingers movable with respect to the frame, and means secured to the movable series of fingers for raising and lowering the same.

3. A turning-in and pasting machine, comprising a work-holder, and a carriage movable toward and from the holder, a frame mounted on the carriage, a stationary series of turning-in and pasting fingers adjustably secured on the frame, a finger-bar support adjustably mounted on the frame, guides carried by the support, a finger-bar received in the guides, fingers carried by the bar and means engaging the bar for raising and lowering the latter in the guides.

4. A turning-in and pasting machine comprising a work-holder, a carriage movable toward and from the holder, a movable finger-bar supported on the carriage, rods to which the finger-bar is secured, levers secured to the rods, means for actuating the levers at predetermined intervals and fingers carried by the finger-bar and adapted to engage the work and paste it when the bar is operated.

5. A turning-in and pasting machine comprising a work-holder, a carriage movable toward and from the holder, a frame supported on the carriage, bearings in the frame, sliding rods received in the bearings, a finger-bar adjustably secured to the rods, fingers carried by the bar, levers pivotally secured to the frame and to the rods, and means engaging the levers for automatically raising and lowering the finger-bar at predetermined intervals.

6. A turning-in and pasting machine comprising a work-holder, and a carriage movable toward and from the holder, a plurality of finger-bars supported on the carriage, one finger-bar movable relative to the other, means for actuating the movable finger-bar to engage and paste the work while the stationary finger-bar is in engagement with the work.

7. A turning-in and pasting machine comprising a bed having a way formed therein, a work-holder located intermediate the ends of the way, means for oscillating the work-holder, and turning-in and pasting mechanisms simultaneously moving toward and from the work-holder.

8. A turning-in and pasting machine comprising a work-holder, a carriage movable toward and from the holder, turning-in and pasting mechanism mounted on the carriage, levers connected with the mechanism, an arm to which the levers are connected, a bar carried by the arms, a pivotally-supported cross-bar resting upon the bar and means engaging the cross-bar for depressing the bar and the arms in which it is supported.

9. A turning-in and pasting machine comprising a work-holder, a carriage movable toward and from the holder, a frame mounted

on the carriage, rods loosely received in the frame, a finger-bar secured to the rods, a depending arm with which the rods are connected, a pivotally-supported cross-rod bearing upon the bar, a driving-shaft, and a cam-wheel on the shaft adapted to engage the cross-rod to operate the finger-bar.

10. A turning-in and pasting machine comprising a work-holder, a carriage movable toward and from the holder, a frame mounted on the carriage, rods slidingly mounted in the frame, a finger-bar carried by the rods, levers pivotally secured intermediate their ends to the frame, one end of each lever pivotally secured to the rods, an arm having an enlarged head, the opposite ends of the levers connected with the head of the arm and means for operating the arm.

11. A turning-in and pasting machine comprising a work-holding mechanism, a carriage, turning-in and pasting mechanism mounted on the carriage, a driving-shaft, a crank-wheel secured thereto, a suitably-journaled arm, a link secured to the arm, a connecting-rod extending between the link and crank-wheel and means connecting the arm and carriage.

12. A turning-in and pasting machine comprising a work-holding mechanism, a carriage movable toward and from the work-holding mechanism, a rod slidingly mounted in the carriage, a bar pivotally secured thereto, a suitably-journaled rod to which the bar is secured, a drive-shaft and means connecting the shaft and journaled rod for oscillating the latter.

13. A turning-in and pasting machine comprising a work-holding mechanism, a carriage movable toward and from the work-holding mechanism, a T-shaped rod slidingly mounted in the carriage, a drive-shaft, a suitably-journaled rod, means connecting the journaled rod and the drive-shaft for imparting an oscillating movement thereto, a connecting-bar secured to the journaled rod and to one arm of the T-shaped rod, and a steadying-bar extending parallel with the connecting-bar, the steadying-bar pivotally secured to the opposite arm of the T-shaped lever and to a suitable support.

14. A turning-in and pasting machine comprising a work-holding mechanism, a carriage movable toward and from the work-holding mechanism, a drive-shaft, a suitably-journaled rod, means connecting the drive-shaft and rod to impart a rotary movement to the latter, means connecting the rod and carriage to transmit a reciprocating movement to the latter and means carried by the rod and engaging the connecting means between the rod and the drive-shaft for giving a resilience to the rod.

