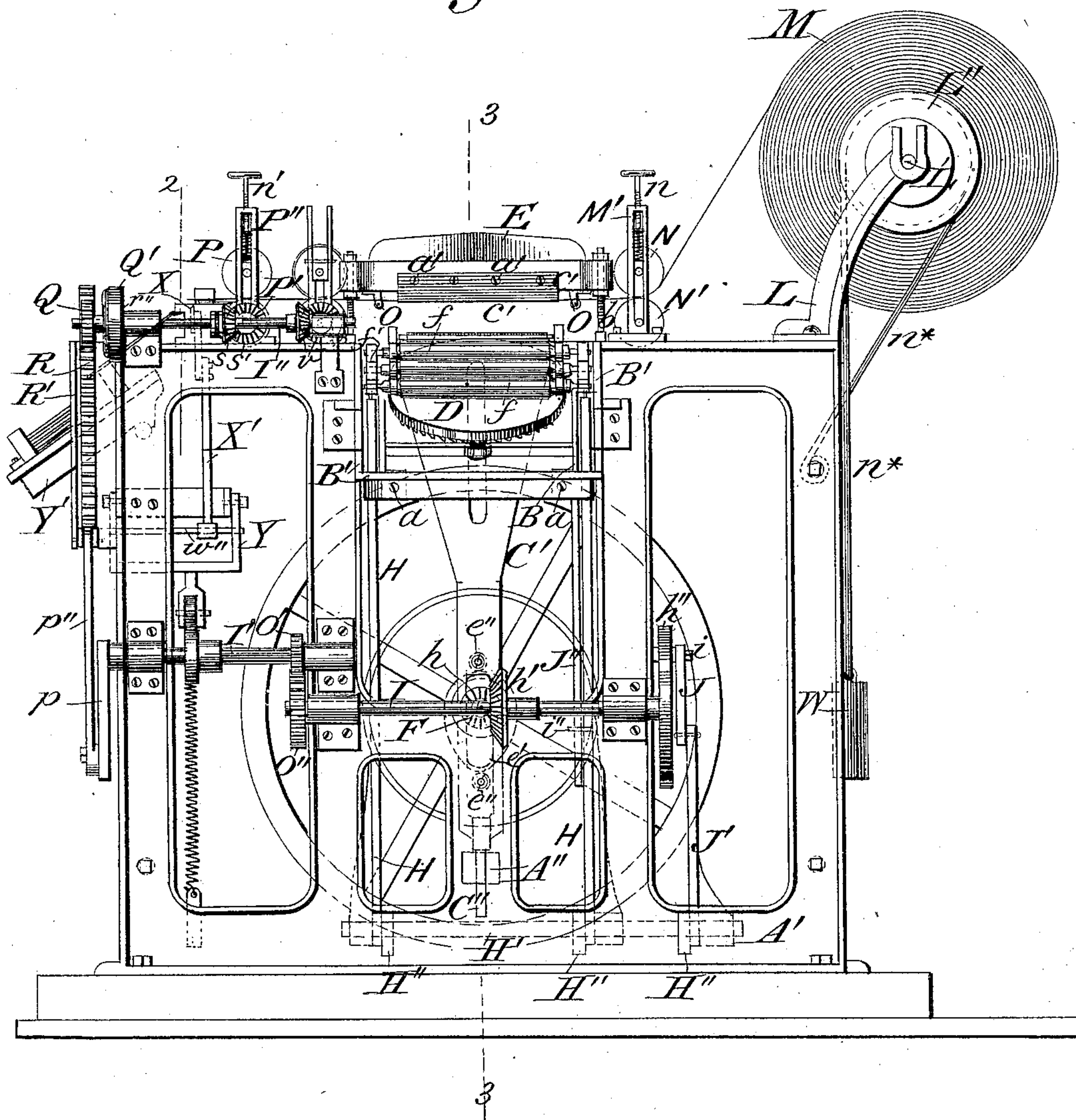


D. I. ECKERSON.
PRINTING MACHINE.

No. 387,500.

Patented Aug. 7, 1888.

Fig. 1.



Witnesses,

H. H. Schott.
J. Burroughs.

Inventor,

David I. Eckerson

By his Attorney

W. E. Chandler.

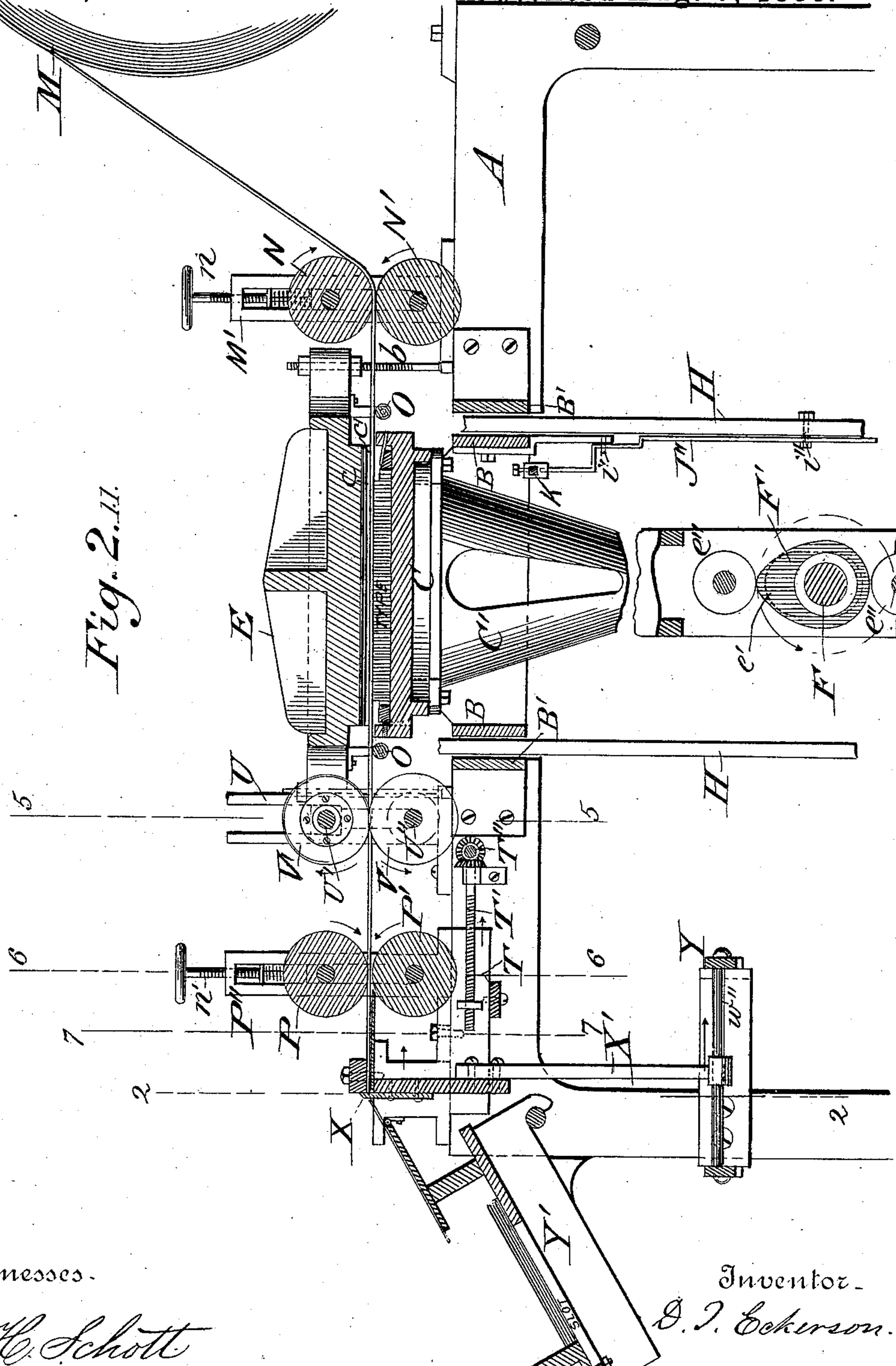
(No Model.)

9 Sheets—Sheet 2.

D. I. ECKERSON.
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Witnesses.

H. H. Schott

J. Burroughs.

Inventor _

J. J. Eckerson.

By his Attorney

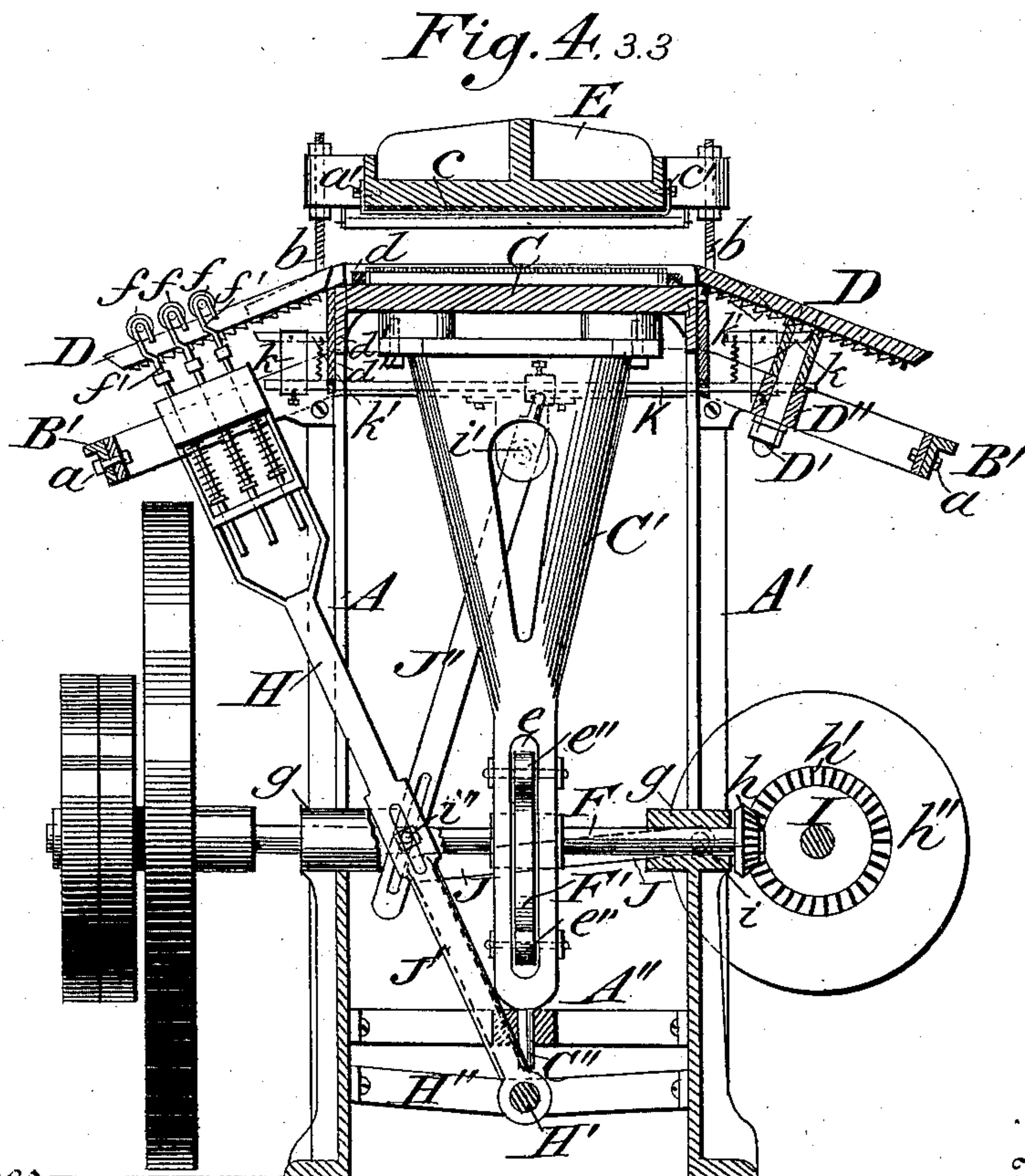
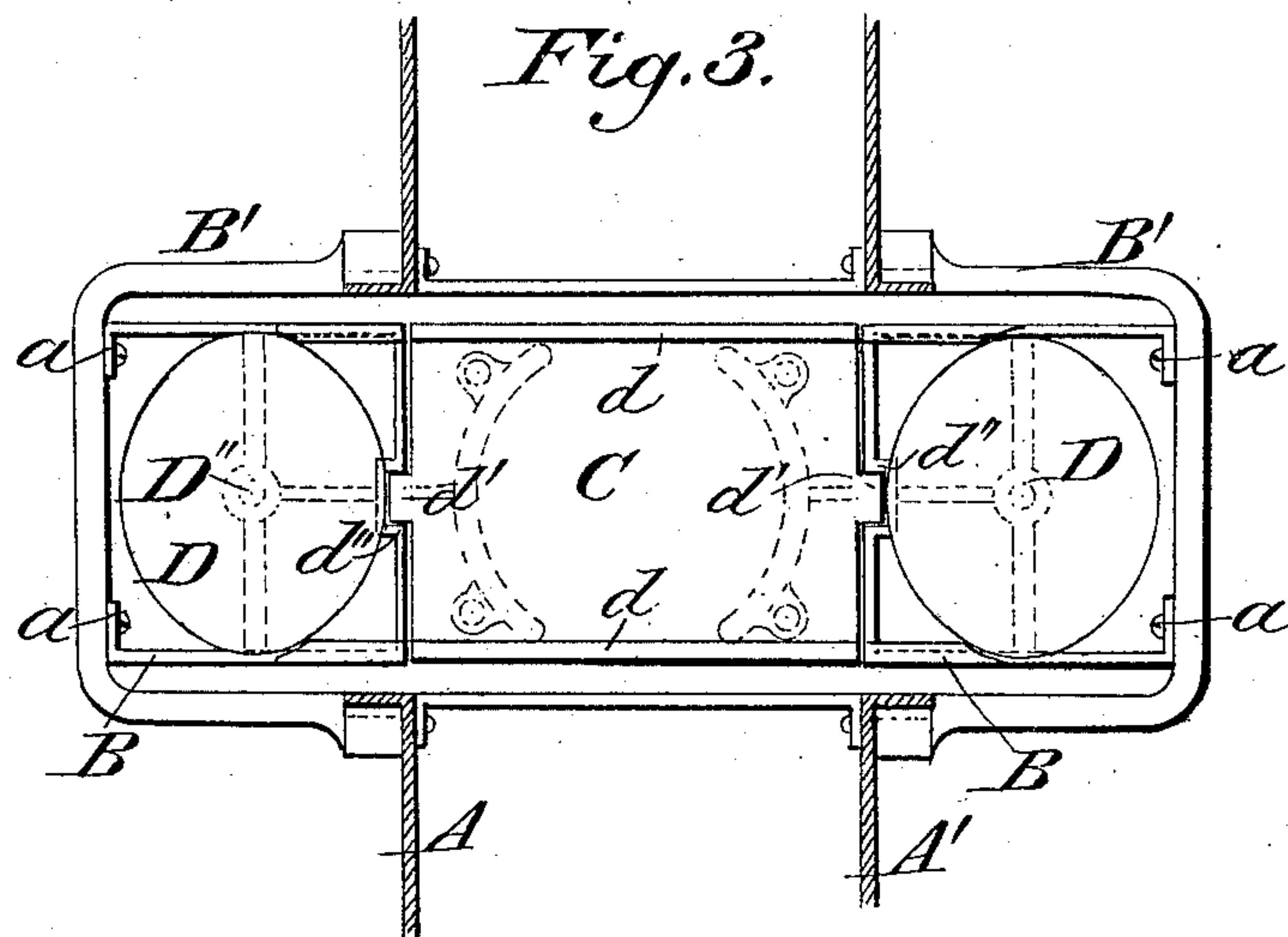
W. E. Chandler

