

(No Model.)

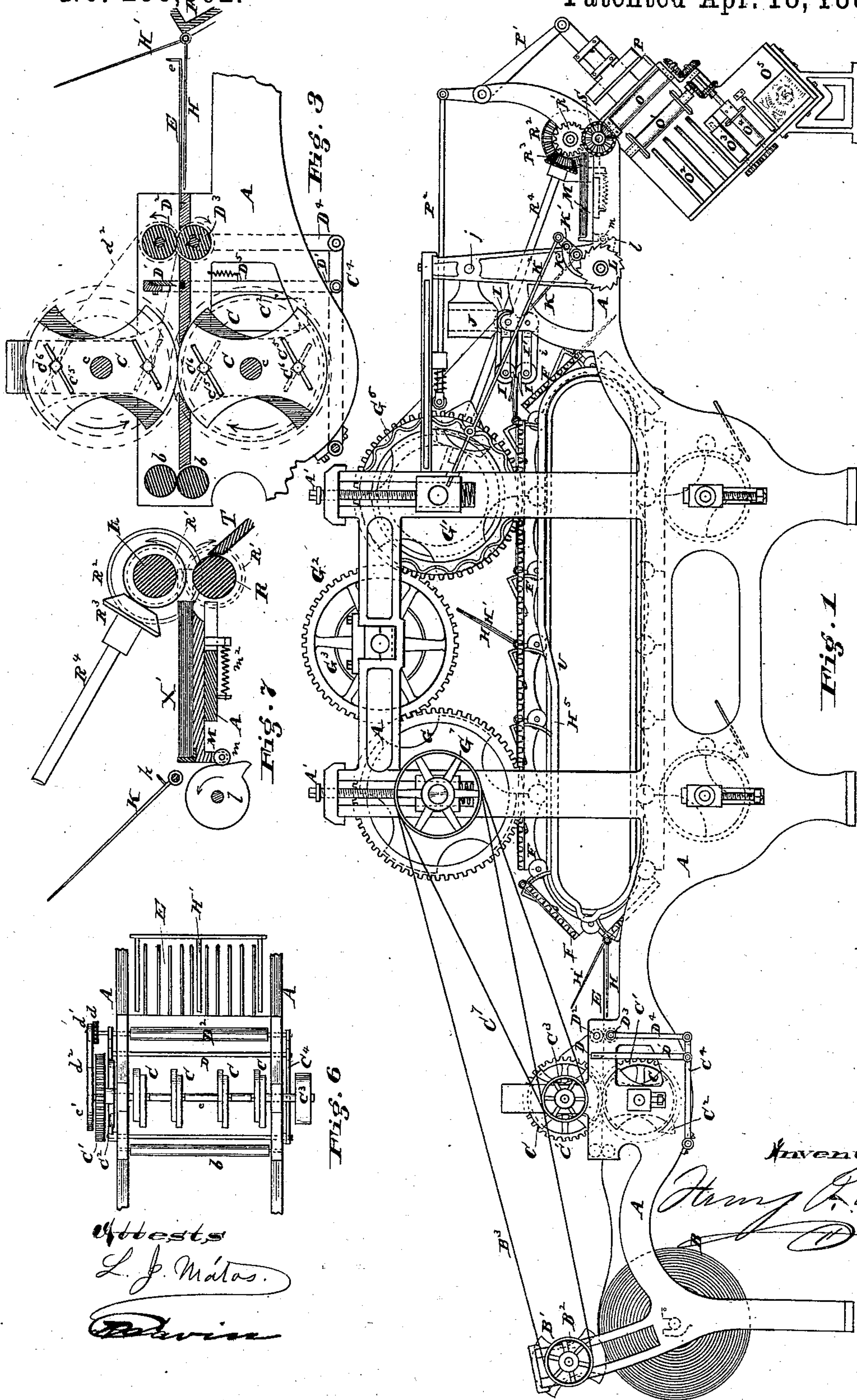
3 Sheets—Sheet 1.

