

No. 894,402.

PATENTED JULY 28, 1908.

C. SEYBOLD.
PAPER TRIMMING MACHINE.

APPLICATION FILED MAY 6, 1904.

6 SHEETS--SHEET 1.

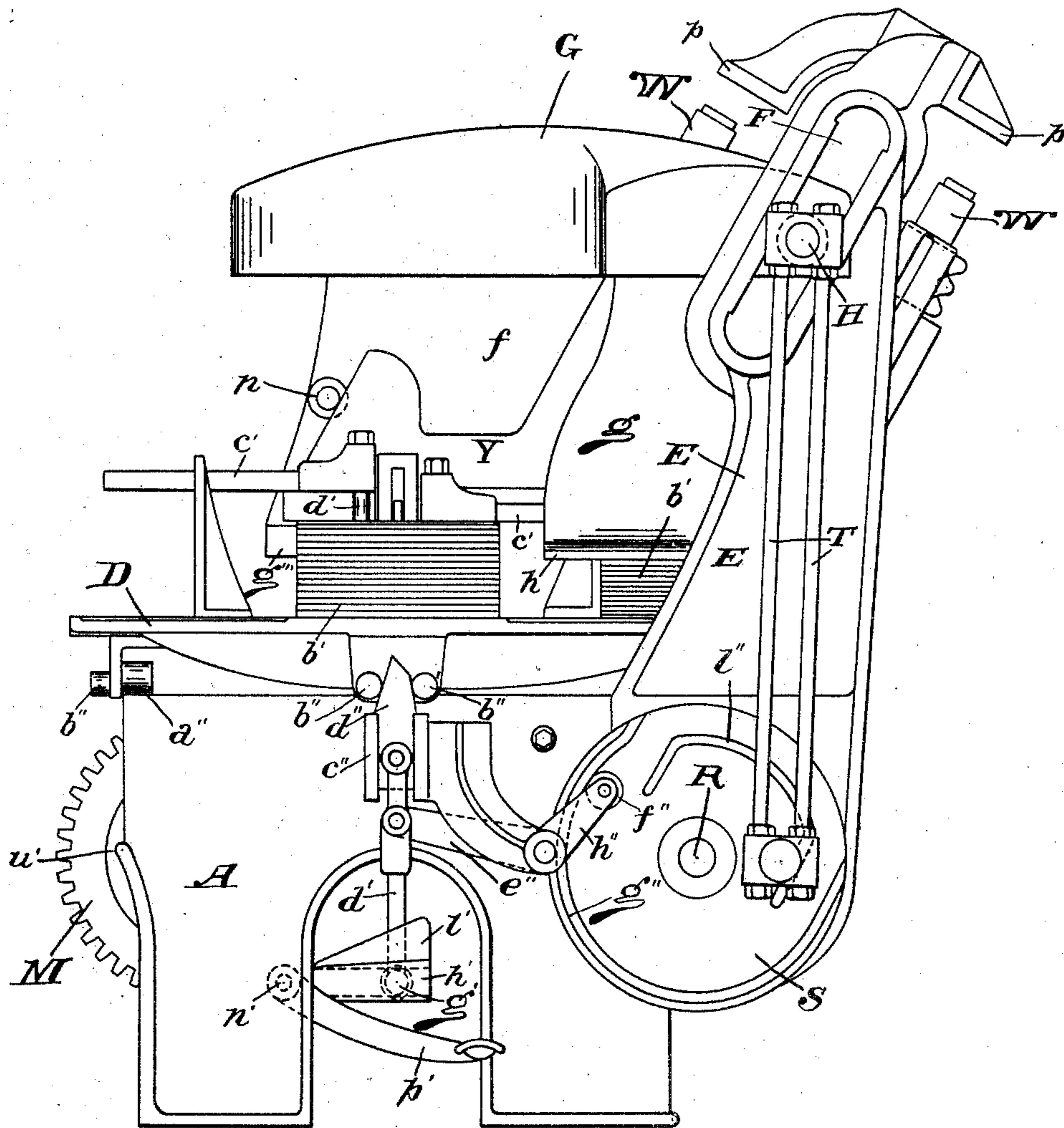


Fig. 1.

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6 SHEETS—SHEET 2.

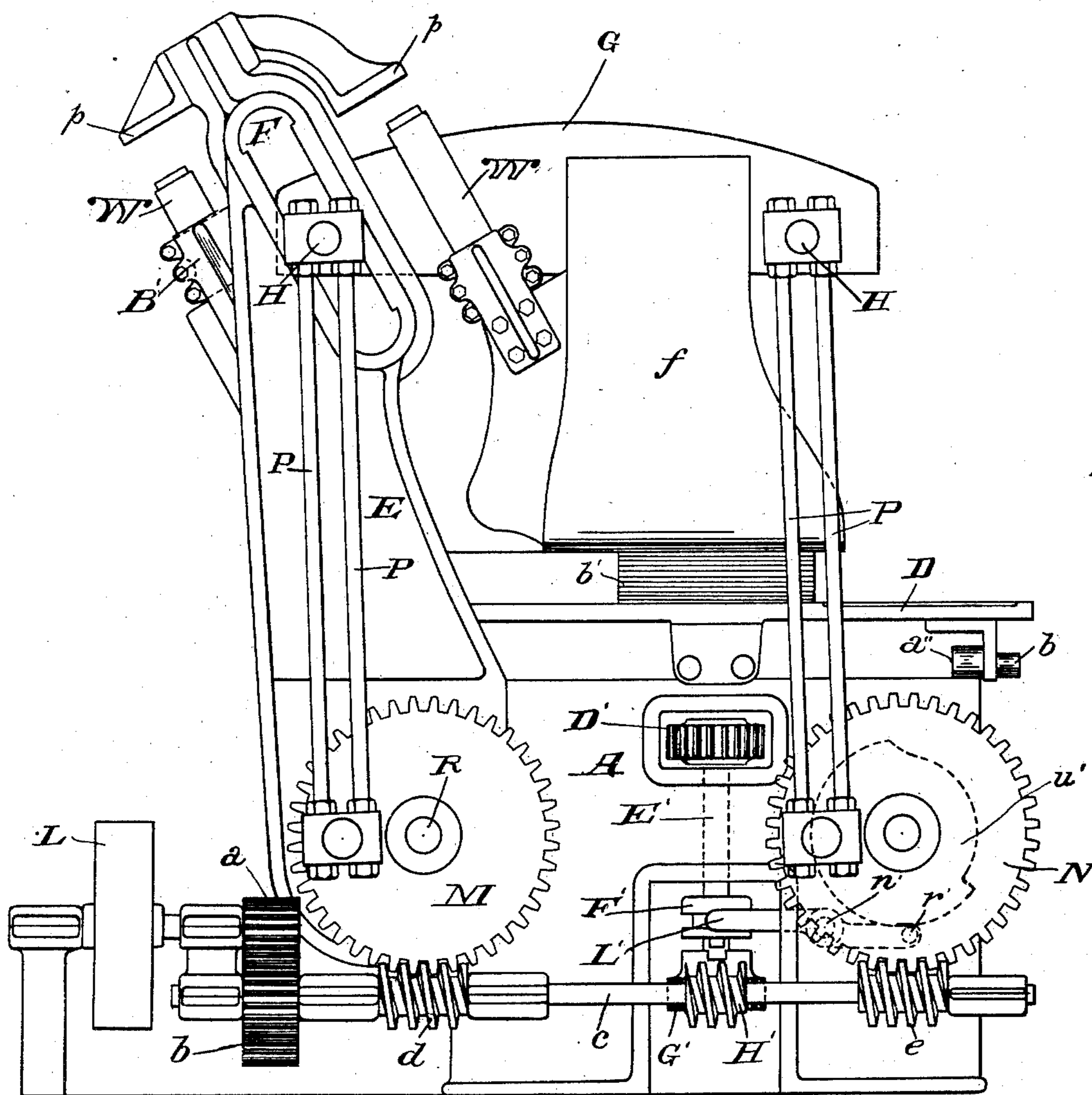


Fig. 2.