D. I. ECKERSON.

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No. 387,500.

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Witnesses

Inventor.

J. H. Schott.
A. Burroughs.

David I. Eckerson.

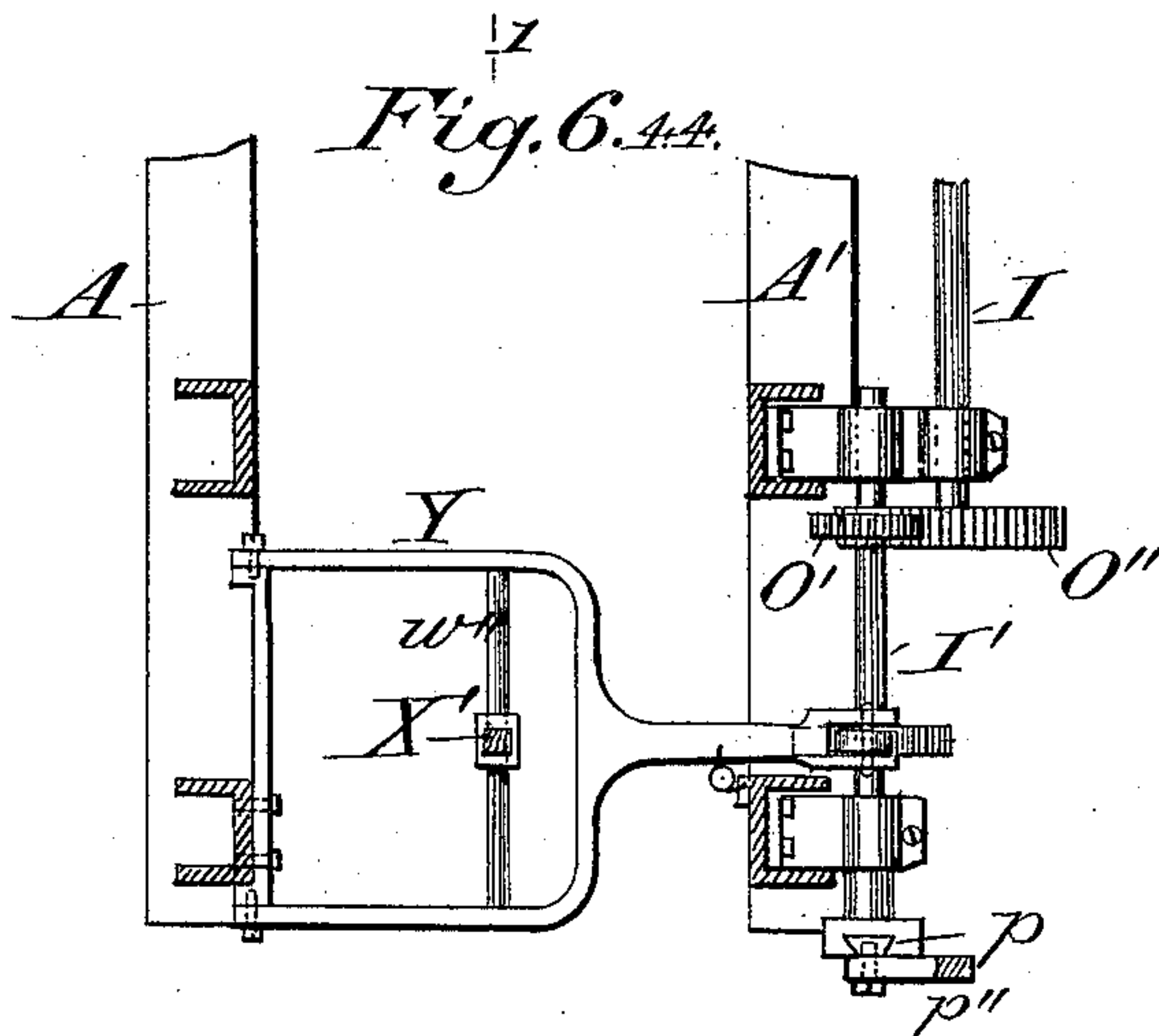
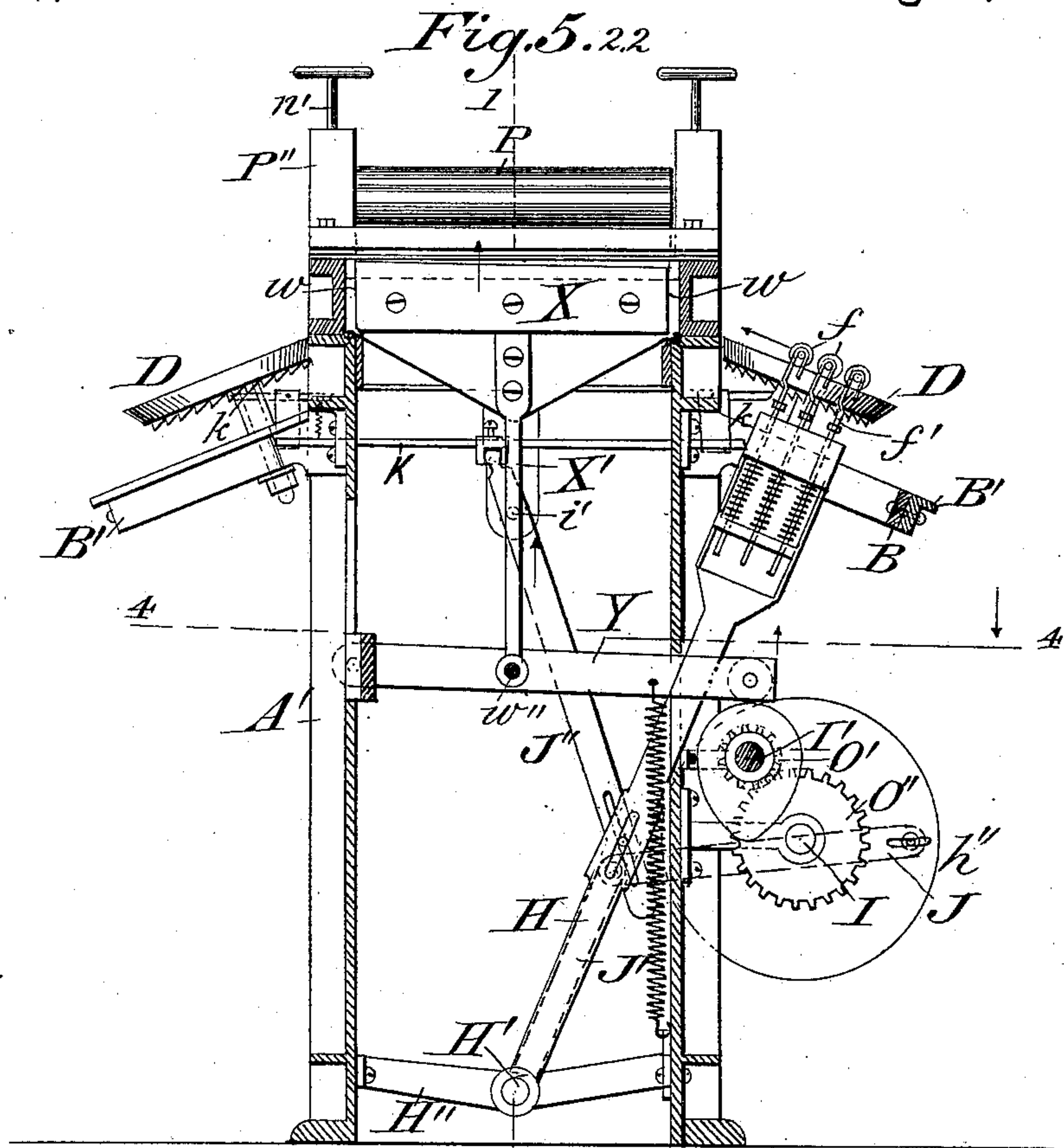
By his Attorney

M. E. Chandler.

D. I. ECKERSON.
PRINTING MACHINE.

No. 387,500.

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Witnesses,

H. H. Schott,
W. Burroughs,

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W. E. Chandler.

(No Model.)