H. P. FEISTER.

PRINTING, BINDING, AND TRIMMING MACHINE.

No. 256,662.

Patented Apr. 18, 1882.



West,

L. J. Matas.

Devin

Inventor

Harry F. Friedman

(No Model.)

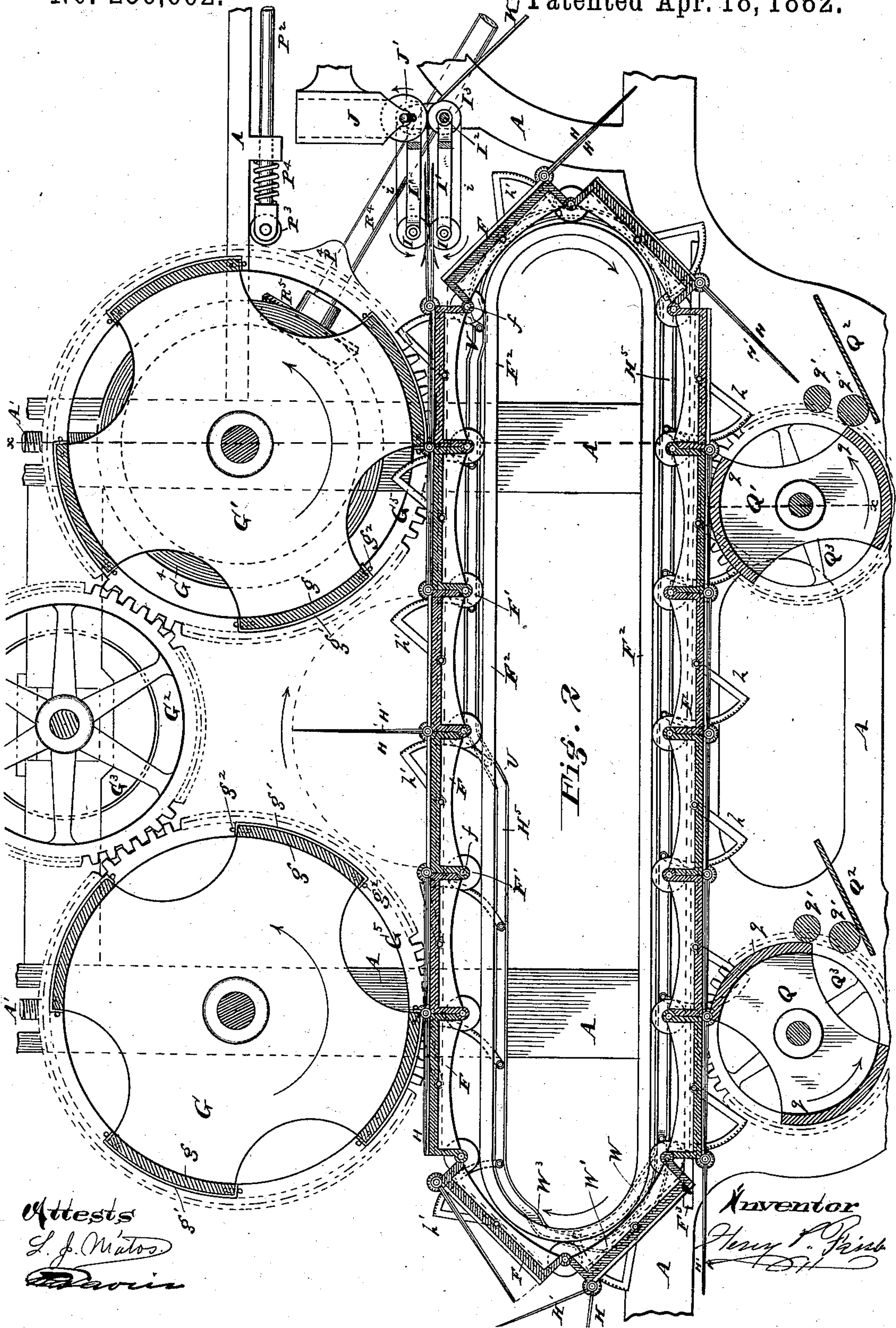
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H. P. FEISTER.