15. A turning-in and pasting machine comprising a work-holding mechanism, a carriage

movable toward and from the work-holding mechanism, a drive-shaft, a suitably-journaled rod, means connecting the drive-shaft and rod to impart a rotary movement to the latter, means connecting the rod and carriage to transmit a reciprocating movement to the latter and a spring coiled about the rod, one end of the spring secured to the rod and the opposite end of the spring bearing against the connecting means between the rod and drive-shaft.

16. In a turning-in and pasting machine, the combination with a work-holder, of a longitudinally-recessed finger-bar and a folding and pasting finger mounted thereon, the base of the finger conforming to the shape of and loosely fitting in the recess in the bar, to admit of the adjustment of the finger relatively of the bar and means for securing the finger in its adjusted position longitudinally of the bar.

17. In a turning-in and pasting machine, the combination with a work-holder, of a finger-support, provided with a slot, a collar-bolt received in the slot, a finger mounted upon the support and provided with an aperture, the bolt received in the aperture, and means on the bolt for securing the finger to its support.

18. In a turning-in and pasting machine, the combination with a work-holder, of a finger-support, provided with a slot, a collar-bolt received in the slot, a finger mounted upon the support and provided with an aperture, the bolt received in the aperture, a nut on the end of the bolt and a spring located between the nut and the base of the finger within the aperture.

19. In a turning-in and pasting machine, the combination with a work-holder, of a finger-bar provided with a T-slot, a collar-bolt received in the slot, an apertured finger mounted on the bar, the bolt projecting into the aperture, a shoulder formed in the aperture, a nut receivable on the bolt and a resilient member bearing against the shoulder and the nut to retain the finger yieldingly in position.

20. In a turning-in and pasting machine, the combination with a work-holder, of a finger-bar, a finger mounted on the bar, an extension on the finger lying parallel with one face of the finger-bar, the work received between the finger-bar and finger extension.

21. In a turning-in and pasting machine, the combination with a work-holder and turning-in and pasting mechanism, of means for moving one relatively to the other in order that they may be brought adjacent each other, the turning-in and pasting mechanism provided with a plurality of finger-bars, fingers mounted on each bar, the fingers on one of the bars adapted to engage and operate upon the exterior, and means for actuating

the remaining finger-bar to cause the engagement of its fingers with the interior surface of the work.

22. A turning-in and pasting mechanism comprising a work-holder, a turning-in and pasting mechanism, a pivotally-supported work-removing member, independent of the work-holder and actuated subsequently thereto to remove the completed work from the work-holder, a suitably-supported rod connected at one end with the work-removing member, a drive-shaft and means actuated by the drive-shaft for operating the rod.

23. In a turning-in and pasting machine, the combination with a work-holder, of a work-removing member, means carried by the member for grasping and removing the work from the work-holder, a drive-shaft, a cam-wheel actuated by the drive-shaft, a suitably-supported lever connected with the work-removing member and engaged by the cam-wheel to operate the member.

24. In a turning-in and pasting machine, the combination with a work-holder, of a work-removing member independent of the holder, a drive-shaft, a counter-shaft, gearing for transmitting motion from the drive-shaft to the counter-shaft, a cam-carrying wheel on the counter-shaft, a suitably-supported lever, one end of which engages the periphery of the cam-wheel, and means connecting the lever and the work-removing member.

25. In a turning-in and pasting machine, the combination with a work-holder, and means for operating on work supported by the holder, of a work-removing member located apart from the work-holder, resilient means carried by the member, and adapted to grasp and support the work and means for operating the work-removing member toward and from the holder.

26. The combination in a turning-in and pasting machine, of a work-removing member, means carried by the member for releasably grasping the work, a rotating cam-wheel, a pivotally-supported lever, a spring engaging the lever to retain one end thereof in engagement with the wheel, and means connecting the lever and work-removing member.

27. The combination in a turning-in and pasting machine with a work-holder, of a work-removing member comprising a suitably-journaled shaft, a crank secured thereto, operating means secured to the crank for rotating the shaft in opposite directions, and a work-engaging member connected with the shaft for grasping and removing the work from the work-holder.

28. The combination in a turning-in and pasting machine, of a work-removing member comprising standards, a shaft journaled in the standards, a crank secured to the shaft, means connected with the crank for rocking

the shaft and work-engaging fingers connected with the shaft.

29. The combination in a turning-in and pasting machine, of a work-removing member comprising a suitably-journaled shaft, means for rocking the shaft, rods secured to the shaft, a transverse member carried by the rods, and work-engaging fingers mounted on the transverse member.

30. The combination in a turning-in and pasting machine, of a work-removing member comprising a suitably-journaled shaft, means for rocking the shaft alternately in either direction, a transverse member connected and moving with the shaft and work-engaging fingers adjustably mounted on the transverse member.