9 Sheets—Sheet 5.

D. I. ECKERSON.
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Fig. 7.

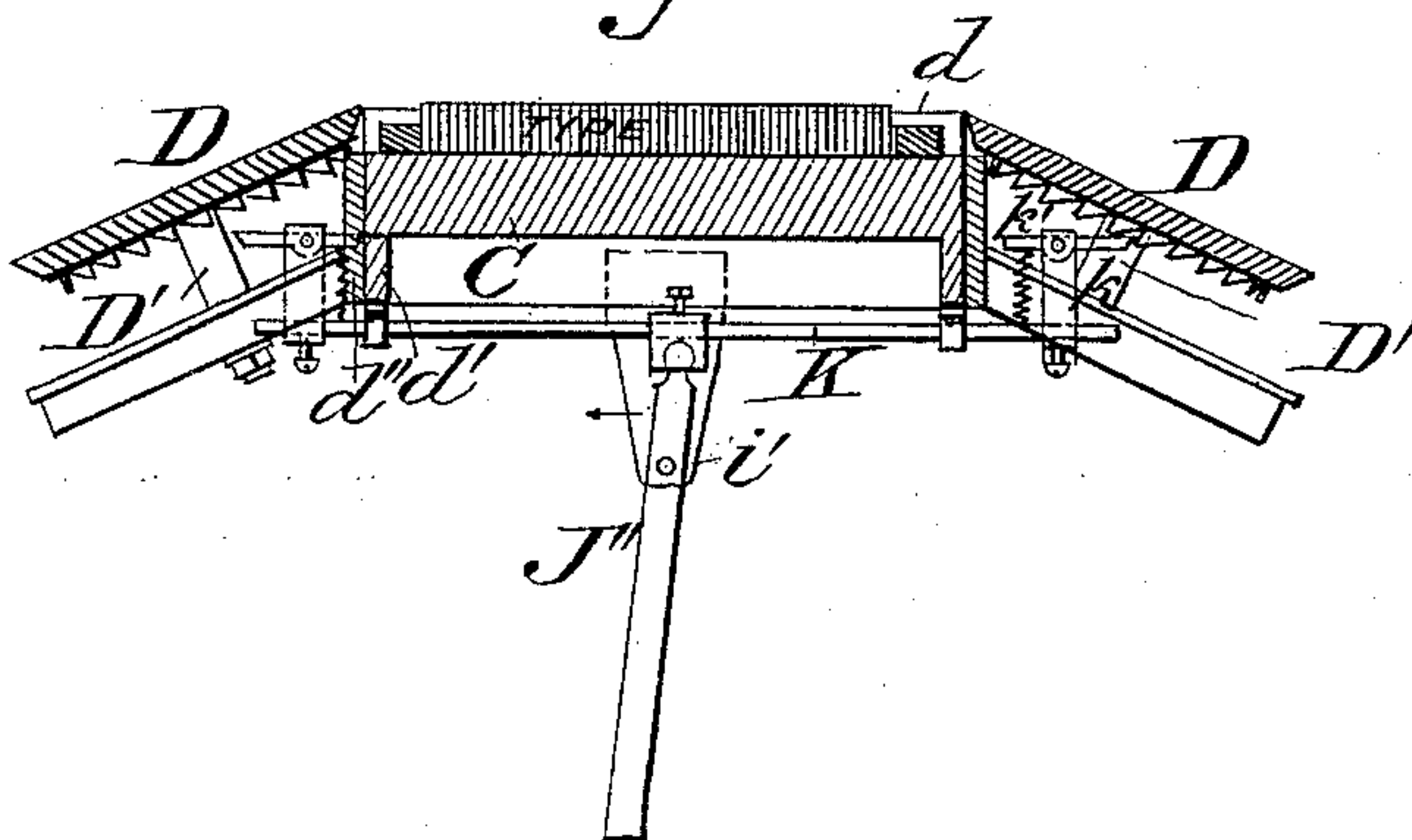


Fig. 8.

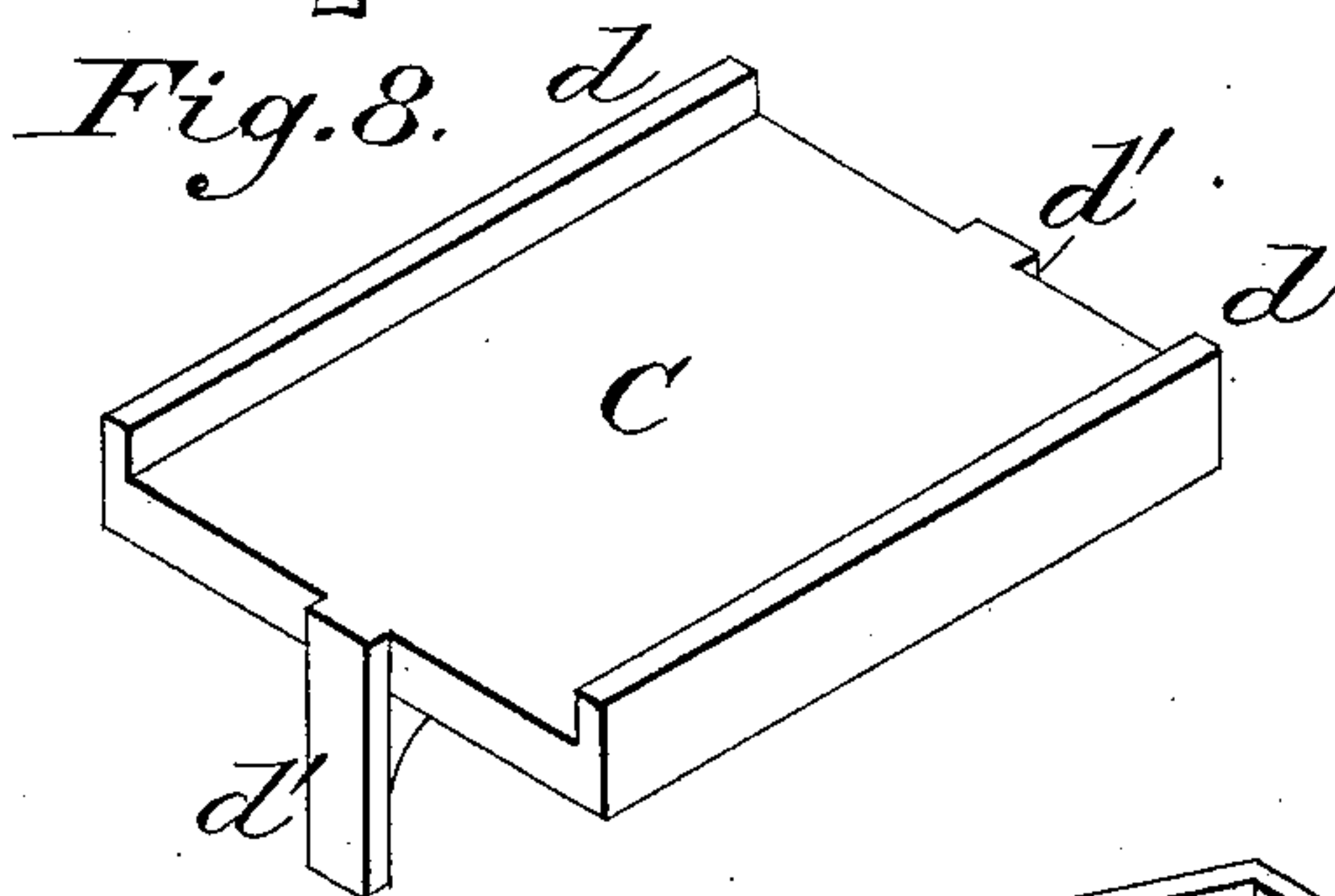
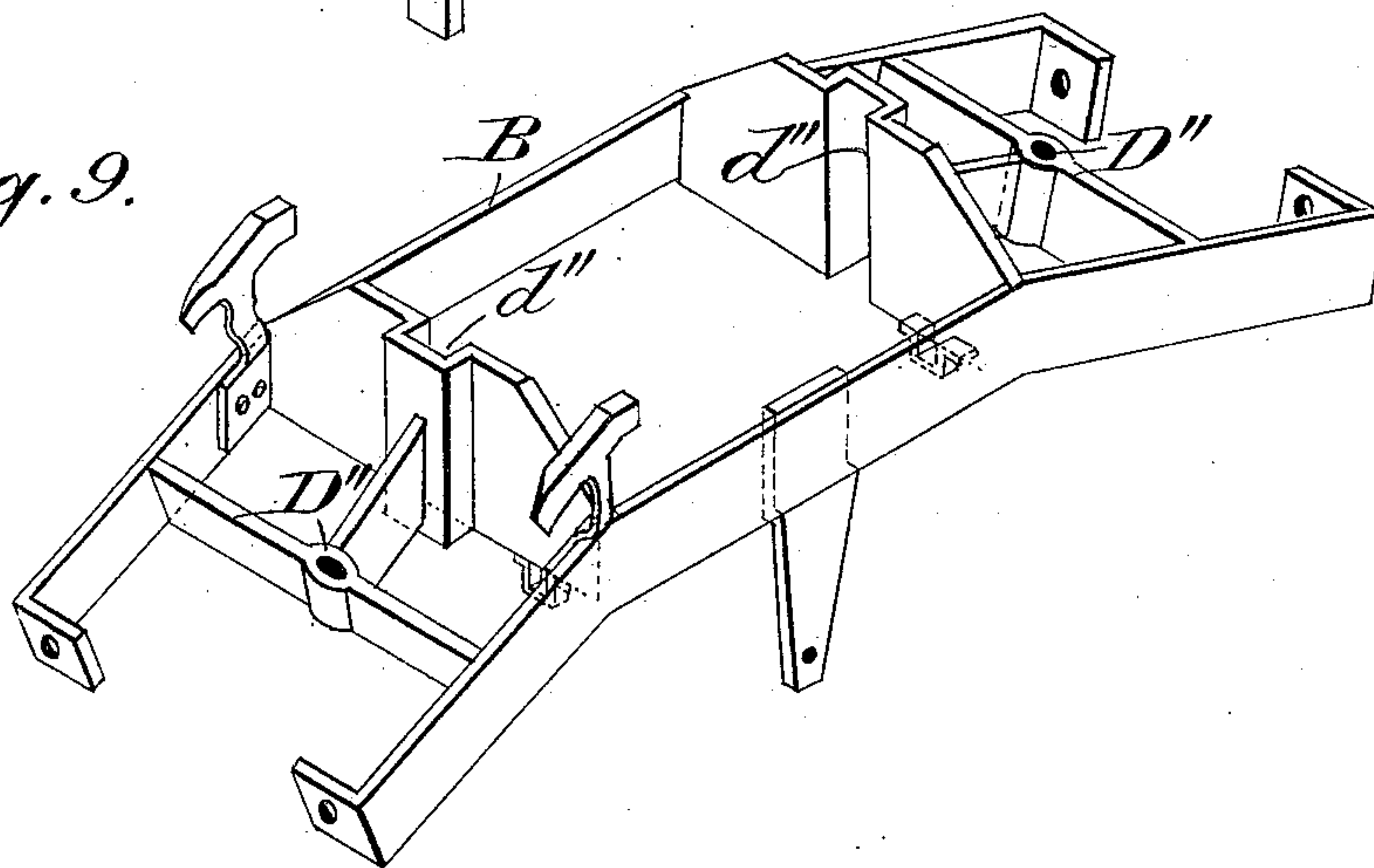


Fig. 9.



Witnesses,

H. H. Schott.
M. Burroughs.

Inventor.

David I. Eckerson.