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3 Sheets—Sheet 3.

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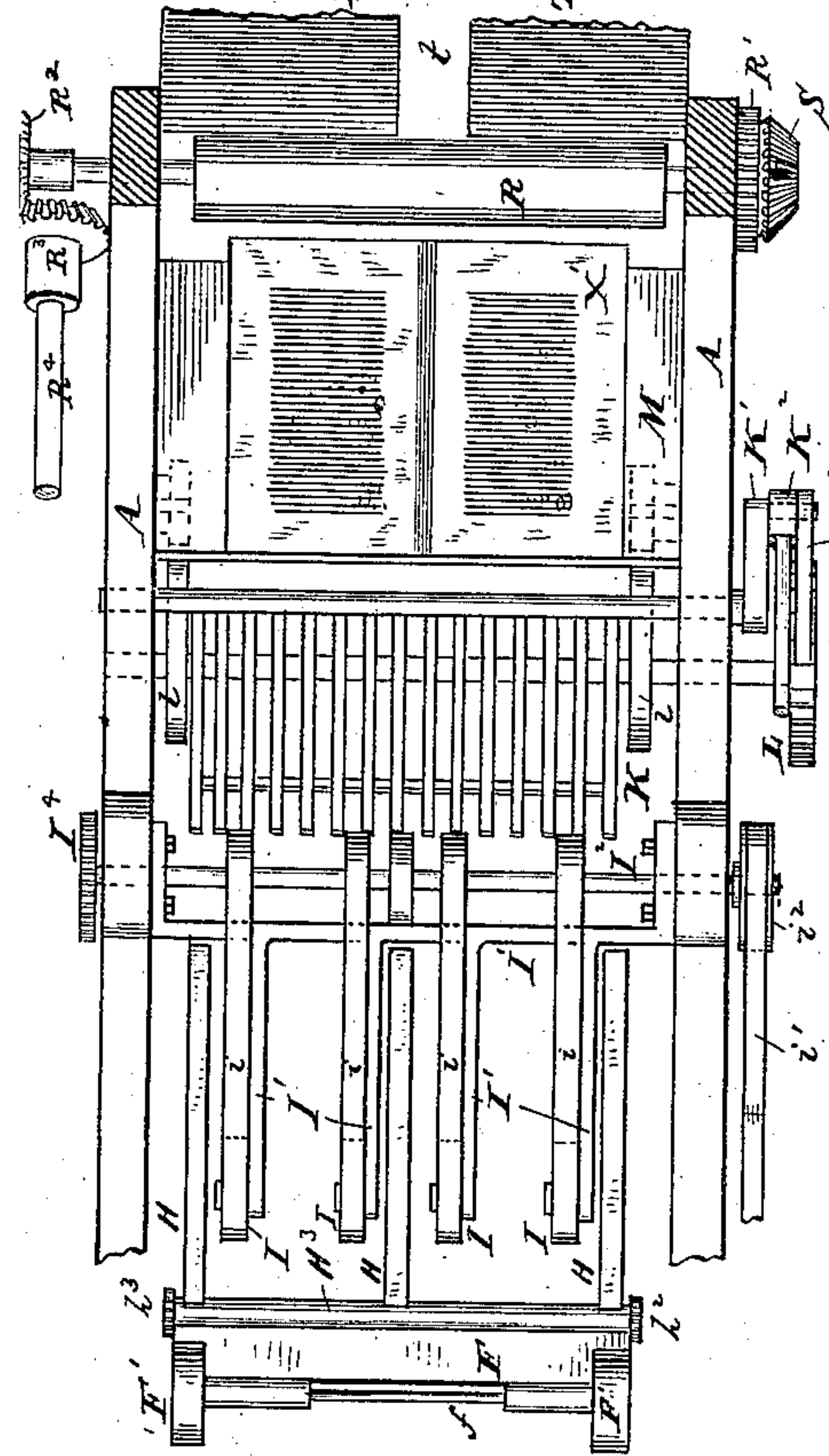