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6-SHEETS-SHEET 3.

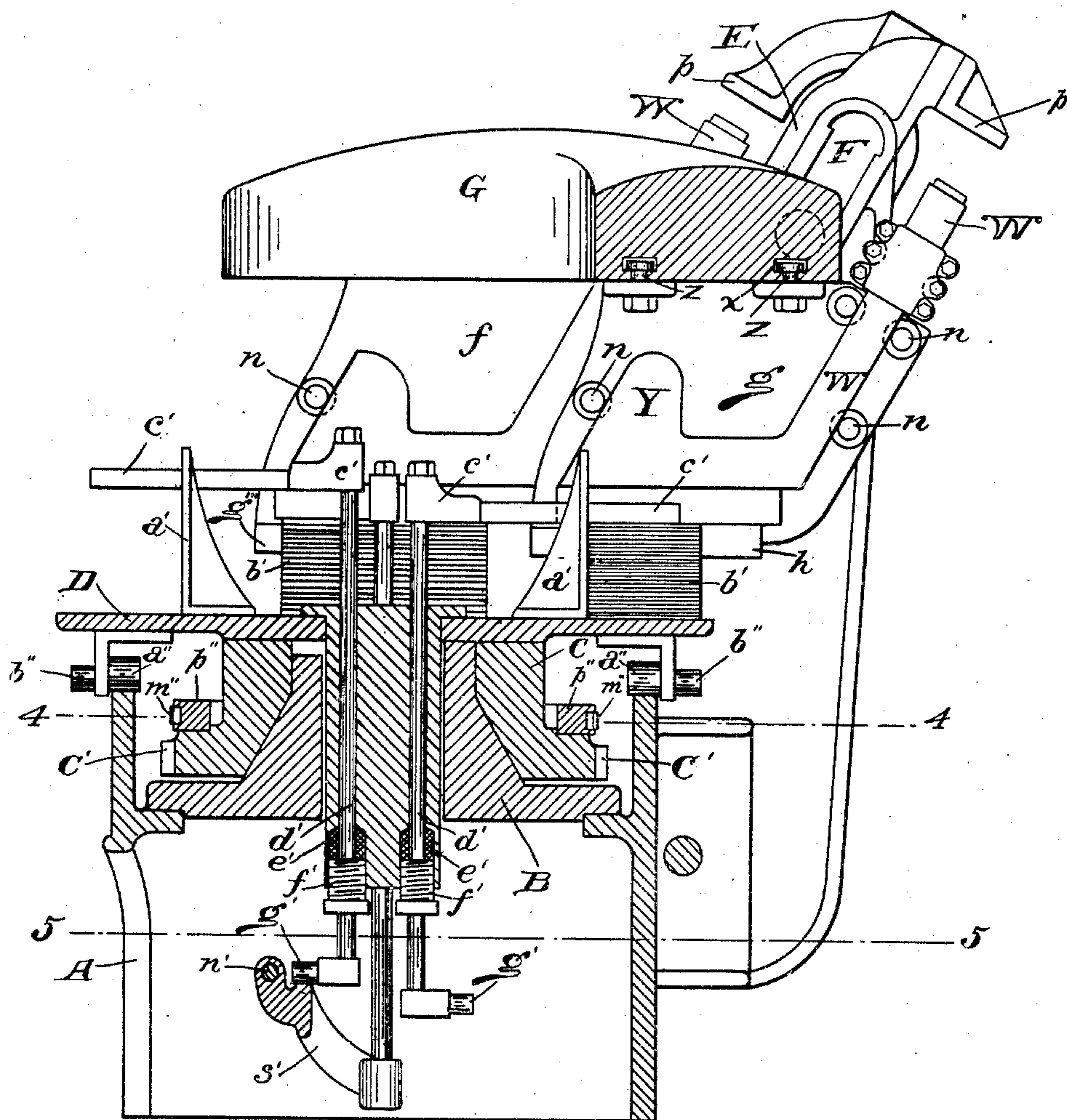


Fig. 3.