By his Attorney

M. T. Chandler.

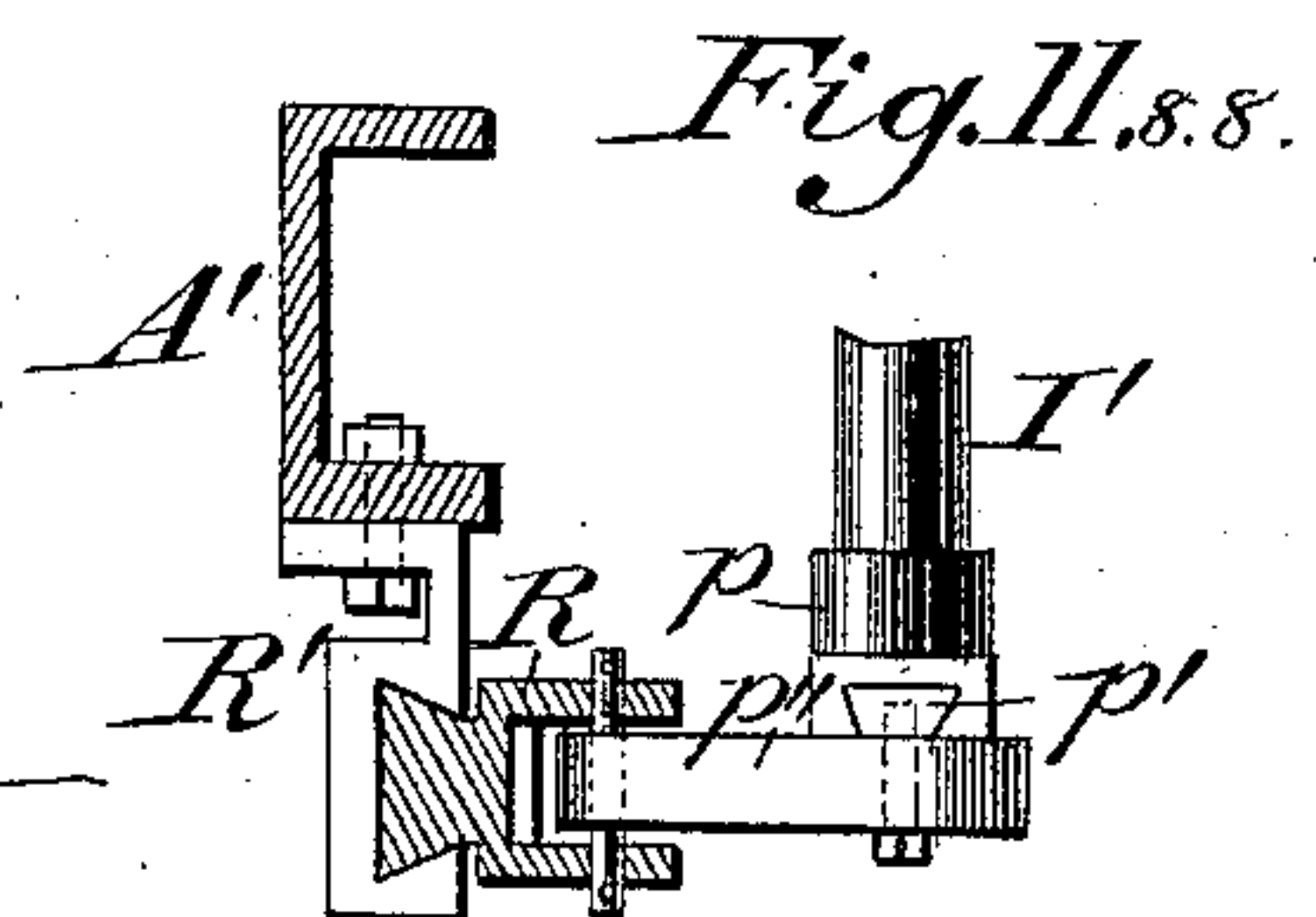
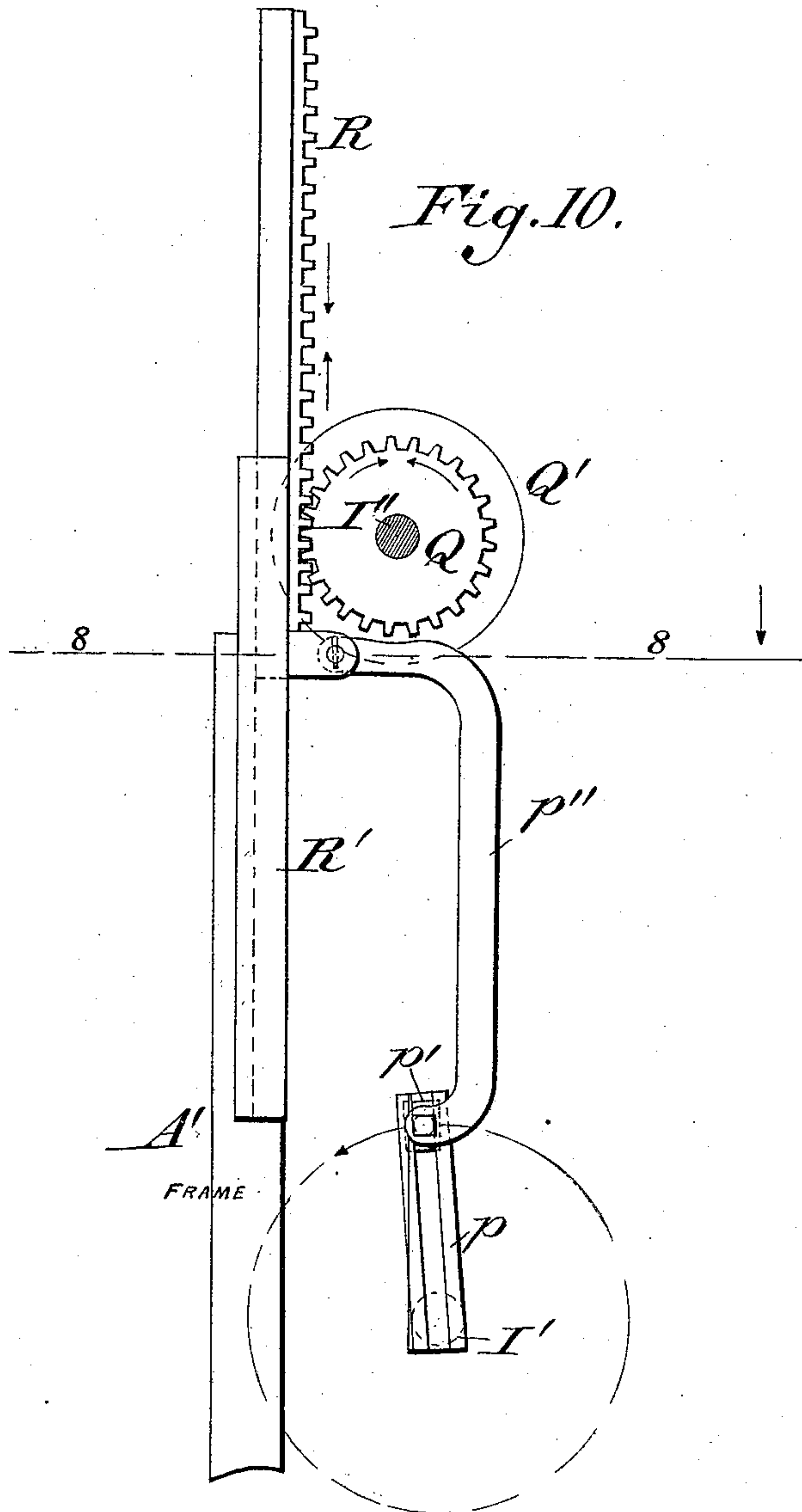
(No Model.)

9 Sheets—Sheet 6.

D. I. ECKERSON.
PRINTING MACHINE.

No. 387,500.

Patented Aug. 7, 1888.



Witnesses.

H. H. Schott.

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D. I. ECKERSON.
PRINTING MACHINE.

No. 387,500.

Patented Aug. 7, 1888.

Fig. 13. 10. 10.

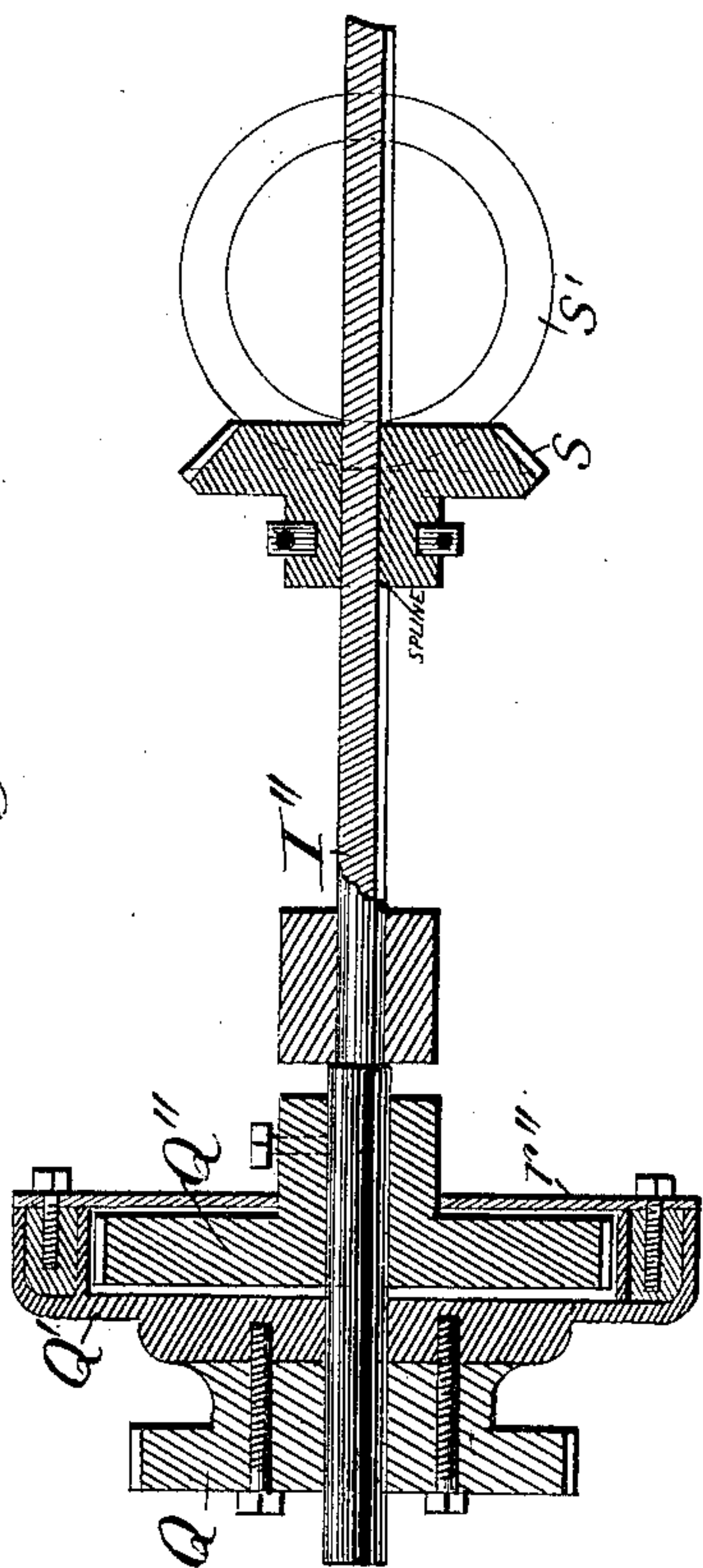


Fig. 15.

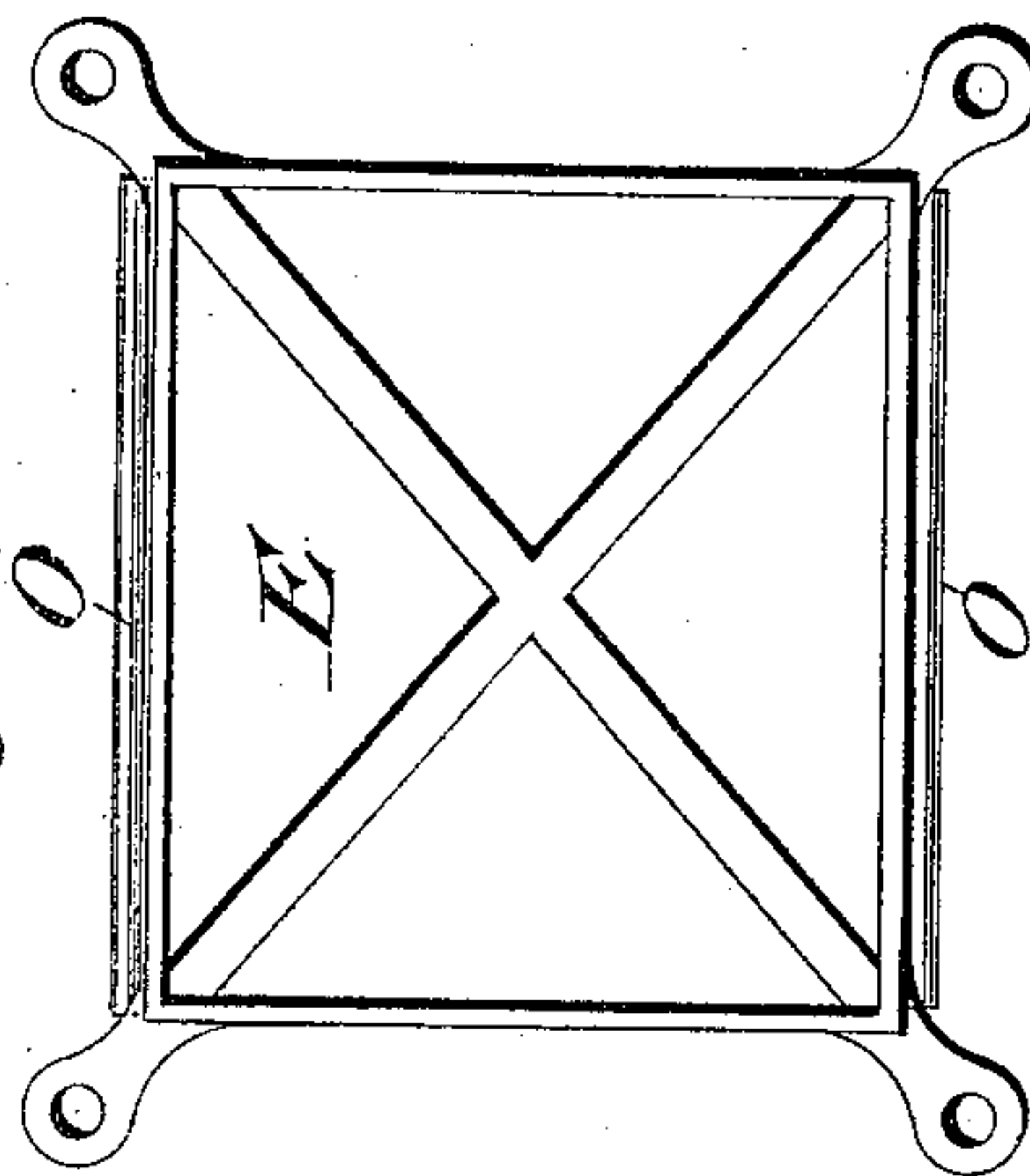


Fig. 12.