Fig. 4

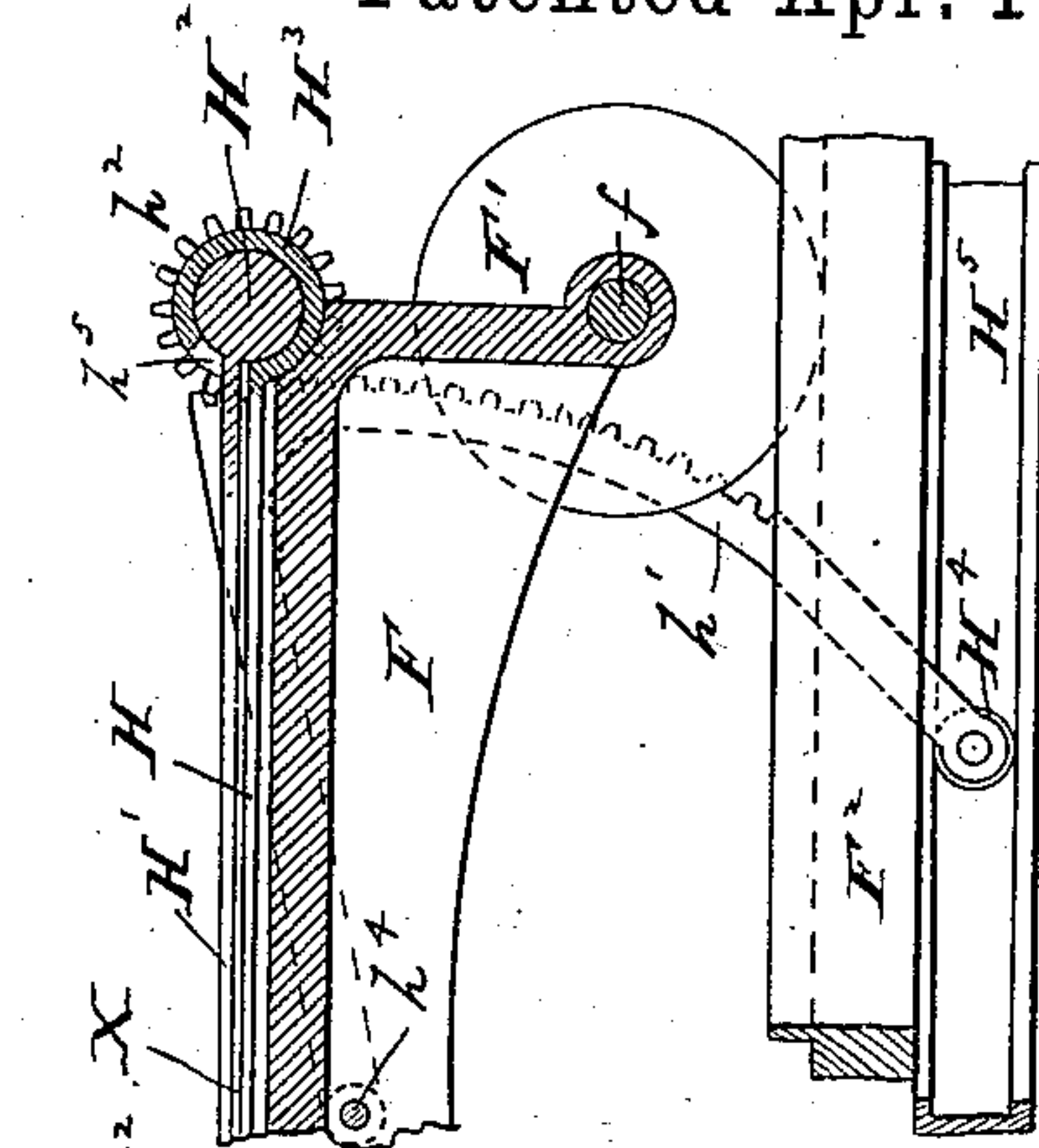


Fig. 5