31. The combination in a turning-in and pasting machine, of a work-removing member comprising a shaft, means for alternately rocking the shaft in opposite directions and resilient flexed fingers adjustably carried by the member.

32. A turning-in and pasting machine, comprising an oscillating work-holder, reciprocating turning-in and pasting mechanisms, a drive-shaft, means connecting the drive-shaft and the holder and turning-in and pasting mechanisms for operating the latter, a power-shaft for actuating the drive-shaft and means operated by the drive-shaft for causing a cessation of movement thereof.

33. A turning-in and pasting machine comprising a work-holder, turning-in and pasting mechanisms, a drive-shaft for actuating the holder and the turning-in and pasting mechanisms, a power-shaft for transmitting motion to the drive-shaft, a clutch on the power-shaft, a counter-shaft, a cam-wheel on the counter-shaft, a suitably-supported lever, one end of which engages the cam-wheel, a pivotally-supported standard engaged by the lever and means controlled by the standard for controlling the drive-shaft.

34. A turning-in and pasting machine comprising a power-shaft, turning-in and pasting mechanism operated by the shaft, a clutch on the shaft, a standard connected with the clutch and normally tending to break the latter, means normally engaging the standard to retain the clutch in locked position and means driven by the power-shaft and engaging the standard-engaging means to temporarily separate the standard-engaging means and the standard to permit the movement of the standard to break the clutch.

35. A turning-in and pasting machine comprising a power-shaft, turning-in and pasting mechanism driven by the shaft, a clutch on the shaft, an automatic member connected with the clutch and normally tending to break the latter, means normally and automatically retained in contact with the clutch-breaking member to retain it in one position, and

means driven by the power-shaft for temporarily releasing the last-named means to permit the breaking of the clutch.

36. A turning-in and pasting machine comprising a drive-shaft, turning-in and pasting mechanism actuated by the drive-shaft, a counter-shaft extending parallel with the drive-shaft, a gear on the drive-shaft, a gear on the counter-shaft meshing with that on the drive-shaft and being a multiple thereof, a clutch controlling the transmission of power to the drive-shaft, a work-removing member for grasping and removing the work, and means on the counter-shaft for successively effecting the operation of the work-removing member and of the clutch, respectively.

37. A turning-in and pasting machine comprising a work-holder, turning-in and pasting mechanism movable toward and from the holder, a drive-shaft, a work-removing member, a clutch for causing a cessation of movement of the drive-shaft and means actuated by the drive-shaft for operating the turning-in and pasting mechanisms two or more times prior to the successive operations of the work-removing member and of the clutch.

38. In a turning-in and pasting machine, the combination with a work-holder, and a plurality of laterally-projecting arms carried thereby, of bases adjustably secured longitudinally of the arms, and standards pivotally secured to the bases and projecting therefrom.

39. In a turning-in and pasting machine, the combination with a work-holder provided with a plurality of arms, of bases adjustably secured to the arms, standards pivotally secured to the bases, apertured feet on the standards, studs carried by the bases and projecting through the apertures in the feet and means carried by the studs and engaging the feet to yieldingly retain the feet in engagement with the bases.

40. In a turning-in and pasting machine, the combination with a work-holder, of upright standards carried by the work-holder, a box adjustable longitudinally of the standard and work-engaging arms adjustably secured to the box and projecting at approximate right angles to the standard.

41. In a turning-in and pasting machine, the combination with a work-holder and standards carried thereby, of a retaining means adjustable longitudinally of one of the standards and work-engaging means carried by the retaining means and projecting at an angle to the standard.

42. In a machine of the character set forth, a work-holder, bases adjustably received on the holder and standards yieldingly supported upon the bases.

43. In a machine of the character indicated, a work-holder, pivotally-supported standards mounted upon the holder, feet carried by the standards, and means bearing upon the feet

for yieldingly retaining the standards in upright position.

44. In a machine of the character set forth, a work-holder, mechanical means for rotating the holder in one direction, automatic operating tension means for rotating the holder in the opposite direction to its original position, locking means for positively engaging and retaining the holder in each of the positions to which it is rotated, and means for engaging and releasing the locking means to permit the reverse movement of the work-holder.

45. The combination with a pivotally-supported work-holder, of turning-in and pasting mechanism movable toward and from the work-holder, means for partially rotating the holder in one direction, separate means for returning the holder to its original position, and means carried by the first-named holder, rotating means for engaging the work-holder to retard its return movement.