Witnesses
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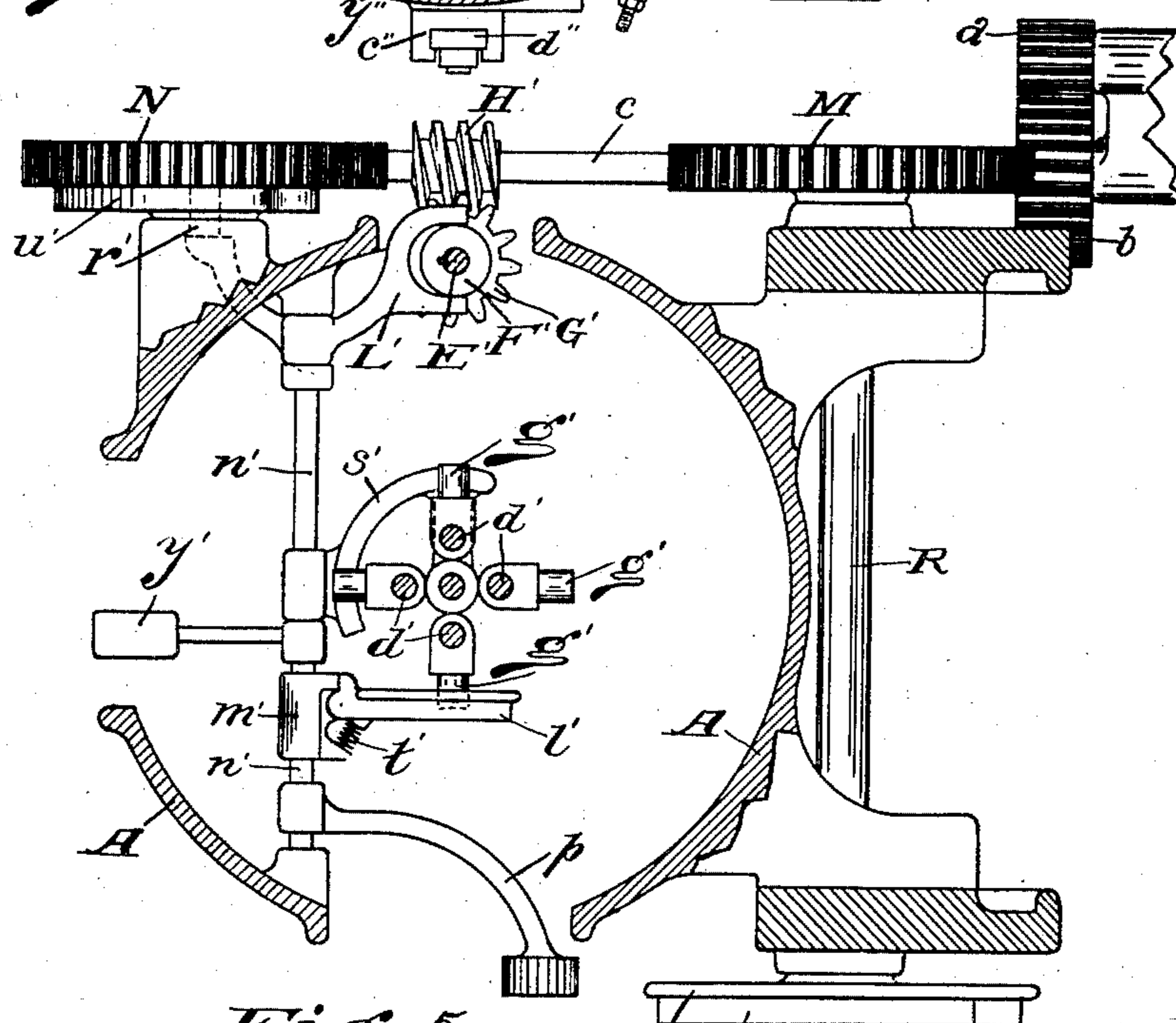
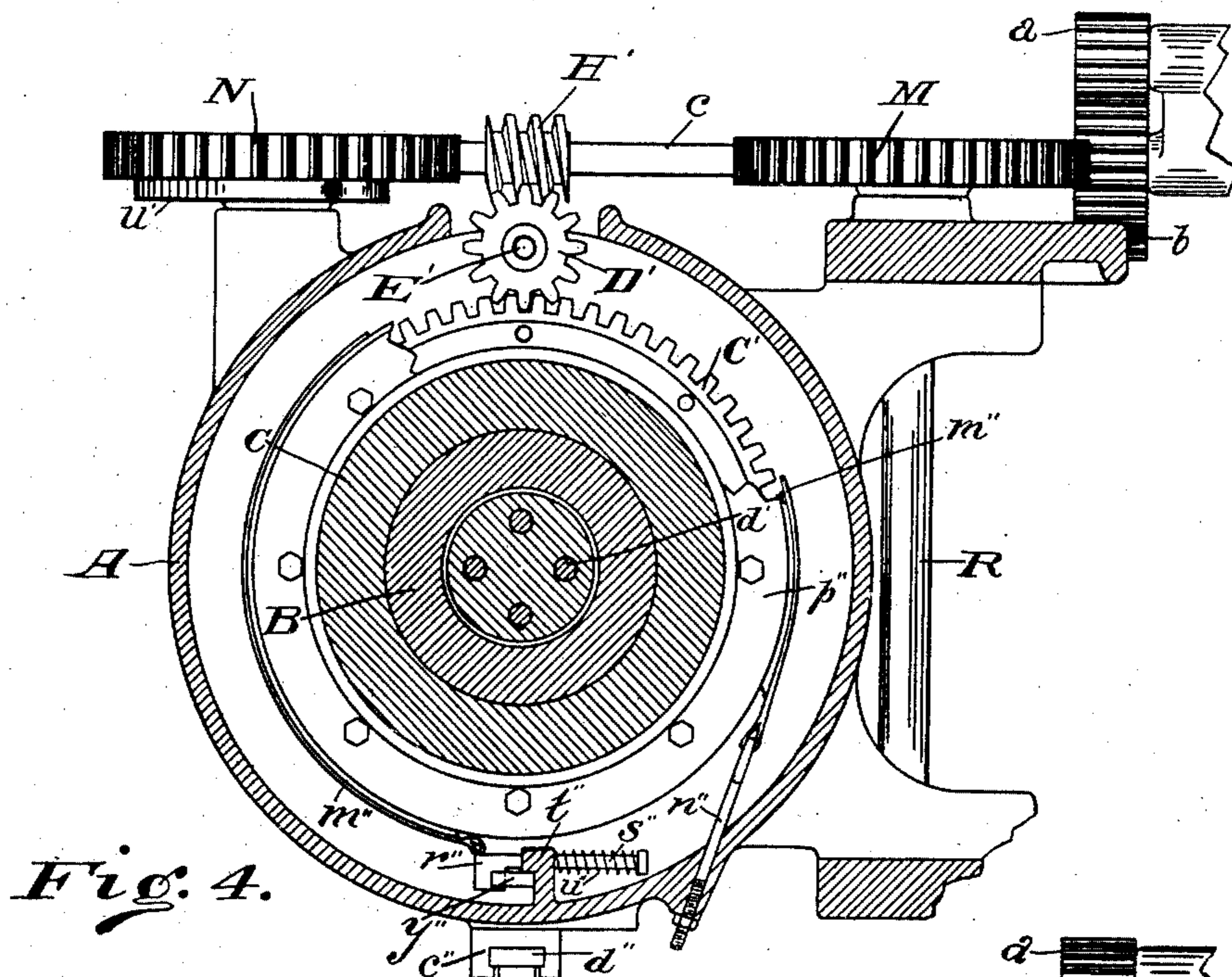
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6 SHEETS—SHEET 4.



Witnesses
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Fig. 5.

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6 SHEETS—SHEET 5.

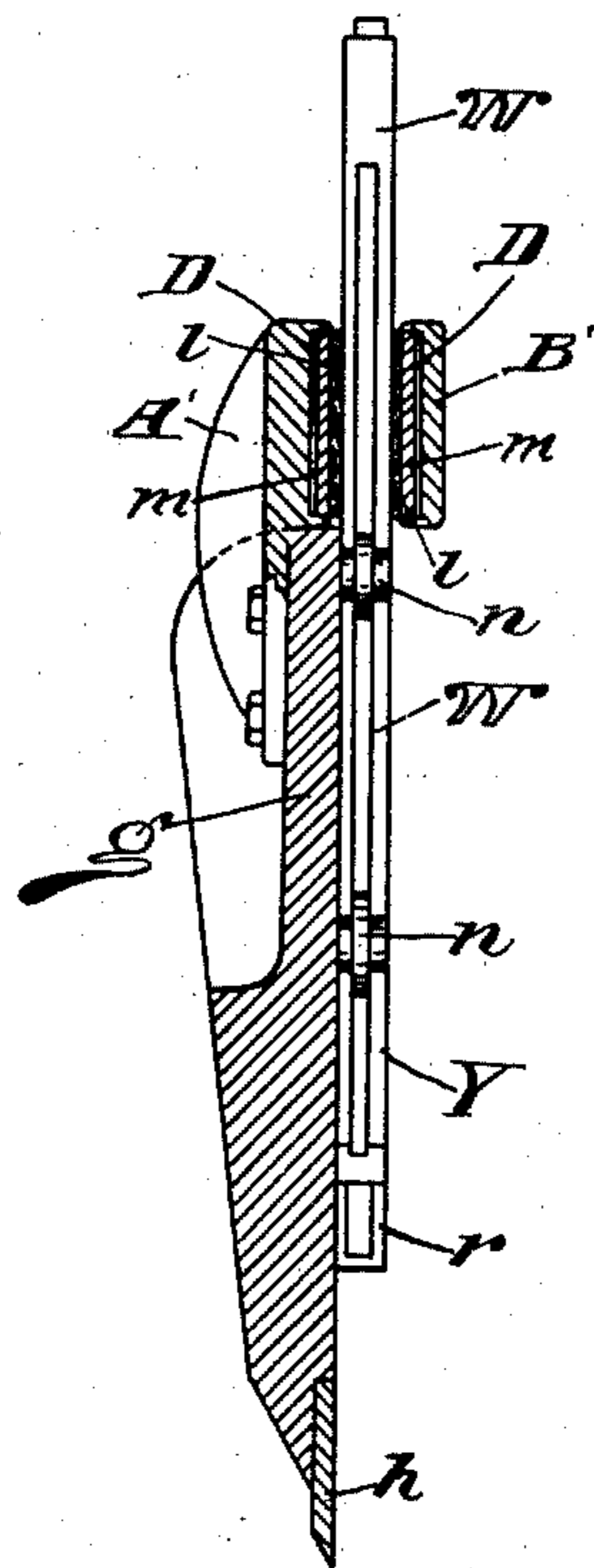
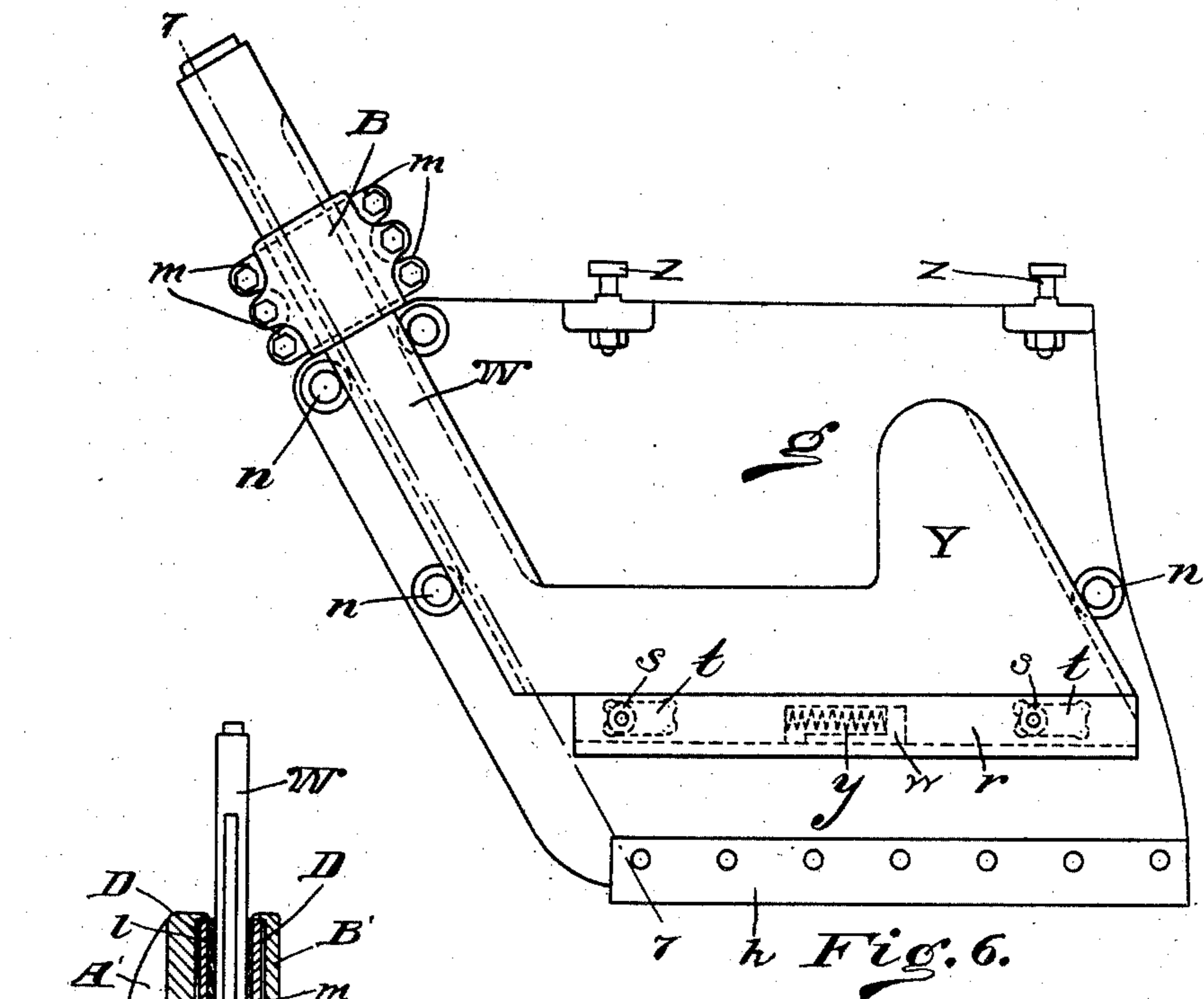