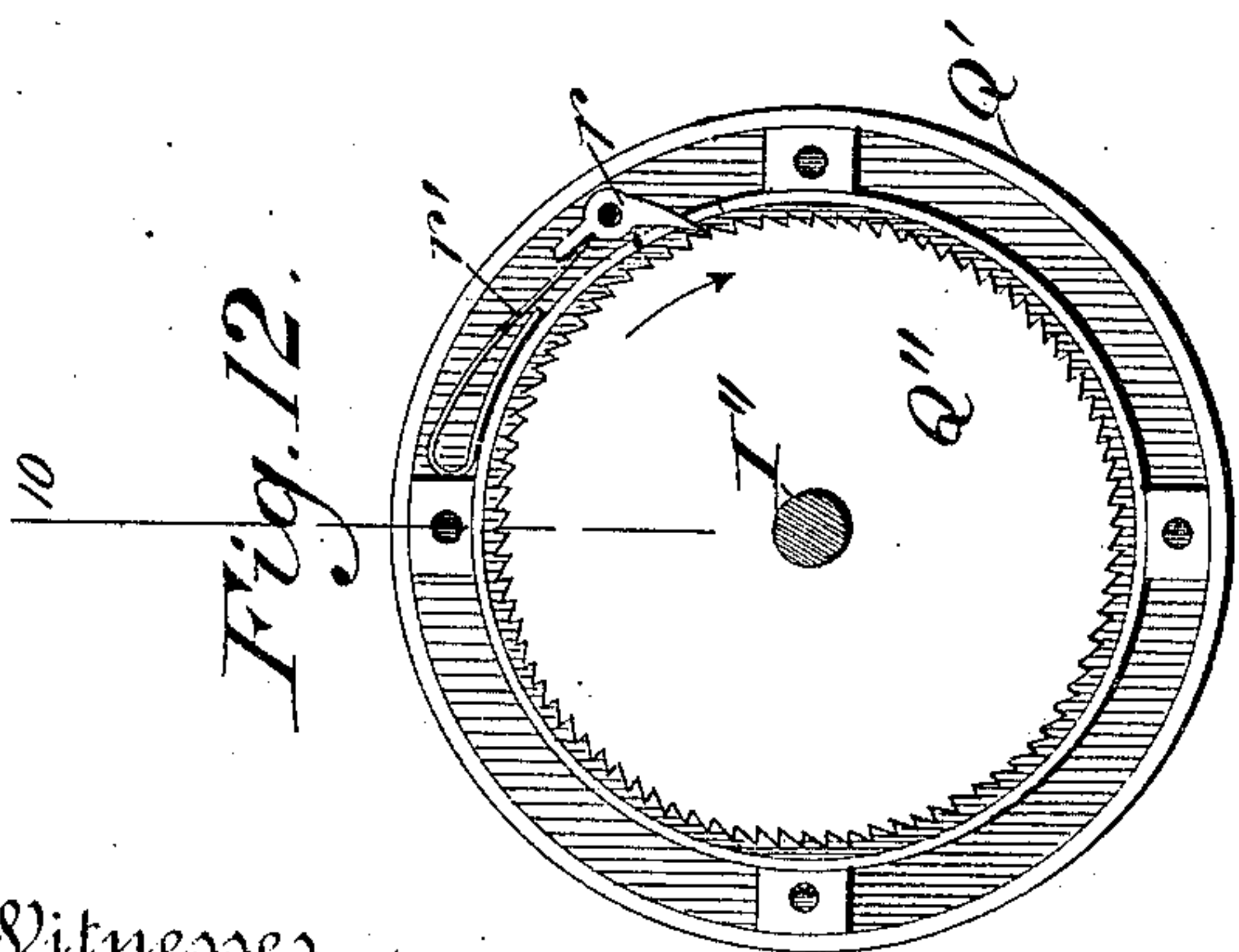
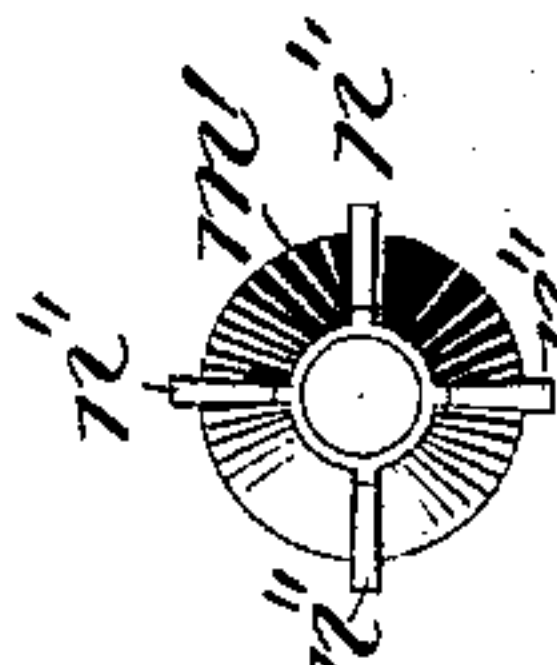
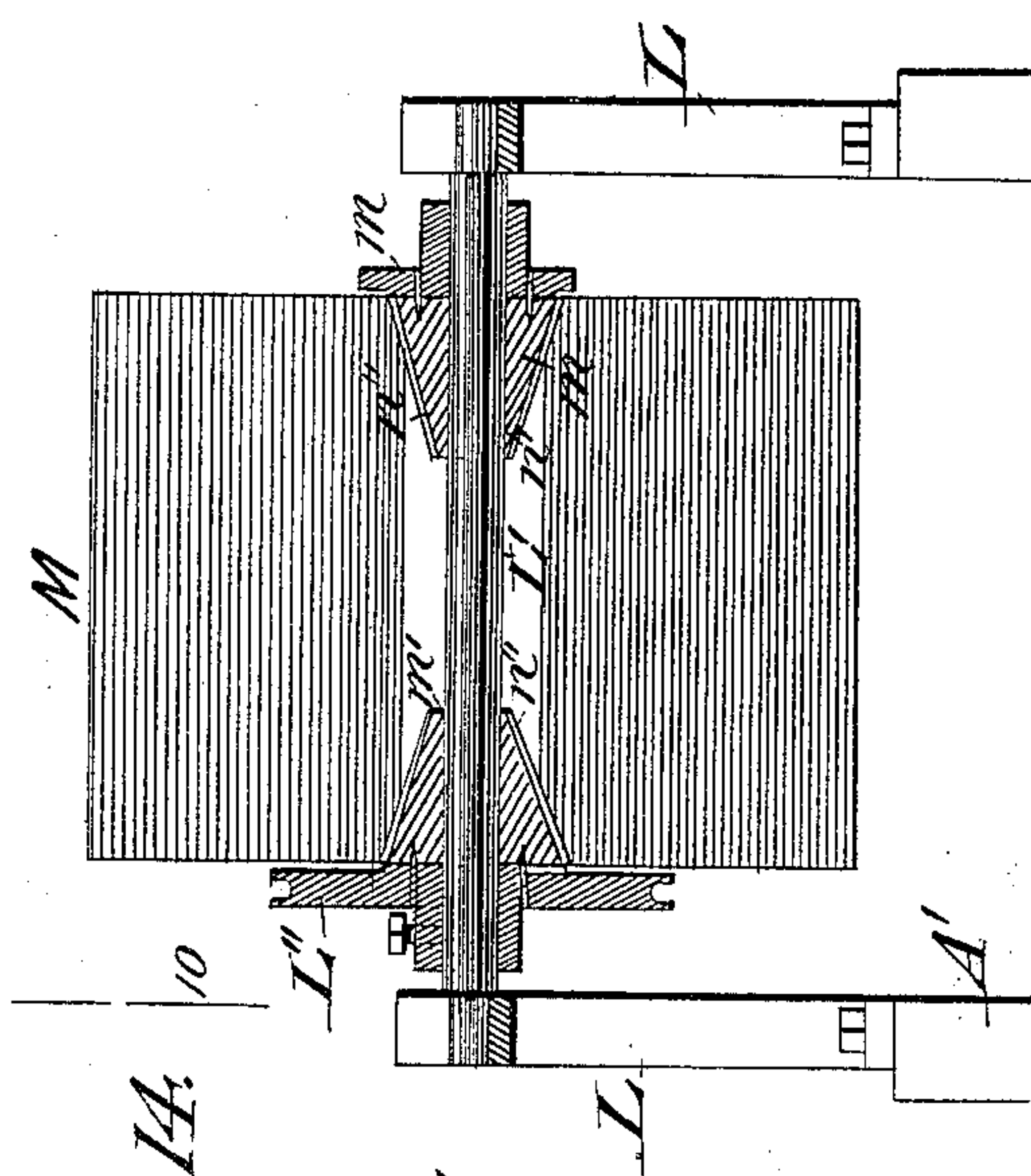


Fig. 14.



Witnesses.

H. H. Schott.
W. Burroughs.

Inventor.

David I. Eckerson.

By his Attorney

W. E. Chandler.

(No Model.)

9 Sheets—Sheet 8.

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PRINTING MACHINE.

No. 387,500.

Patented Aug. 7, 1888.

Fig. 16.