46. In a machine of the character indicated, a work-holder, a drive-shaft, means carried by the holder and engaged by the shaft for moving the holder in one direction, a resilient member placed under tension by the primary movement of the holder for moving the holder in the opposite direction and releasable means for temporarily retaining the holder in the position to which it is first moved.

47. In a machine of the character set forth, a work-holder, a shaft upon which the holder is mounted, a coil-spring encircling the shaft, an arm projecting from the shaft, a drive-shaft, means on the drive-shaft for engaging the arm to move the work-holder in one direction and place the coil-spring under tension, releasable means for locking the work-holder in the position to which it has been moved, and means for releasing the locking means to permit the return movement of the holder.

48. In a machine of the character indicated, a work-holder, a washer connected therewith, an arm loosely mounted relative to the washer, means for temporarily connecting the arm to the washer, and means for moving the work-holder.

49. In a machine of the character indicated, a work-holder, a washer connected therewith, an arm loosely mounted with respect to the washer, an arc-shaped incline plane stationarily located beneath the washer, a pin loosely passing through the washer and engaging the inclined plane, means engaging the arm for rotating the work-holder in one direction, and means for rotating the holder in the opposite direction.

50. The combination with a pivotally-supported work-holder, of a washer connected therewith, a stationary inclined rib located beneath the washer, a pin passing loosely

through the washer, the pin adapted to ride upon the inclined rib and project more or less above the washer in accordance with the inclination of the rib, an arm loosely connected with the holder, the arm adapted to engage the pin when the latter is raised above the plane of the washer, means engaging the arm when so engaged for imparting a partial rotation to the work-holder and means for returning the work-holder to normal position.

51. The combination with a pivotally-supported work-holder, of a washer connected therewith, an arm loosely mounted upon the washer, means engaging the arm temporarily for locking the arm to the washer, means engaging the arm for rotating the holder in one direction and means for returning the holder to its normal position.

52. The combination in a work-holder, of a washer connected therewith, an arm loosely mounted on the washer, a stop against which the arm normally rests, a pin against which the arm temporarily rests, means engaging the arm, when the latter is engaged by the pin for rotating the holder in one direction and means for returning the holder to normal position.

53. The combination in a work-holder, of an arm loosely secured thereto, a stop, a resilient member engaging the arm and normally retaining it against the stop, an adjustable pin automatically actuated to temporarily assume a position in advance of the arm, means engaging the arm to force it against the pin for imparting a partial rotation to the holder and means for returning the holder to normal position.

54. The combination with a work-holder, of an arm loosely connected therewith, a movable stop engaged by the arm, a drive-shaft, a pin carried by the shaft and engaging the arm to partially rotate the holder and means for returning the holder to normal position.

55. The combination with a work-holder, of a pair of oppositely-projecting arms loosely connected with the holder, stops against which the arms normally bear, the arms normally moving freely away from the stops, a means automatically and temporarily extending into the path of movement of one of the arms to lock the arm to the holder, means for partially rotating the arm and holder while

so locked and means for returning the arm and holder to normal position.

56. The combination in a turning-in and pasting machine, with a recessed rotary work-holder, of a drive-shaft, means on the drive-shaft directly engaging and oscillating the work-holder, a suitably-supported pawl receivable in the recesses in the work-holder and a cam mounted on the drive-shaft and engaging the pawl prior to the oscillation of the work-holder.

57. The combination with a work-holder, of a pair of arms connected therewith, a drive-shaft, a pair of radially-extending pins carried on the shaft, one of the pins adapted to engage and wipe past one of the arms to partially rotate the holder, automatic means for returning the holder to normal position, the remaining pin engaging with the opposite arm to retard the return movement of the holder.

58. In a machine of the character set forth, the combination with a pivotally-supported work-holder, of a driving-shaft, projecting members carried by the work-holding member, means carried by the shaft and engaging one of the projecting members to partially rotate the work-holder in one direction, means for returning the work-holder to its original position and means carried by the drive-shaft and engaged by a projecting member on the work-holder to retard the return movement of the holder.

59. The combination with a work-holder, of a pair of arms loosely connected therewith, means for temporarily locking one of the arms to the holder, a drive-shaft, radially-extending pins carried by the shaft, one of which pins engages and wipes past the locked arm to partially rotate the holder, means for returning the holder to normal position upon the succeeding rotation of the drive-shaft, the remaining pin adapted to engage the remaining arm to retard the return movement of the holder.

Signed at Mansfield, Ohio, this 24th day of October, 1903.

CHARLES F. ROOT.
BYRON O. CONN.

Witnesses:

JOHN A. COSS,
R. W. HARTMAN.