Fig. 7.

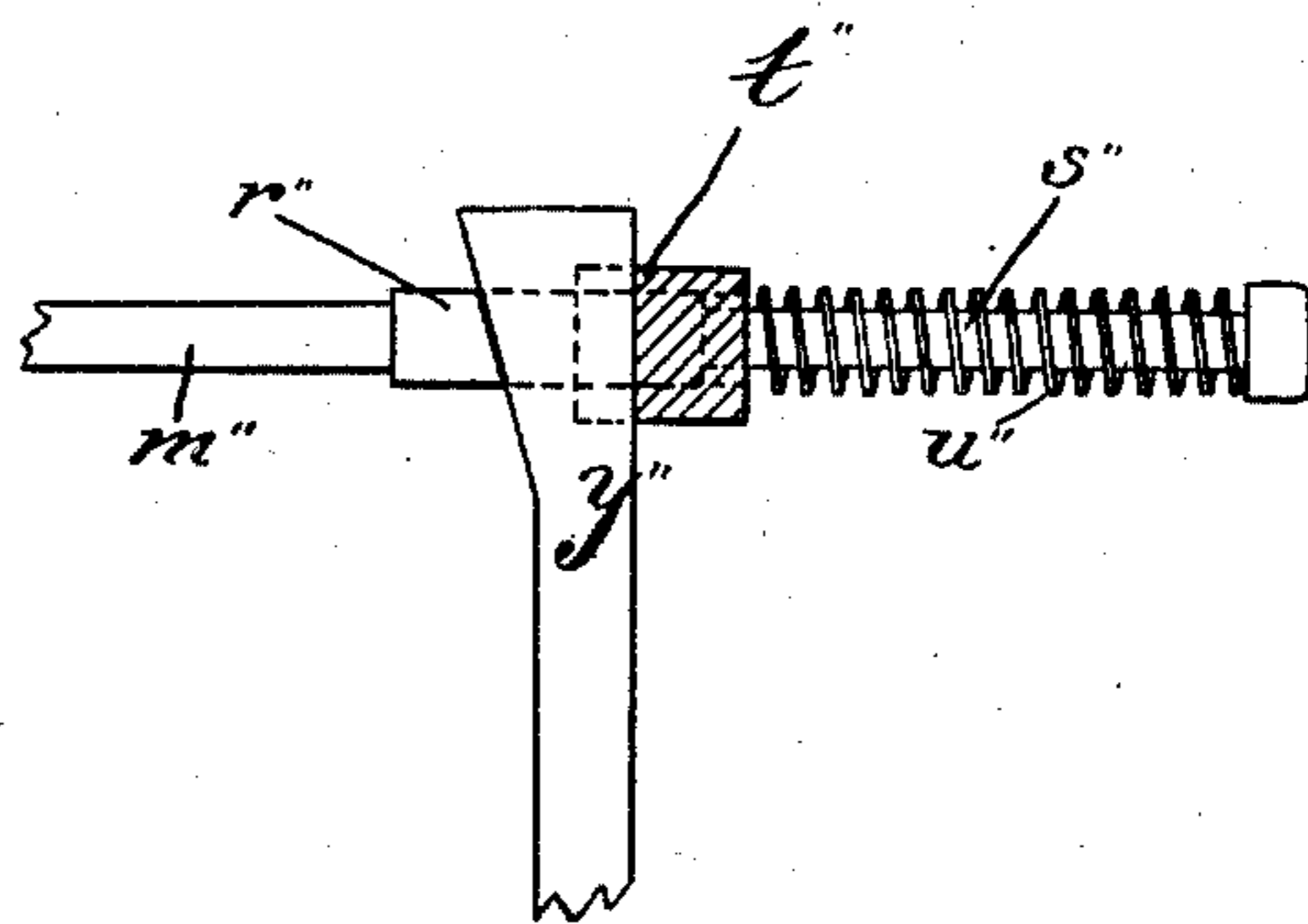


Fig. 8.

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6 SHEETS—SHEET 6.