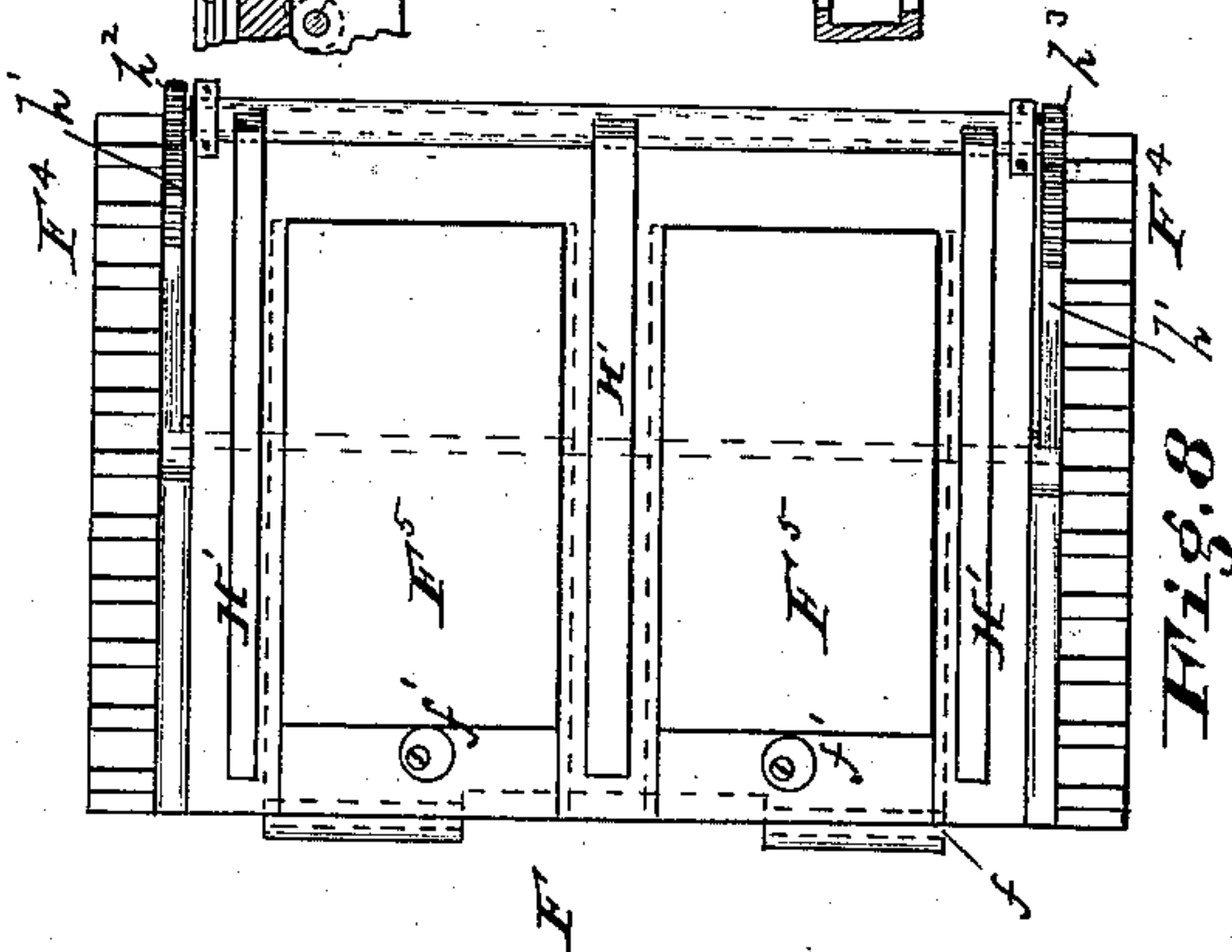


Fig. 8

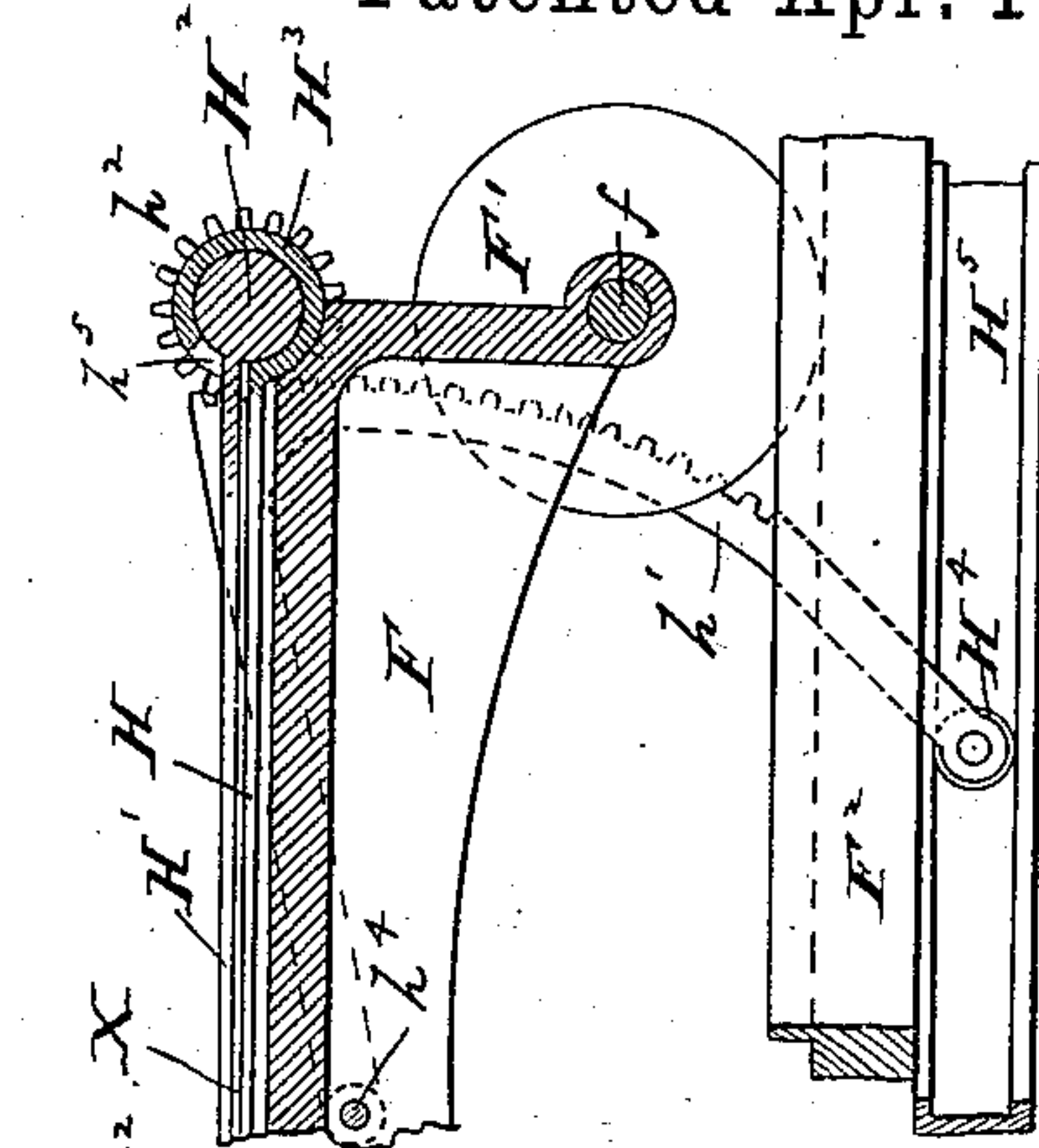