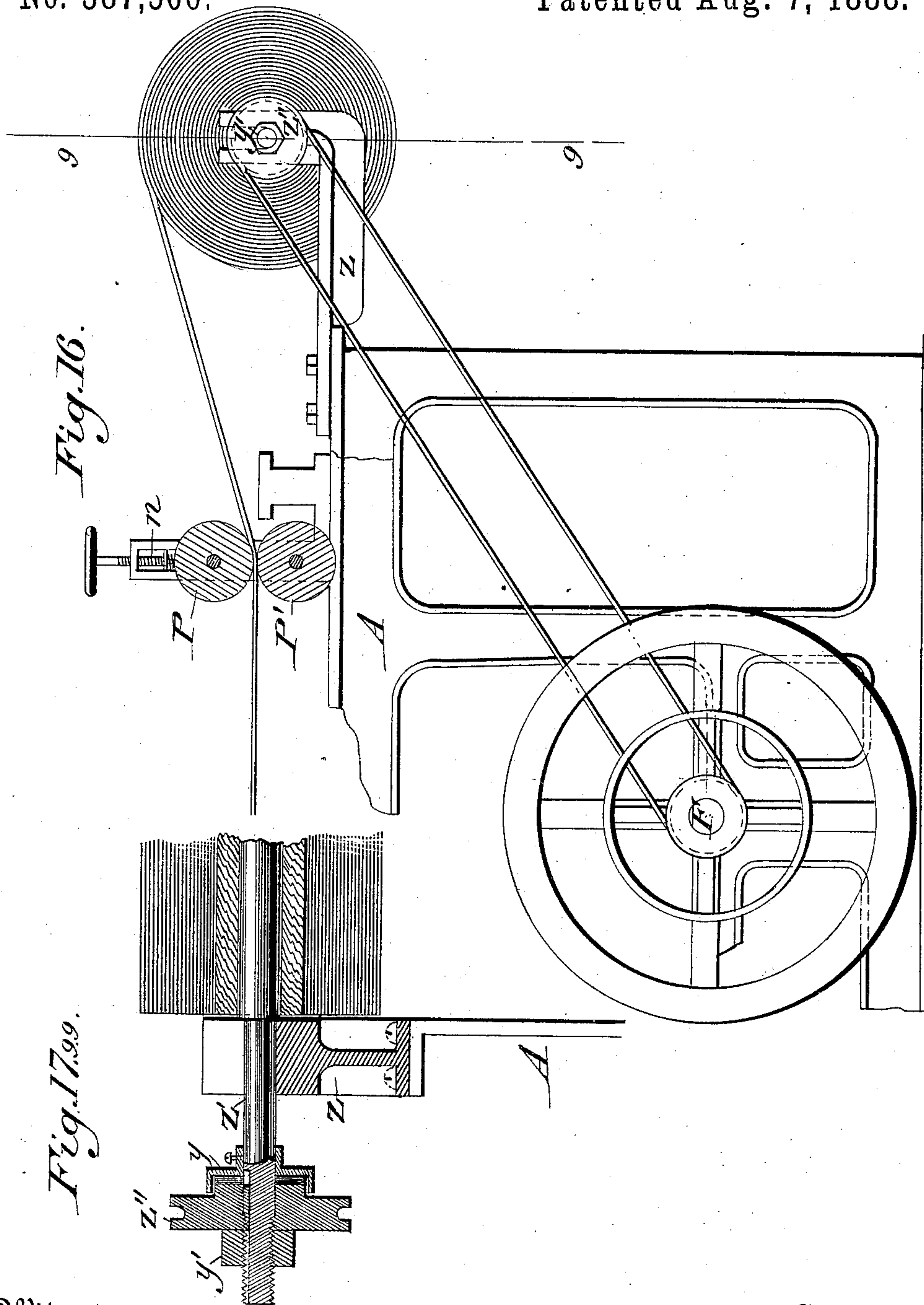
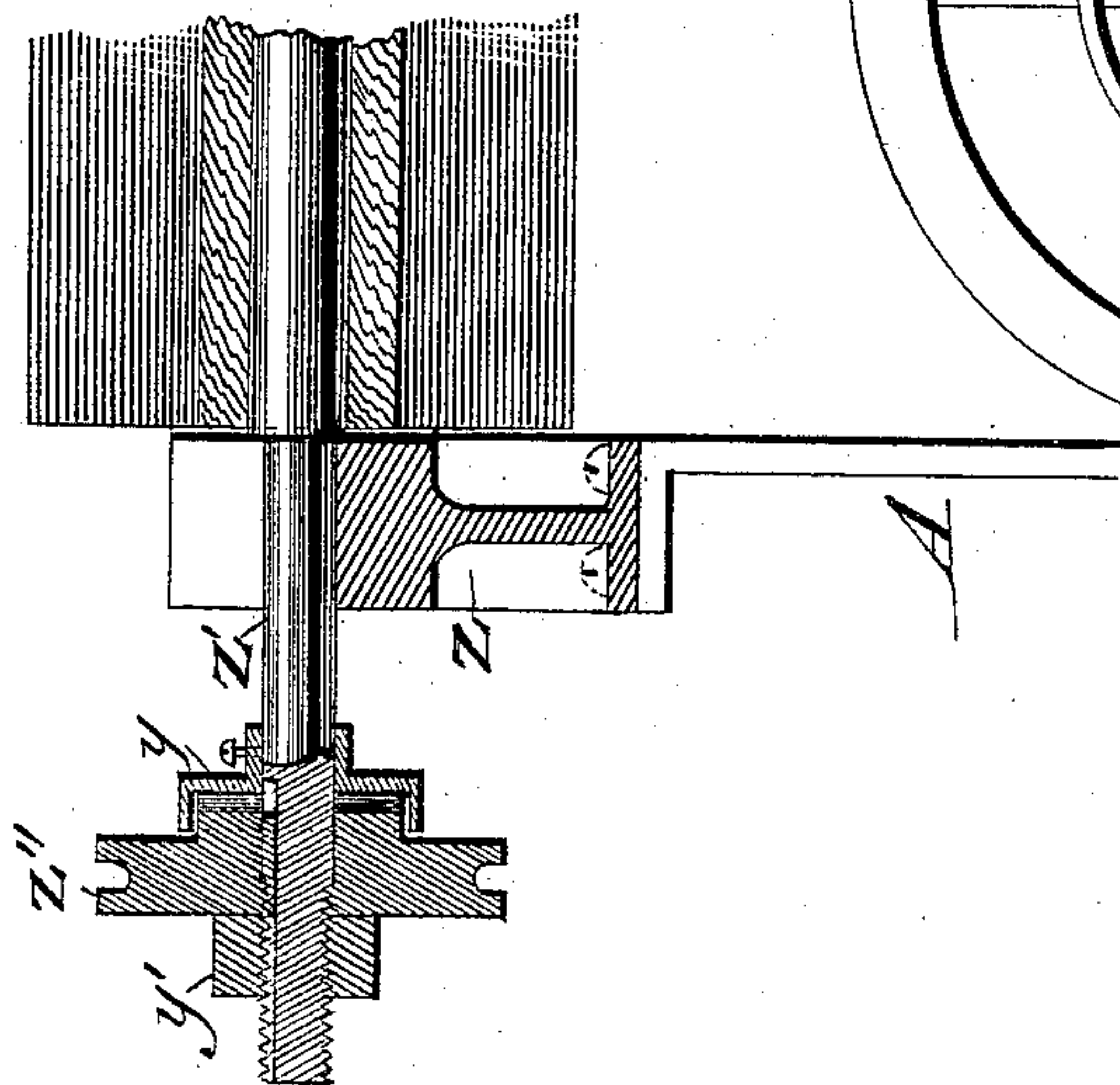


Fig. 1799.



Witnesses,

H. H. Schott.

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By his Attorney

W. E. Chandler.

D. I. ECKERSON.
PRINTING MACHINE.

No. 387,500.

Patented Aug. 7, 1888.

Fig. 18. 55.

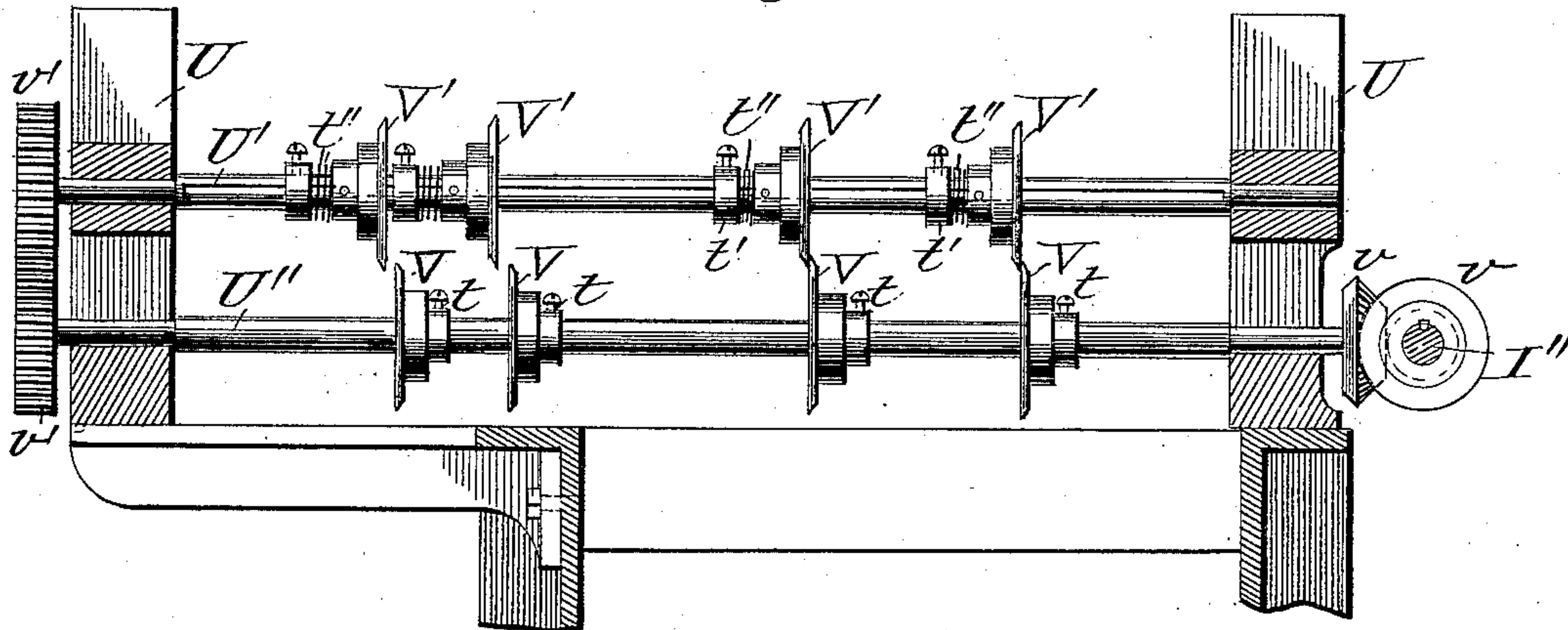


Fig. 19. 66.

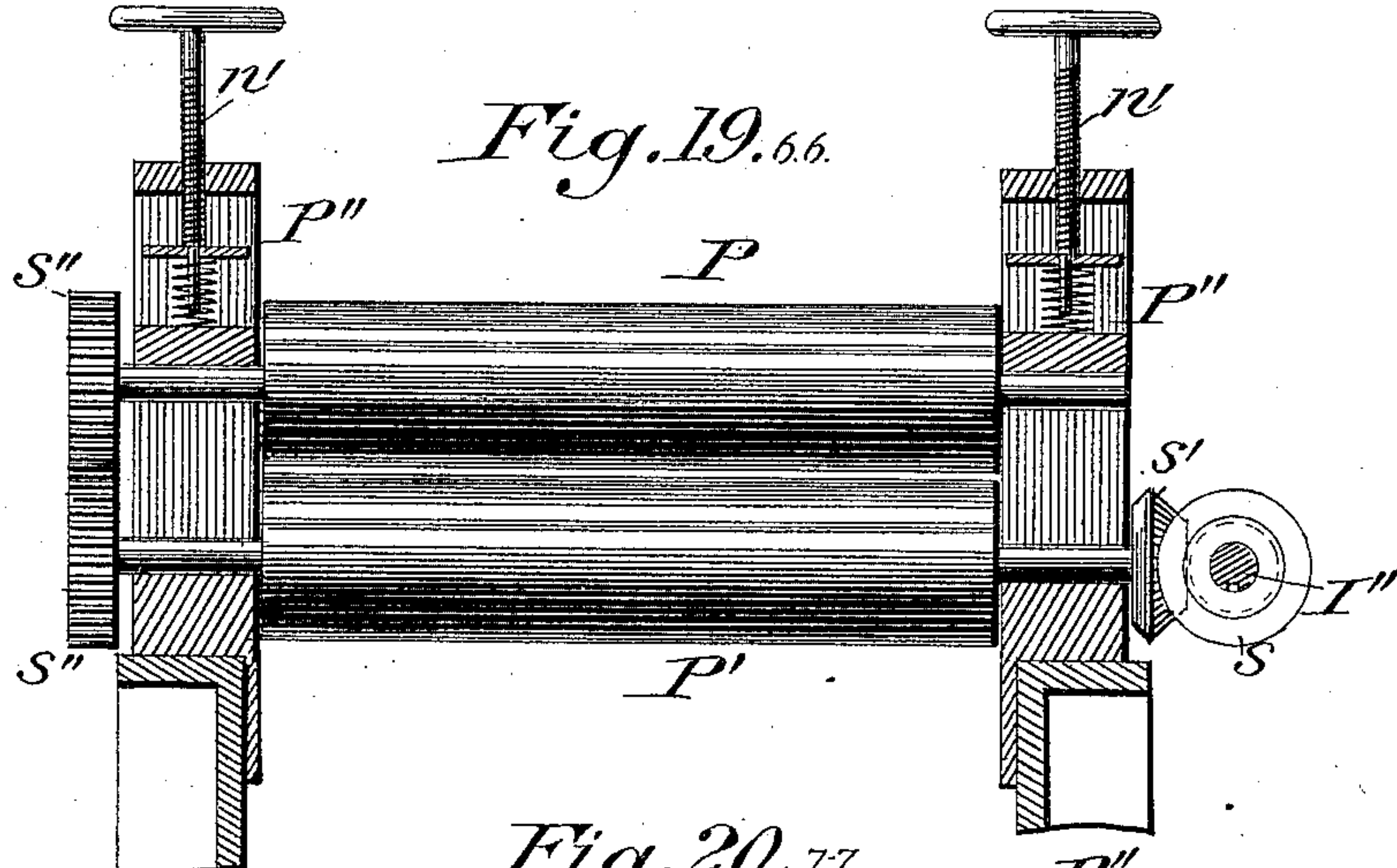
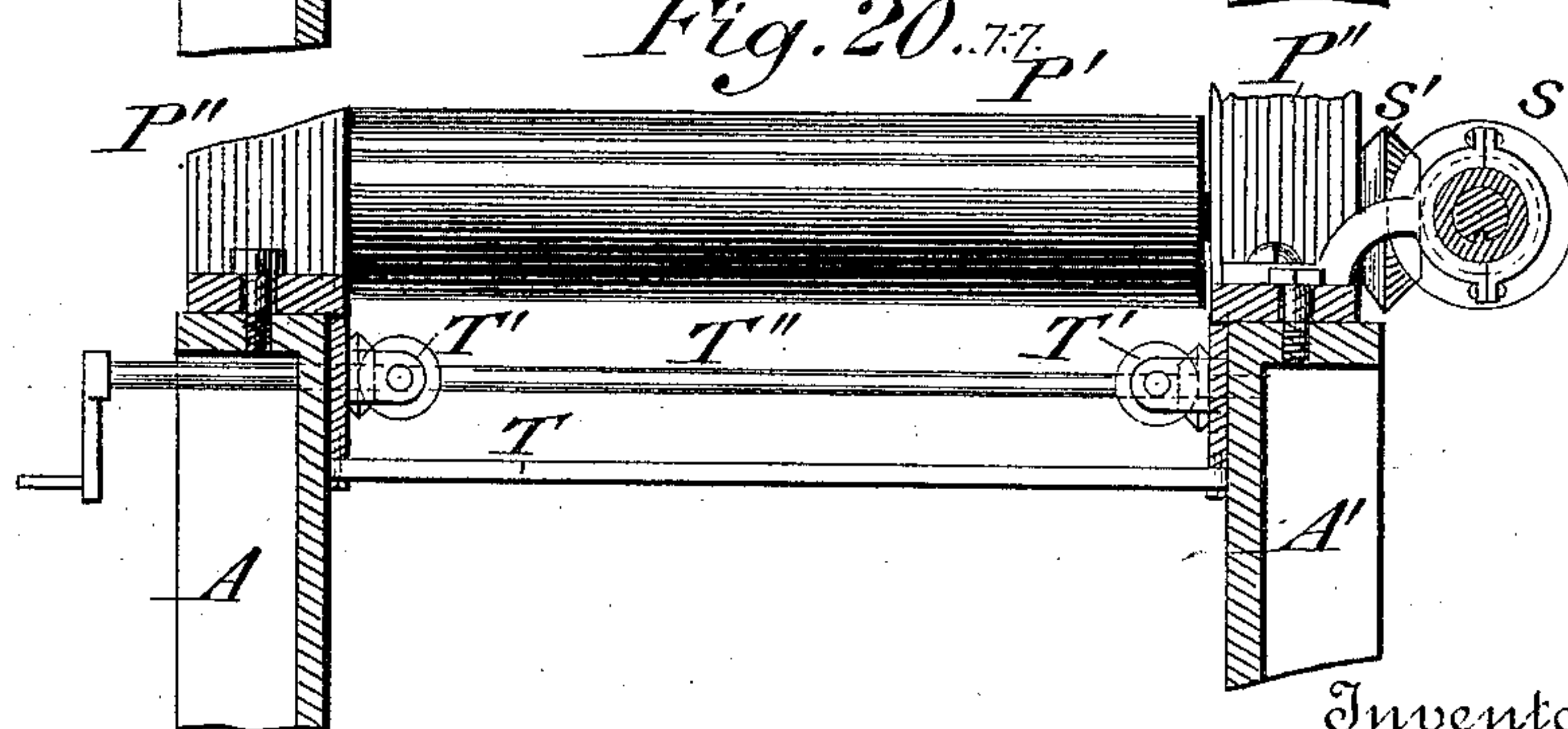