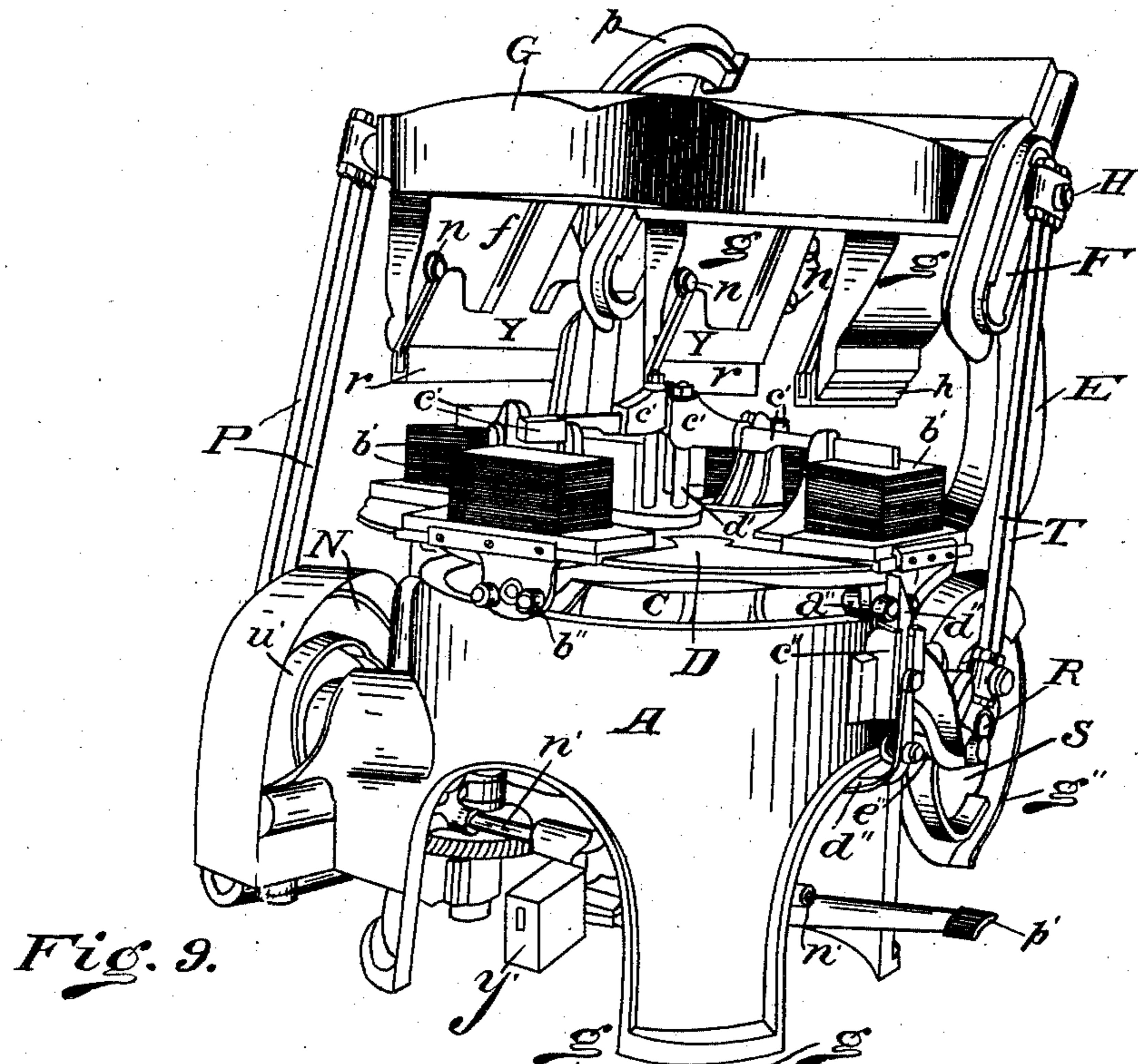


Fig. 9.

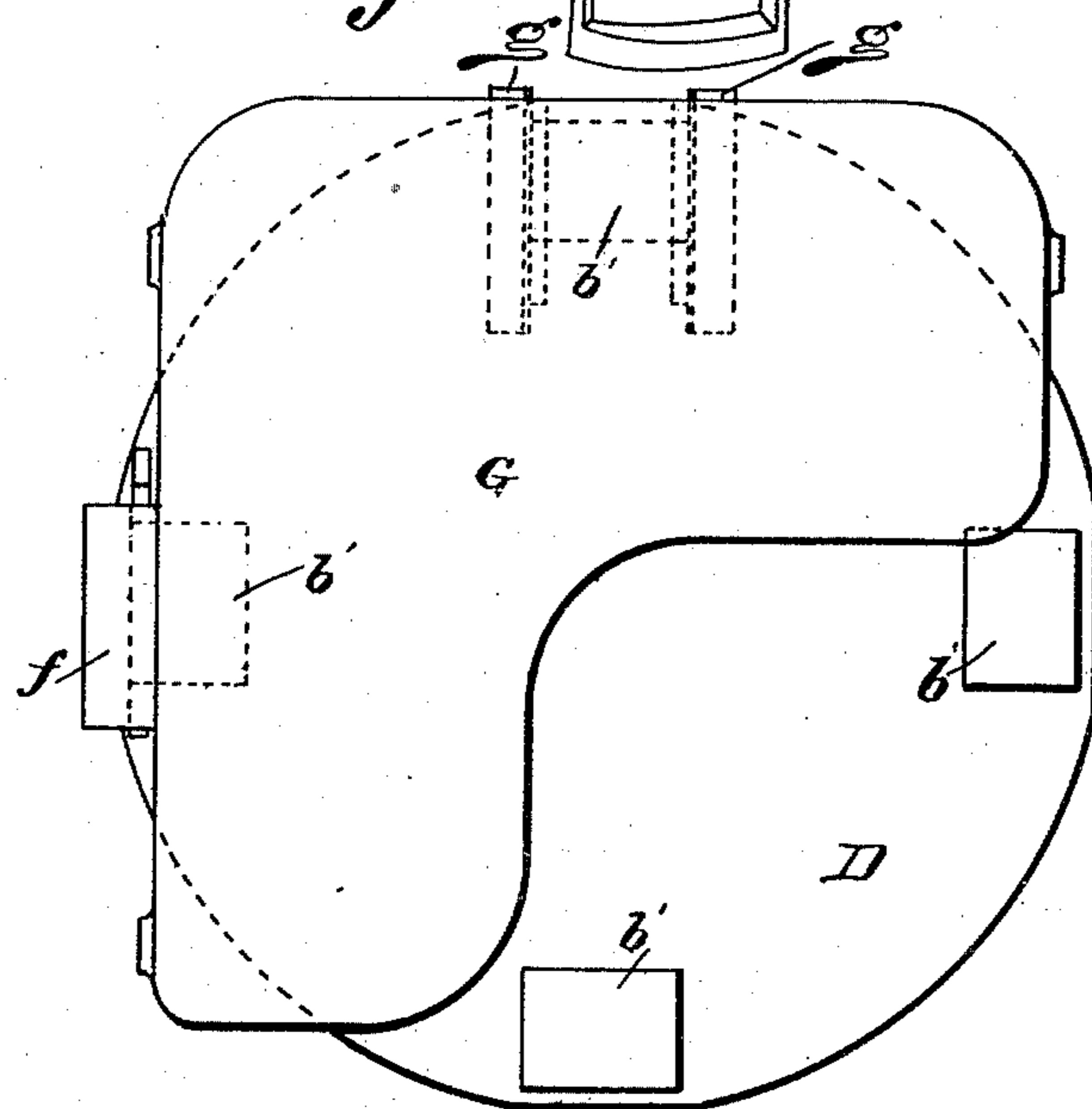


Fig. 10.

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UNITED STATES PATENT OFFICE.

CHARLES SEYBOLD, OF DAYTON, OHIO.

PAPER-TRIMMING MACHINE.

No. 894,402.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed May 6, 1904. Serial No. 206,645.

To all whom it may concern:

Be it known that I, CHARLES SEYBOLD, a citizen of the United States, residing in the city of Dayton, county of Montgomery, and State of Ohio, have invented certain new and useful Improvements in Paper-Trimming Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to machines for trimming the edges of bundles of paper, such as books, pamphlets, circulars, and the like, and it has for its object the construction of a machine in which, with each single operation of the cutting knives, a package of books, pamphlets, and the like, shall be delivered from the machine completely trimmed, both front and side edges.