Fig. 9

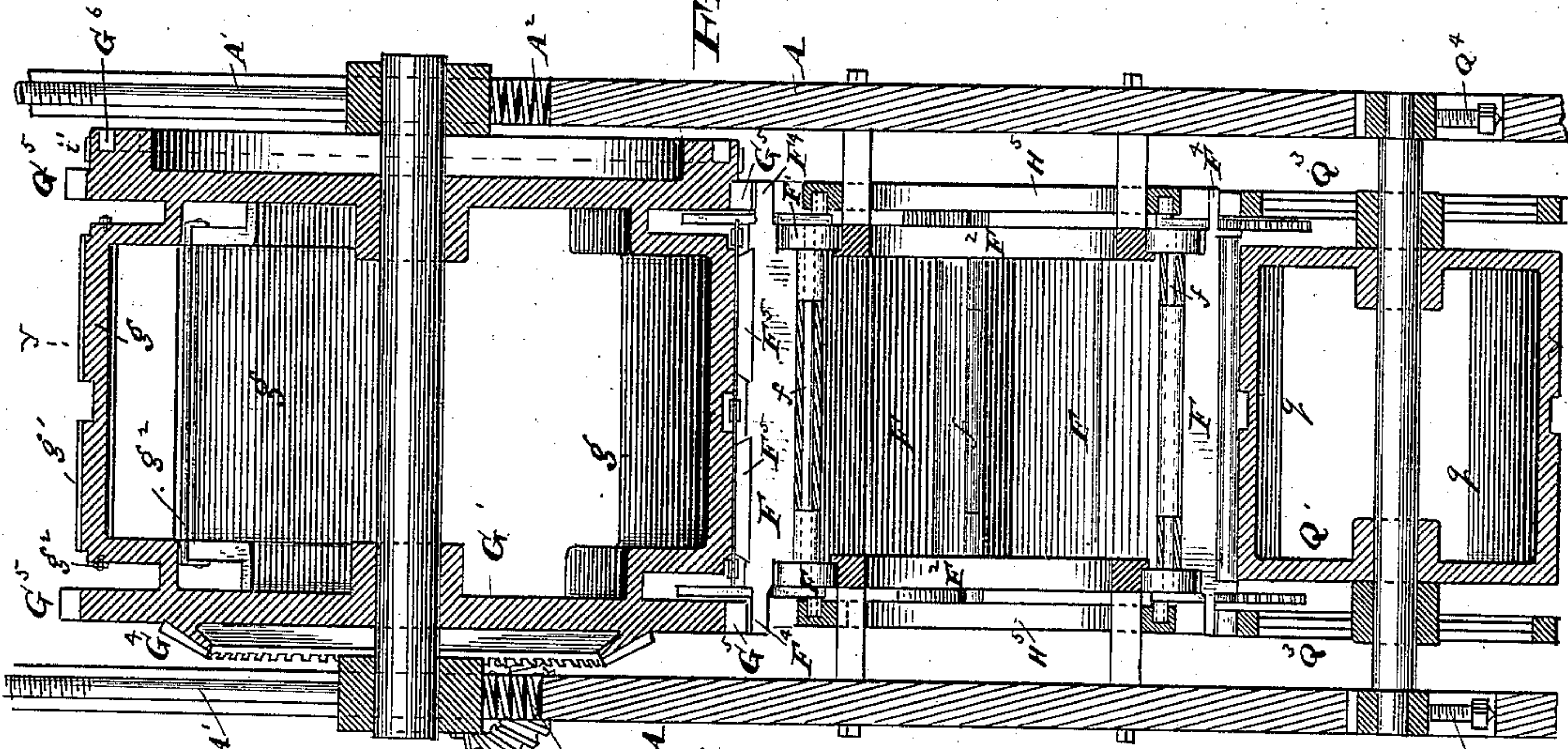


Fig. 10

Attest

L. J. Matos.

Notary

Inventor

Henry P. Feister

UNITED STATES PATENT OFFICE.