Fig. 20. 77.



Witnesses.

J. H. Schott.
A. Burroughs.

Inventor.

David I. Eckerson.

By his Attorney

W. E. Chandler.

UNITED STATES PATENT OFFICE.

DAVID I. ECKERSON, OF WORCESTER, NEW YORK, ASSIGNOR OF ONE-HALF
TO GEORGE B. WRIGHT, OF SAME PLACE.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 387,500, dated August 7, 1888.

Application filed June 30, 1887. Serial No. 243,003. (No model.)

To all whom it may concern:

Be it known that I, DAVID I. ECKERSON, a citizen of the United States, residing at Worcester, in the county of Otsego and State of New York, have invented certain new and useful Improvements in Printing-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
10 pertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in
15 that class of printing presses or machines designed to print upon paper taken from a roll, and which, after being printed, may, if desired, be cut into sheets of any size, all of which operations are performed automatically
20 by the machine, the especial object of the invention being to produce a printing-press that shall be capable of taking its impressions from ordinary type or stereotype-plates in a very rapid manner and at the same time execute the
25 work in a good and legible form.

In carrying out my improvements I construct a rectangular frame of metal, to and upon which all the operative parts of the machine are secured. These consist of a suitable
30 driving-shaft revolving in bearings attached to the opposite sides of the frame, said shaft carrying a cam by which a vertically-reciprocating movement is given to the type-bed, causing it to come in contact at each upward
35 movement with the impression-plate or stationary platen above it or to cause the type secured upon said type-bed to act upon the paper passing between it and the platen.

In order to properly ink the types before
40 each impression, an inking-disk is placed at each side of the machine, over which and the type-bed the inking-rollers pass, traversing the surface of the type on each journey from one disk to the other, thus allowing an impression
45 to be made after each passage of the rollers in either direction, instead of allowing only one impression to two trips of the inking-rolls.

When but one ink table or disk is used, as in the common press, the rolls must travel over
50 the type and return between the impressions, thus causing much loss of time.

Motion is given to the inking-rollers by a pitman attached to a crank upon a shaft at the side of the machine, connected to the main shaft by bevel-gear of such a character as to
55 allow the inking-rollers to travel back and forth over the type once to each two complete revolutions of the main shaft, the machine making two impressions to each complete revolution of the shaft which gives motion to said
60 rollers. To the oscillating arm carrying the inking-rolls is also attached the swinging arm which operates the pawls that rotate the inking-disks.

The devices which draw the paper from the
65 roll consist of two driven rolls between which the paper passes, an intermittent movement being given to these rolls by means of suitable gearings connecting them with a horizontally-placed shaft which is operated at the proper
70 time through the agency of a rack connected with an adjustable crank upon a shaft at the side of the machine, revolving at the same speed as the main driving-shaft, the pinion upon which the rack operates being loose
75 upon its shaft and causing the latter to revolve in one direction only through the agency of a pawl and ratchet, the forward movement of the feed-rolls being so timed as to draw forward the paper when the type-bed is at its
80 lowest point and to remain stationary while said bed is carrying the type up and making an impression.

As the crank-pin which gives motion to the rack is capable of adjustment nearer to or far-
85 ther from the axis of the shaft which carries it, it is evident that the movement of the rack, and consequently that of the feed-rolls, can be graduated to suit the desired forward movement of the paper.

As in printing handbills and like articles it is necessary to cut the continuous sheet upon which they are printed into pieces, each of which shall contain the matter of a single bill, I provide a pair of rolls having adjustable
90 cutting-disks thereon, which split the sheet longitudinally into any desired number of parts. These parts are then cut transversely into pieces, each being the length of a single imprint, by a vertically-reciprocating cutting-
100 blade operated by a cam upon the shaft which gives motion to the feed-rolls, so that the move-

ments of the latter and the cutter are synchronous, therefore dividing the continuous sheet into pieces of the same length as the distance the sheet is fed forward at each imprint.

5 The roll of paper is carried upon a shaft in suitable supports at one end of the machine, said shaft being provided with a grooved pulley over which passes a cord, one end attached to the frame of the machine and the other to
10 a weight, the cord and pulley thus forming a frictional device which prevents the paper from unrolling any faster than it is drawn into the machine by the feed-rolls.

When it is desired to print the sheet upon
15 both sides, a roll driven by a belt from the main shaft is substituted for the receiving-table as the sheet of paper passes through the machine the first time. The sheet is thus rolled up, and after the printing is completed
20 on one side the roll of paper is transferred to the opposite end of the machine and passes through it a second time to receive the imprint on the opposite side.

The whole apparatus thus forms a complete
25 automatic printing-machine, making its impression from an ordinary plane form of type, instead of the cylindrical form commonly used for fast printing, in which the ordinary type cannot be used, but the printing must be done
30 from a stereotype-plate bent to the curvature of the cylinder, thus making a saving in time and cost.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts in the different figures, Figure 1 is a side elevation of the machine complete as arranged for printing on one side of the sheet of paper. Fig. 2 is a longitudinal section of the same
40 upon an enlarged scale. Fig. 3 is a top or plan view showing the frame and position of the inking-disks with relation to the type-bed. Fig. 4 is a transverse vertical section through the machine on line 3 3 of Fig. 1.
45 Fig. 5 is a similar section on line 2 2 of Fig. 1. Fig. 6 is a horizontal section on line 4 4, Fig. 5, showing the arrangement of the mechanism which operates the cutting-knife. Fig. 7 is a longitudinal section through the type-bed and inking-disks, illustrating the arrangement of
50 mechanism used to rotate said disks. Fig. 8 is a perspective view of the type-bed removed from the machine. Fig. 9 is a similar view of the inner part of the frame, showing the grooves which act as guides for the type-bed and the step-openings which receive the spindles of the ink-disks. Fig. 10 is a side elevation showing, upon an enlarged scale, the rack and gear which operate the feed-roller. Fig. 11 is a
60 horizontal section of the same on the line 8 8. Fig. 12 is an end view of the ratchet-wheel and pawl which operate the shaft that drives the feed-rolls. Fig. 13 is a sectional view of said feed shaft on the line 10 10 of Fig. 12. Fig. 14 is
65 a vertical section through a roll of paper as supplied to the machine, showing the devices for holding the same in position and prevent-

ing its rotation upon its supporting-shaft. Fig. 15 is a top or plan view of the platen or plate which receives the pressure from the im-
70 print. Fig. 16 is a side elevation of a part of the machine with the devices attached which receive the printed sheet and roll it up when it is desired to print said sheet upon both sides. Fig. 17 shows a section of the same on
75 line 9 9 of Fig. 16. Fig. 18 shows a sectional view on line 5 5 of Fig. 2. Fig. 19 shows a sectional view on the line 6 6 of Fig. 2. Fig. 20 shows a sectional view on the line 7 7 of Fig. 2.

The working parts of this machine are carried upon a frame composed of the two sides A A', united at suitable points by cross pieces or girts and by the inside transverse frame, B, which supports and guides the movable type-
85 bed C and inking-disks D. The sides A A' have each a rectangular inclined projection, B', to which the ends of said transverse frame are bolted by the bolts *a a*. Above this frame B and attached to it by means of the bolts *b b*,
90 provided with adjusting-nuts, is the platen E, the under side of which is covered with a layer of rubber or other equivalent yielding material, *e*, secured to the metallic under surface of the platen by a suitable cement. As this
95 yielding material does not form a proper wearing-surface to receive the impression, it is covered by a layer of linen cloth or other suitable woven fabric, *e'*, which is carried across the face of the platen and a short distance upon its
100 sides and secured thereto by the screw-bolts *a' a'*, thus affording a ready means of removing and replacing the cloth when made necessary by its wear or for other purposes.

The type-bed C is provided with suitable
105 upwardly-projecting ledges, *d d*, at each side, within which the form of type is locked, and with two downwardly-projecting guides, *d' d'*, which are received in the recesses *d'' d''* of the frame B, thus forming an efficient guide for
110 said type-bed in its reciprocating movements. To the under side of the type-bed is secured by means of the bolts *a'' a''* the hollow conical and slotted extension or standard C', terminating at its lower end in the cylindrical portion
115 C'', which passes through a suitable orifice in the cross-bar A'', forming a guide for the lower end of said extension C' and steadying the movements of the type-bed.

In the lower part of this extension-piece C'
120 are formed two slots, *e* and *e'*, crossing each other at right angles, the slot *e* being larger than the other and having pivoted in its upper and lower ends the two friction-rollers *e'' e''*, and between these rollers in the slot
125 is placed the cam F', mounted upon the main driving-shaft F of the machine, which passes transversely of the machine through the slot *e'* and revolves in journal-bearings *g g*, secured to the side frames, A and A'. The periphery
130 of this cam F', as shown in Fig. 2 of the drawings, is concentric with its axis for at least one-half its perimeter, so that while the type-bed is resting upon the concentric portion said bed

shall remain stationary at the lowest point of its movement long enough to allow time for the inking-rolls $f f$ to pass over the surface of the type. These inking-rolls are carried by the adjustable spring-bearings $f' f'$, attached in the usual manner to the upper ends of the swinging arms $H H$, secured at their lower ends upon the rock-shaft H' , journaled lengthwise of the machine in the cross-bars H'' .