Heretofore in paper trimming machines in which it has been sought to provide mechanism for trimming and delivering packages of books completely trimmed, both front and sides, with each successive operation of the machine, it has been found necessary,—either to feed the books loosely in succession to the trimming devices without, previous to the feeding operation, securing the package to be trimmed rigidly under clamp pressure, in which event it is difficult to present by any automatic feed the books in proper position to the trimming knives,—or, when the clamping means has been provided, to hold the paper bundles previous to their presentation to the trimming mechanism, these clamps have had a fixed and positive throw, so that when adjusted for a particular height, in order to obtain the requisite clamping pressure, it has been necessary to furnish to the machine packages of uniform thickness. Inasmuch as, even with the same number of sheets or pages of the same quality of paper, no two packages of paper are of uniform compressibility, it has been difficult to present uniform piles for the operation of the machine.

It is to overcome both of these objections that my invention is directed, and the invention in its essential features consists in the arrangement of trimming devices to act in parallel planes in connection with feeding devices to present the different edges of the packages to be trimmed in succession to the trimming devices, and in combining with

these features means for clamping and holding the packages during the successive operations, so that the clamping pressure may be automatically varied to suit the requirements of the particular packages as they are presented, in order that compensation may be made for the varying compressibility of packages of apparently the same height, or of the same number of sheets.

The machine is designed to work automatically. A rotating table is provided with four book supports, or positions for the books, or packages of paper, to be trimmed, and each furnished with a clamping device to compress and hold rigid the piles as they are arranged on the machine during the feeding operation, and three cutting knives are mounted in connection with suitable clamping devices to further compress and hold the paper at the cutting edge. The table is rotated intermittently to carry the paper bundles to be trimmed to the knives which operate simultaneously, so that when the side edges of one pile are being trimmed, the front edge of another pile shall be trimmed at the same time, and as a result, with each operation of the cutting knives a package or bundle of paper will be completely trimmed, and during the entire feeding operation each bundle of paper will be held rigidly in position by clamping devices, which automatically vary the clamping pressure to suit the requirements of each particular package as it is arranged on the feeding table.

In the drawings, Figure 1 is a front elevation of my improved paper trimming machine. Fig. 2 is a rear elevation of same. Fig. 3 is a central vertical section. Fig. 4 is a horizontal section taken on the lines 4, 4 of Fig. 3. Fig. 5 is a similar horizontal section taken on the lines 5, 5 of Fig. 3. Fig. 6 is a detail side elevation of the cutting head. Fig. 7 is a central longitudinal section through the friction box for the clamp. Fig. 8 is a detail view of the wedge block construction for the friction band. Fig. 9 is a perspective view of the machine. Fig. 10 is a top plan view in outline, illustrating the shape of the cutting head.

A is a substantial and massive framework, carrying the massive cone-shaped bearing plate B, upon which is mounted the hub portion C of the rotatable table D, rollers a'' a'' being also provided for the table,

which ride on the circular flange of the frame to further support and steady the movement of the table.

E E are side standards, a part of the frame-work extending above the table top, and provided at their upper ends with diagonal slots F, in which are mounted by the studs H, H the massive L-shaped cutting head G.

L is the driving pulley, provided with any suitable clutch mechanism for starting and stopping the machine, and connected by a train of gears *a*, *b*, with the shaft *c*, upon which is mounted the worms *d*, *e*. These worms mesh with the gear wheels M, N journaled in the frame, which gears are connected by crank pins and the connecting rods P, P, with the cutting head G. The gear M is keyed to the shaft R, which extends across the machine in suitable bearings on the frame and carries on its front end the cam wheel S, which wheel is connected by crank pin and the connecting rods T, with the cutting head G in the same manner that the worm gears M, N, are connected with the cutting head. In this way, guided on the studs H, H in the diagonal slots F of the supporting standard and supported in the rear by the two sets of connecting rods coupling same with the crank pins on the gears M, N, and supported by the connecting rods T in front, the cutting head is mounted in place, so that with the rotation of the gears M N, and the cam wheel S the cutting head will be caused to descend to give the necessary shearing cut for the cutting knives. These cutting knives are mounted on the depending portions *f* of the cutting head, the cutting knives being arranged in parallel planes. The cutting knife *g'''* mounted on frame *f* bears a fixed relation to the cutting table, while the cutting knives *h*, *h* are secured to the frames *g*, *g*, which frames are mounted in the dove tailed slots *x* in the under surface of the cutting head, so that the knives can be adjusted to and from each other. To adjust the cutting knives *h*, *h* the bolts *c*, *c* are released, the frames adjusted, and the bolts then tightened to hold the frames rigidly in place.

Each cutting knife is provided with a clamp Y for clamping the paper during the cutting operation. These clamps are provided with an upwardly extending arm W, which is securely clamped between the arm A' on the cutter head, and the plate B'. Between the plate B' and the arm A' is inserted a strip of leather *l*, *l* on each side, and a metal plate *m*, *n*, and by tightening the bolts of the plate B' the arm W of the clamp is frictionally secured to the cutter head. The clamps are guided in their movement by the rollers *n*, *n* on the cutter head, and during the upstroke of the cutter head, the outer end of the arm W is brought in contact with the stop *p* on the frame, one for each clamp arm, and moved into position slightly in advance

of the cutting knife, so that as the cutter descends, the clamp will come first in contact with the paper, and compress the paper to the extent of the frictional clutch between the clamp arm and the cutting head.

In view of the fact that the cutting heads, and the clamps are brought down diagonally upon the paper it is evident that if the clamps were one solid piece that they would shift on the paper. To prevent this, the bottom faces of the clamps are recessed, and each clamp is provided with a contact plate *r* secured on rollers *s*, *s* in the body of the clamp, and passing through slots *t*, *t* in the contact plate *r*. A central recess carries the coiled spring *y*, which bears between the clamp and the lug *w* on the contact plate *r*. With this construction when the friction clamp is brought to bear upon the paper by the descent of the cutting head in a diagonal direction, the contact plate *r* will clamp the paper securely at the same time that the clamp itself advances with the subsequent movement of the cutting head.

As heretofore stated, the table top D is rotated intermittently to carry the paper packages to the cutting knives. Mounted on the table top are four adjustable back gages *a'* *a'*, and the paper packages *b'* to be trimmed are placed on the table with their backs against this back gage, where they are held by the clamps *c'*. There is one clamp for each bundle to be trimmed, which is mounted on the rod *d'*, passing down through suitable openings in the frame, and through a friction packing *e'* which is compressed to exert sufficient tension on the clamp to hold same in position by the nuts and washers *f'*. The lower ends of the clamp rods *d'* are provided with the pins *g'*, and as the table is rotated, the pin *g'* is brought within the slot *h'* in the plate *l'*, pivoted to the collar *m'*, mounted on the shaft *n'*, operated by the foot treadle *p'*. When the machine is at rest, the operator places the package of paper to be trimmed against the back gage, which has been adjusted for the proper cut of the third knife, and then depressing the foot treadle *p'*, he brings the clamp *c'* down upon the paper to hold it from displacement during the subsequent operations.

The table is rotated in the following manner in connection with the movement of the cutting knives. The supporting hub C of the table top is provided with gear teeth C' to form a gear wheel, which meshes with the pinion D' mounted on the vertical shaft E' journaled in the frame and provided with the clutch collar F' for engagement with the gear G', which meshes with the worm H' on the shaft *c*. The clutch collar F' is caused to engage the gear G' during a quarter revolution of the gear N, by means of the clutch shifting arm L', which carries the roller *r'* on its outer end in engagement with the cam *u'*

on the inner surface of the gear N. It will be evident from this construction that when the cutting head G is at the top of its stroke, the cam surface on the gear N is so arranged that the clutch collar F' shall be thrown into engagement with the driving gear L', and that during this portion of the rotation of the gear N, the table top D will be rotated a quarter of a revolution. This will bring the second back gage on the table in front of the operator, who places the next bundle of paper on the table and clamps it as before, by depressing the foot treadle p'. The rotation of the table has brought the first bundle of paper between the parallel knives suspended from the cutting head G and the further rotation of the gears M, N and cam wheel S cause the cutting head to descend and the side edges of the first bundle are trimmed by the cutting knives, the friction clamps Y, Y acting as heretofore described. During this actuation of the cutting head, the cam surface on the gear N has disconnected the table gear from the driving gear, so that the table is at rest. As the cutting head reaches its upstroke, however, the table gearing is connected with the driving gear as above described, and the table rotated another quarter of a revolution. This brings the third back gage before the operator, who places the third bundle upon the table, clamps it tight, as before, during which operation the cutting head descends and the front edge of the first bundle is trimmed by the third of the cutting knives, while the side edges of the second bundle are trimmed by the other two knives. This operation being completed, during the upstroke of the cutting head the table is again rotated a quarter of a revolution, and the fourth back gage is brought before the operator, who places the fourth bundle on the table and clamps it as before.

During the rotation of the table, and the carrying of the bundles of paper to the cutting knives, as described, the clamp c' is held on the paper bundle to prevent any displacement, as the table rotates. After the front edge of the bundle has been trimmed, however, and during the last quarter revolution of the table, the pin g' on the clamp rod d', comes in contact with the cam surface s', located at the bottom of the frame, and the clamp rod and the clamp are thus raised to release the package of paper, and this package completely trimmed is removed from the machine. The next quarter revolution of the table top carries the pin g' on the clamp arm into the slot h' in the plate l' connected as above described, with the foot treadle. As the foot treadle and the plate l' are fixed in position to the frame, while the clamp rods rotate with the table, in order that no damage can be done by the accidental operation of the foot treadle while the table is moving the plate l' is pivoted

to the casting m', and held in extended position by the coiled spring t', so that no connection can be had between the treadle plate l' and the clamp rod d', except when the table is at rest, and the treadle is raised, in which position it is normally held by the weight y'. In any other position the pin g' merely strikes against the plate l', and pushes it back, without engagement therewith.

So far as we have heretofore described the mechanism, the table top carrying the bundles of paper to be trimmed, is merely stopped during the operation of the cutting knives by disconnecting the table gear from the driving gear. It is evident, however, that the table top with the bundles of paper must be held accurately in position under the operation of the knives. The table must be stopped, and locked accurately in position during the cutting operation. The table mounted, as heretofore described, rides evenly and securely on the rollers a'', and at each quarter of the table a pair of roller pins b'' b'' are provided.

Sliding vertically in a suitable guide plate c'' on the frame is the wedge bolt d'' to the lower end of which is pivoted the crank arm e'' of a bell crank lever, the other arm h'', of which is provided with a roller f'', which engages the cam g'', on the face of the cam wheel S. This cam surface g'' is adjusted with reference to the cam surface u' on the gear N, so that when the table gear is in mesh with the driving mechanism the roller f'' will be riding on the flange l'' of the cam wheel S, and the wedge bolt d'' will be withdrawn from the roller pins b'' on the table. The table gear is disconnected after each quarter turn of the table in which position the pins b'' are brought above the wedge bolt d'', and the wedge bolt is at once thrown in between the roller pins b'' by the cam wheel S, operating upon the bell crank lever which controls the movement of the wedge bolt, and the table is thus securely locked during the subsequent operation of the cutting head G.

In order that the table shall not over-run the proper locking position, I provide the friction band m'' secured at one end to the rod n'', which rod is screw threaded and secured by a nut to the frame, so that the tension on the band can be adjusted and this friction band lies in the grooved periphery of the rim p'', secured to the table. The other end of the friction band is connected with the casting r'', which casting carries the pin s'' passing through an opening in the lug t'' on the frame, tension being obtained by the coiled spring u'' bearing between the lug t'' and the head of the pin s''.

y'' is a wedge connected at its base to the lower end of the wedge bolt d'', the wedge y'' and the wedge bolt d'' forming an integral U-shaped piece. This wedge y'' bears be-

tween the casting r'' , and the lug t'' , so that when the wedge bolt d'' is released, the wedge y'' is drawn down between the casting r'' , and the frame t'' , thus releasing the tension of the friction band on the rim p'' , so that the table is free to turn. When the table gear is released from the driving mechanism, and the wedge bolt d'' is just entering between the pins b'' b'' on the table, by this movement of the wedge bolt, the wedge y'' is released and the tension of the friction band brings the table to a stop, and as the wedge bolt seats itself between the pins b'' , the table is locked in the exact position required.

The operation of the machine will be clear from the foregoing description. When the machine is started, by reason of the fact that the gear wheels M, N, rotated by the worms on the driving shaft and the cam wheel S, are each coupled by connecting rods with the cutting head to which the three knives and the clamps are secured, the operation of the cutting knives is continuous. As described, however, the rotation of the table takes place only when the cutting head and the knives are at the upper end of their stroke, and this rotation continues for a quarter of a turn of the table. The table is then locked, and continues locked while the cutting knives act on the paper. The operator places the package of paper to be trimmed on the table against the back gage, which has been adjusted for the proper cut of the third knife. To obtain the proper adjustment of the two knives for cutting the side edges of the package, the bolts z , z are released, and the depending portions of the cutting head carrying the knives and clamps are adjusted for the exact length of the package. The clamps c' are employed for temporarily holding the package. While the table is at rest, the operator places the package in the proper position on the table, and lowers the clamp by the foot treadle, the clamp being held down by the friction clutch on the clamp rod, while the treadle being released is returned to its normal position by the counter weight. The table is then released automatically by the cam wheel S, withdrawing the wedge bolt, the table gear is coupled with the driving mechanism by the cam u' , and the table is rotated a second quarter of a revolution, bringing an empty back gage to the operator, from which the completely trimmed book has been removed at the previous stopping point of the table. The three parallel knives, carried by the single cutting head, operate simultaneously to trim the side edges of one package, and the front edge of the other package and with each quarter turn of the table a completely trimmed package is delivered, the temporary clamp during the last quarter revolution being released by contact with the casting s' .

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a paper trimming machine, the combination, with a plurality of trimming devices arranged to operate on different parts of books in succession, of a book presenting means, and means for effecting a relative positioning movement between the trimming devices and the presenting means without varying the relative positions of the planes in which the trimming operations are effected, with mechanism for holding the successive books under variable pressure during the presenting operation and mechanism for subjecting the books to additional variable pressure during the trimming operation.

2. In a paper trimming machine, the combination, with a plurality of trimming devices arranged to operate on different parts of books in succession, of a book presenting means, means for effecting a relative trimming movement between the trimming devices and the presenting means, and means for effecting a relative positioning movement between the trimming devices, and the presenting means, without varying the relative positions of the plane in which the trimming operations are effected, with mechanism for holding the successive books under variable pressure during the presenting operations and mechanism for subjecting the books to additional variable pressure during the trimming operations.

3. In a paper trimming machine, the combination, with a plurality of trimming devices arranged to operate on different parts of books in succession, of a book presenting means, means for operating the trimming devices whereby each effects its successive trimming operations in the same plane, and means for operating said presenting means to present books in succession to said trimming devices, with mechanism for holding the successive books under variable pressure during the presenting and trimming operations and mechanism for subjecting the books to additional variable pressure during the trimming operations.