In order to give to the arms $H H$ the movement needed to carry the inking-rollers from one inking-disk D across the type to the inking-disk upon the opposite side of the machine, a bevel-pinion, h , is secured upon the projecting end of the shaft F , which pinion engages with the wheel h' , having twice as many teeth as are in the pinion, said wheel being secured upon the shaft I , revolving in journal-bearings attached to the side A' of the machine-frame. Upon one end of this shaft I is secured a crank-wheel, h'' . In a radial slot formed in this crank-wheel is adjustably secured the crank-pin i , to which is attached the pitman J , connecting with the arm J' , attached to the rock-shaft H' . It will be apparent from this construction that two revolutions of the mainshaft F will be required to produce a complete reciprocation of the inking-rolls—that is, to carry them from one inking-disk to the other and back again, thus passing once over the type at each imprint. The revolution of the shaft F causes the cam F' to elevate the type-bed and bring it into forcible contact with the platen or with the paper placed just beneath it. To give a rotary movement to the inking-disks D , a swinging arm, J'' , pivoted at i to a downwardly-projecting arm of the frame, is connected with one of the arms H which operates the inking-rollers by a bolt, i'' , passing through an elongated slot in both arms and connected at its upper end by a pivotal connection with the horizontally-reciprocating bar K , carried in guides attached to the type-bed. To each end of this bar K are movably secured by means of a set-screw the vertical arms $k k$, each of which has pivoted in its upper end a pawl, k' , with its inner end weighted or attached to a spring, so that its outer free end is always retained in connection with the ratchet-teeth formed on the under side of the disk, as shown in Fig. 7 of the drawings. A downwardly-projecting pintle, D' , upon the under side of the inking-disks rests in a suitable hole formed for its reception in each of the cross-bars D'' of the transverse frame B and forms the support and bearing for said disks.

Upon one end of the frame of the machine are secured two standards, $L L$, the upper ends of which are bifurcated and form the journal-bearings for the roll-shaft L' . This shaft carries two cones, $m m'$, the cone m being fixed upon the shaft and the cone m' made adjustable thereon by means of a set-screw, so that the cones which enter the opening in the center of the roll of paper, M , may be adjusted to the length of said roll. In order to give

these cones a firm grip upon the roll M , they are each provided with a series of projecting ribs, n'' , which, when the cones are forced into the ends of said roll, firmly grip the same and prevent its turning upon the shaft L' . As a further means of regulating and retarding the unwinding of the paper from the roll, a grooved pulley, L'' , is attached to the adjustable cone, over which pulley passes a cord, n^* , having a weight, W , attached to its end. This weight causes the cord to act as a friction-brake upon the roll and prevent the paper from unwinding therefrom faster than it is taken up by the feed-rolls in printing. The paper as it is drawn from the roll M passes between the rolls N and N' , mounted in the standards $M' M'$ on opposite sides of the machine. The upper one of these rollers, N , is pressed down upon the lower one or the paper between them by means of the screws $n n$, which are prevented from forcing them too tightly together by spiral springs inserted in the standards between the journal-boxes in which the rolls revolve and the adjusting-screws. The sheet of paper then passes over the supporting-rolls $O O$, attached to the platen, which rolls prevent it from dropping on the type-bed when the latter is lowered to allow the inking-roller to pass over its surface. The sheet then passes onward to the feed-rolls $P P'$, arranged one above the other in the standards P'' , said rolls being caused to take a firm grip on the paper, not only by the weight of the top roll, P , but also by the pressure brought to bear upon this roll by the screws $n' n'$, which act through springs upon the bearings of this roll in the same manner as the screws n upon the bearings of the roll N . In order to give the necessary intermittent movement to these feed-rolls, they are connected with the main driving-shaft through the following mechanism: As heretofore described, the shaft I revolves in suitable bearings attached to a side frame of the machine at a speed one-half that of the main shaft F , and from this shaft I the shaft I' , which gives motion to the feed-rolls, is driven; but as it is necessary that the shaft I' should revolve at the same speed as the main shaft it is connected by the spur-pinion O' with the toothed wheel O'' , having double the number of teeth that the pinion has and mounted upon the shaft I . At the opposite end of the shaft I' from that which carries the pinion is secured the slotted crank-arm p . An adjustable crank-pin, p' , secured to this arm, is connected by a pitman, p'' , with the reciprocating rack R , sliding in a guide, R' , attached to the side A' of the frame. (See Figs. 10 and 11.) This rack engages with the spur-gear Q , loosely mounted on the shaft I'' , which shaft is carried in bearings attached to the side frame of the machine. The hub of this gear Q is formed integral with or attached to a double-flanged disk, Q' , which carries pivoted within the flanges, one or more pawls, r , the engaging ends of which pass through openings in the inner flange and engage with the

teeth of the ratchet-wheel Q'' , secured upon the shaft I'' . (See Figs. 12 and 13.) In order to secure the engagement of these pawls with the ratchet, a spring, r' , is secured to the disk between the flanges and bears continually upon the rear end of the pawls, so that the pawls are always in engagement with the ratchet no matter at what point of its periphery it may be situated. A cover, r'' , is secured to the open side of the flanged disk Q' , inclosing the ratchet and preventing the entrance of dirt or other matters which might prevent the perfect operation of the parts. Made adjustable longitudinally upon the shaft I'' by means of a spline and feather key is the miter-gear S , the mate to which, S' , is secured upon the shaft of the lower feed-roll, P' .

The upper roll, P , is made to revolve in unison with the lower one by means of the spur-gears $S'' S''$, secured upon the shafts of the feed-rolls at the side of the machine opposite to that upon which the gears S and S' are placed.

It will be apparent from this construction that the distance over which the peripheries of the feed rolls travel at each revolution of the main shaft will depend altogether upon the distance of the movable crank-pin p' from the axis of the shaft I' , thus enabling the movement of the rolls, and consequently the length of paper drawn forward, to be adjusted to the length of the imprint. As this change in the length of paper fed forward at each imprint may necessitate a change in the position of the feed-rolls, I provide for such an emergency by carrying the standards which support said rolls upon a sliding frame, T , made adjustable lengthwise of the machine by the screws $T' T'$, connected by suitable miter or bevel gears with the cross-shaft T'' , one or both ends of which are provided with a hand-crank, Fig. 20, by the rotation of which the frame T may be moved to any desired point.

In the printing of handbills and similar sheets of small dimensions it greatly facilitates the speed with which they may be produced to use a sheet of paper wide enough for two or more of the bills, the type upon the bed from which they are to be printed being duplicated or triplicated, as may be desired. After the printing upon such a sheet is accomplished, it becomes necessary to cut it into as many strips as there are forms on the bed, which cutting is accomplished by the use of rotary shears arranged upon the frame between the feed-rolls and printing apparatus. These shears are constructed as follows: In suitable slotted standards, $U U$, attached to the frame, are placed two shafts, $U' U''$, the shaft U'' being fitted with a series of movable sharp-edged disks, V , secured at any desired points along said shaft by set-screws t , and the shaft U' having similar disks, V' , arranged as desired to correspond with those on the shaft U'' , but held in position against the corresponding disks of the other shaft by having a spring, t'' , placed upon the shaft between said collar and the hub of

the disks V' , so that the latter are always kept up against the disks V by a yielding pressure, which causes them to act in dividing the sheet of paper like a pair of shears. Motion is given to these shears by means of the pair of miter-gears $v v$, one of which is secured upon the shaft U' and the other upon the shaft I'' , while the shaft U'' is driven from the shaft U' by means of spur-gears $v' v'$, secured upon opposite ends of shafts U' and U'' . The standards which carry these rotary shears, at the end where they are coupled by the gears $v' v'$, are located out beyond the frame, so as to make room for the assemblage of all the cutting-disks at one end of their shafts and out of the way when they are not needed for use.

It also becomes necessary to provide means for cutting the sheet or strips transversely into pieces of a length equal to the distance that said sheet or strips are drawn forward by the feeding-rolls at each imprint. This is accomplished by the knife X , having a vertical reciprocating movement in the guides $w w$ at each side of the frame T . A pitman, X' , extends downward from the knife, and is connected at its lower end with the bifurcated lever Y , at each extremity of said bifurcations being pivoted to the frame A , and a bar, w'' , extends across from one arm of the lever to the other. Upon this bar the lower end of the pitman moves when the position of the frame T is shifted, the feeding-rolls and cutting-knife shifting with it. As the sheets are severed by the cutting-knife they fall upon an inclined removable table, Y' , attached to the end of the machine by hooks, which connect with the cross-bars uniting the two sides. This table is provided with an adjustable stop, which is arranged in such a position as to cause the deposit of the sheets as they fall from the knife one upon the other in suitable piles.

As heretofore stated, it is sometimes desirable to print the sheet upon both sides. When this is to be done, the table Y' is removed and a frame, Z , attached to the end of the machine in its place. This frame carries a roller, Z' , upon which the paper as it passes from the feed-rolls is wound. Motion is communicated to said roller by a pulley, Z'' , upon the roller Z' . This pulley is driven by a belt loose upon said roller, and communicates motion thereto through the agency of the leather-lined frictional disk y , which is firmly secured upon the roller, and against which the pulley Z'' is pressed with any desired force by a nut, y' , upon the end of the roller. By this construction it will be seen that as the feed-rolls revolve, the roll Z' will also revolve and take up what paper passes them; but when the feed-rolls stop, the roller Z' also stops, the pulley Z'' continuing its revolution and slipping upon the surface of the friction-disk z . The roll of paper after being printed upon one side is transferred to the opposite end and again passes through to receive the imprint upon the opposite side.

Having thus described my invention, I claim

as new, and desire to secure by Letters Patent, the following:

1. As an improvement in printing-machines, a horizontally-placed adjustable platen provided upon its under side at each end with the rollers O O, supporting the paper, and a yielding layer of material, *c*, covered by a cloth, *c'*, passing under said yielding material and secured to the sides of the platen by screws *a'* *a'*, to support the paper while it receives the impression from the upwardly-moving type-bed, as set forth.

2. As an improvement in printing-machines, the vertically-reciprocating type-bed C, provided with guides *d'*, and the secondary frame B, having guide slots or recesses *d''* to receive said guides, in combination with the cone-shaped slotted support C' for said bed and the cam and shaft, arranged substantially as shown and described, to produce the reciprocation of said type-bed, as set forth.

3. As an improvement in printing-machines, the transverse secondary frame B, in combination with vertically-reciprocating type-bed C, supported upon an inverted hollow cone-shaped standard, C', said standard being diametrically slotted below the apex of the cone in two directions at right angles to each other for the reception of the cam-shaft, cam, and friction-wheels, as specified.

4. As an improvement in printing-machines, the vertically-reciprocating type-bed C, supported upon the downwardly-projecting cone-shaped standard C', carrying the friction-wheels *e''* and provided at its lower end with guide-pin C'', moving in a guide-orifice in a cross-bar of the frame, in combination with the cam F' and its shaft F, revolving in one of the slots of said standard and adapted to impart a vertically-reciprocating movement to said standard and type-bed, as set forth.

5. As an improvement in printing-machines, the main frame A, carrying an adjustable platen, the secondary frame B, vertically-reciprocating type-bed, and its cone-shaped slotted supporting-standard, said type-bed and standard sustained in their vertical movements by suitable guides in said secondary and main frames, in combination with the cam F', carried by shaft F and adapted to impart a vertical reciprocating movement to said type-bed by contact in their revolutions with the friction-rolls *e'' e''* above and below said cam, as specified.

6. In a printing-machine, the main frame A of said machine and the transverse driv-

ing-shaft F, carrying the cam F', for giving motion to the type-bed, in combination with the longitudinal shaft I and bevel-gears *h h'*, arranged to give one revolution of the shaft I to two of the shaft F, the disk *h''*, provided with an adjustable crank-pin, *i*, connecting-rod I', and slotted swinging arm H, all operating, as shown and described, for imparting motion to the inking-rolls.

7. In a printing-machine, the combination, with the main frame A, of the inside transverse secondary frame, B, provided with inclined ends for the reception of the inclined inking-plates and guide-recesses to receive the guides of the vertically-reciprocating type-bed, as set forth.

8. In an inking apparatus for printing-machines, the combination, with the swinging lever carrying the inking-rolls and a lever connected with said roll-carrying lever by an adjustable rod or connection, of the pawl-rod, pawl, and inking-disks, all arranged, as shown and described, to give a rotary motion to said disks, as specified.

9. As an improvement in means for imparting motion to a system of inking-rolls in printing machines, the combination, with the main driving-shaft placed transversely to the main frame of the machine, of a crank-shaft placed at right angles to said driving-shaft and connected therewith by bevel-gears adapted to give one revolution of the crank-shaft to two of the driving-shaft, a pitman, and swinging lever carrying upon its free end the inking-rolls, all arranged and operated as set forth.

10. In a printing-machine, the combination, with the stationary rolls, of the adjustable feed-rolls P P', the rack-pinion and ratchet mechanism by which an intermittent and adjustable length of rotating movement is imparted thereto, the screws upon opposite sides of the frame, and their connecting shaft and gear for adjusting the position of the rolls P P' longitudinally of the frame, as set forth.

11. In printing-machines, the vertically-reciprocating and longitudinally-adjustable cutter X, in combination with the pitman X', cross-bar *w''*, bifurcated lever Y, and the shaft and cam arranged to give a swinging movement to said lever, as specified.

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

DAVID I. ECKERSON.

Witnesses:

G. BURROUGHS,
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