4. In a paper trimming machine, the combination, with a plurality of reciprocating cutters arranged to trim different parts of books in succession, of a book presenting means, means for reciprocating the cutters to effect the successive trimming operations of each in the same plane, means for operating said presenting means to present successive books to said cutters, with mechanism for holding said successive books under variable pressure during the presenting and trimming operations and mechanism for subjecting the books to additional variable pressure during the trimming operations.

5. In a paper trimming machine, the combination, with means for presenting books, of

trimming mechanism including a side trimming device, and an end trimming device, means for effecting a relative positioning movement between the trimming mechanism and the presenting means, means for effecting a relative trimming movement between the trimming mechanism and presenting means, mechanism for holding the successive books under variable pressure during the presenting and trimming operations, the trimming devices being so located with respect to the presenting means that the successive trimming operations by each trimming device occurs in the same plane and mechanism for subjecting the books to additional variable pressure during the trimming operations.

6. In a paper trimming machine, the combination, with a plurality of reciprocating cutters arranged to operate on different parts of books in succession, of means for reciprocating said cutters to effect the successive trimming operations of each in the same plane, book presenting means comprising a rotary member, mechanism for holding the successive books under variable pressure on the rotary member, and means for intermittently rotating said member to present the books to the cutters successively and mechanism for subjecting the books to additional variable pressure during the operation of the cutters.

7. In a paper trimming machine, the combination, of a trimming device arranged to effect the successive trimming operations in a single plane, book presenting means comprising a rotary member mounted for rotation on an axis parallel to the plane in which the trimming device operates, and having a plurality of book supports each arranged in a plane transverse to the axis of the presenting means, with mechanism for holding the successive books under variable pressure on the rotary member and mechanism for subjecting the books to additional variable pressure during the trimming operations.

8. In a paper trimming machine, the combination, of a reciprocating cutter, means for reciprocating said cutter to effect the successive trimming operations in a single plane, a book presenting means comprising a rotary member mounted for rotation on an axis parallel to the plane in which the cutter operates, and having a plurality of book supports each arranged in a plane transverse to the axis of the book presenting means, with mechanism for holding the successive books under variable pressure on the book supports during the presenting and cutting operation and mechanism for subjecting the books to additional variable pressure during the cutting operation.

9. In a paper trimming machine, the combination, of a reciprocating cutter for trimming one end of successive books, a reciprocating

cutter for trimming the sides of successive books, means for reciprocating each of said cutters in the same vertical plane during successive operations, a rotary member for presenting books in succession to said cutters, mechanism for holding the successive books on the rotary member under variable pressure, and means for intermittently moving said rotary member on a vertical axis and mechanism for subjecting the books to additional variable pressure during the cutting operation.

10. In a paper trimming machine, the combination, of a pair of cutters for trimming the ends of successive books, a separate cutter for trimming the sides of said books, means for reciprocating said cutters in unison, means for simultaneously presenting books to said cutters, and mechanism for holding the successive books under variable pressure on said presenting means and mechanism for subjecting the books to additional variable pressure during the operation of the cutters.

11. In a paper trimming machine, the combination, of a pair of cutters trimming the ends of successive books, a separate cutter for trimming the sides of said books, means for reciprocating said cutters in unison, and an intermittently moving rotary member for simultaneously presenting books to both of said cutters, the axis of rotation of said rotary member being arranged at an angle to the path of the movement of the cutters, with mechanism for holding the successive books under variable pressure on the rotary member during the presenting and cutting operation and mechanism for subjecting the books to additional variable pressure during the operation of the cutters.

12. In a paper trimming machine, the combination, with cutting mechanism, of a rotary member for carrying the material to be cut to and from the cutting mechanism in a plane intersecting the axis of said member, a clamp for the material to be cut, movable in the direction of the axis in said member, with friction clutch mechanism for closing said clamp at one point in the revolution of the rotary member, and means for opening the clamp at another point in the movement of said rotary member.

13. In a paper trimming machine, the combination, with trimming mechanism, of a rotary member having a plurality of book supports arranged in a plane intersecting the axis of said rotary member, a book clamp for each support, said clamps being movable in the direction of the axis of said rotary member, and a friction mechanism for closing the clamps at one point in the rotation of said member, with means for opening said clamps at another point in the rotation.

14. In a paper trimming machine, provided with three cutting knives arranged in parallel planes, with means for actuating

them, and an intermittently rotating table to feed the paper into proper position to be cut, and clamps for holding the paper bundles during the feeding operation, with means for
5 automatically varying the clamping pressure for successive operations of the clamps and clamps operating in connection with said cutting knives to subject the paper bundles to additional clamping pressure during the
10 cutting operation.

15 15. In a paper trimming machine, provided with three cutting knives arranged in parallel planes, with means for actuating them, and an intermittently rotating table to feed the paper into proper position to be cut, clamps for holding the paper bundles during the feeding operation, with means for
20 automatically varying the clamping pressure for successive operations of the clamps and clamps operating in connection with said cutting knives to subject the paper bundles to additional clamping pressure during the cutting operations, and means for releasing
25 the table clamps successively after the bundles are trimmed.

16. In a paper trimming machine, the combination, with a cutting head, and means for operating same, of three cutting knives mounted on said cutting head in parallel
30 planes, and a rotatable table carrying clamp bars independently operable to clamp successive paper bundles on the table, mechanism for automatically varying the clamping pressure for the successive bundles, means
35 for rotating the table intermittently to present the paper bundles successively to the operation of the knives while under clamping pressure, and means for releasing the clamps successively upon the completion of the
40 knife strokes.

17. A paper trimming machine, provided with three cutting knives arranged in parallel planes, with means for actuating them, and a
45 rotatable table with clutch mechanism for rotating same, and means for disconnecting the clutch mechanism while the knives are operating.

18. A paper trimming machine, provided with three cutting knives, arranged in parallel
50 planes, with means for actuating them, and a rotatable table with clutch mechanism for rotating same, and means for disconnecting the clutch mechanism while the knives are operating, a lock for the table, and means
55 for operating said lock to lock the table during the knife operation.

19. A paper trimming machine, provided with three cutting knives arranged in parallel planes, with means for actuating them, and a

rotatable table with clutch mechanism for
60 rotating same, clamps for holding the paper bundles during the feeding operation, and means for disconnecting the clutch mechanism while the knives are operating.

20. In a paper trimming machine, the combination, with a cutting head and means for
65 operating same, of three cutting knives mounted on said cutting head in parallel planes, a rotatable table for feeding the paper bundles to the knives, a lock for holding
70 said table, during the knife operation, means for rotating said table, with cams actuated by the driving mechanism in operative connection with said lock and the table
75 rotating mechanism respectively to connect and to disconnect said lock and the table driving mechanism alternately.

21. In a paper trimming machine, the combination with a plurality of cutting knives, and means for actuating them, of a rotatable
80 table for feeding the paper bundles to the knives, a friction band brake to stop said table, and a locking device for locking said table in position, with connecting mechanism intermediate said lock and friction band
85 whereby the friction brake is applied and released with the locking and releasing of the table.

22. In a paper trimming machine, the combination, with a cutting head and cutting
90 knife secured thereon, with means for actuating said cutting head to give a shearing cut, of a clamp bar mounted on said cutting head to compress the paper to be cut, and a laterally movable contact face plate for said
95 clamp bar to permit the body of the clamp bar to shift with the cutting head without shifting the paper.

23. In a paper trimming machine, the combination, with a cutting head, and means for
100 operating same, of three cutting knives mounted on said cutting head, in parallel planes, with clamps frictionally mounted on said cutting head to cooperate with said cutting knives to compress the paper under variable
105 pressure for successive piles, a rotatable table carrying clamps independently operable to clamp successive paper bundles on the table, mechanism for automatically varying the pressure of said table clamps for successive
110 paper bundles, and means for rotating the bundle intermittently to present the paper bundles successively to the operation of the knives.

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Witnesses:

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