HENRY P. FEISTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO ISAAC FINE; SAID FEISTER AND FINE ASSIGNORS OF ONE-THIRD TO ISAAC S. SHARP, ALL OF SAME PLACE.

PRINTING, BINDING, AND TRIMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 256,662, dated April 18, 1882.

Application filed November 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY P. FEISTER, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Printing, Binding, and Trimming Machines, of which the following is a specification.

My invention has reference to printing machinery in general, but more particularly to combined printing, binding, and trimming machines, and is fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

The object of my invention is to construct a machine which shall in itself turn out a complete bound book from a roll of paper, and thereby save time in the manufacture and the labor of several men, and shall not necessitate any handling of the paper by the operator.

In the drawings, Figure 1 is a side elevation of my improved machine. Fig. 2 is a sectional elevation of the printing devices of same on line *y y* of Fig. 4. Fig. 3 is a sectional elevation of the feeding and sheet-cutting devices. Fig. 4 is a cross-section of my improved machine on line *x x* of Fig. 2. Fig. 5 is a plan view of the receiving tapes and table. Fig. 6 is a plan view of the feeding and sheet-cutting devices. Fig. 7 is a sectional elevation of the receiving-table and appendages. Fig. 8 is a plan view of one of the type-form carriages with the nippers in place. Fig. 9 is a sectional elevation of a part of same. Fig. 10 is a detailed view, showing method of folding the printed pages into book form.

A is the frame of the machine, which carries at one end the paper feeding and cutting devices, in the middle the printing mechanism, and on the other end the binding mechanism.

B is the roll of paper from which the books are made. It is supported loosely in the frame, and is intermittently rotated by feed-disks *B'*, which are rotated at a given speed by pulleys *G*⁷, *B*², and *B*³. These feed-disks *B'* are similar to the feed-disks *C C*, (shown clearly in Fig. 3,) and are adapted to move toward the axis of the paper roll as the same is reduced in diameter. The paper then passes through

tension-rollers *b b*, and is fed in given lengths upon the wires or fingers *E* by means of the feed-disks *C C*, knife *D*, and rollers *D*² *D*³. The disks *C* have a portion of their peripheries cut away on diametrically-opposite sides, and are arranged two-and-two, one of which disks in each set is secured to the shaft *c*, and the disks are then secured together by means of slots *C*⁵ and bolts *C*⁶. There being two shafts and disks arranged to roll in contact uniformly by means of spur-wheels *C'*, the length of time their peripheries are in contact is governed by means of the slots *C*⁵ and bolts *C*⁶. If desired, the disks on one shaft might be of uniform diameter all around. These disks are rotated at a given speed by means of pulleys *C*³ *G*⁷ and band *C*⁷. As the paper is fed through the rollers *D*² *D*³ they are kept apart by the cam *C*² upon shaft *c*, which strikes the lever *C*⁴, drawing down the rods *D*¹ and *D*⁴, thereby depressing the knife *D*, severing the paper just as the feed-disks *C* have ceased to feed, and upon the passage of the cam the spring *D*⁵ or equivalent device forces up the knife and presses the roller *D*³ against the paper, causing it to be fed out quickly upon the fingers *E*, being arrested by the lugs *e*. The rollers *D*² *D*³ may be made of disks and geared together, as at *d*, and the roller *D*² carries on its end a band-wheel, *d'*, which is rotated by means of band-wheel *c'* and band *d*². The knife *D* is made oblique, so as to give a shearing cut.

Traveling before the fingers *E* are a series of type-form carriages, *F*, which are pivoted together at *f* and run by means of wheels *F*¹ upon an endless track, *F*², which is secured to the frame *A*. These carriages *F* are all hinged together, so as to form an endless chain, as shown in Fig. 2, and are grooved or otherwise adapted to receive the type-forms *F*⁵, which may be kept in place by means of cam-nuts *f'*. Each carriage *F* is arranged to carry two forms or pages, *F*⁵, which correspond to opposite pages in the book, leaving sufficient space between them, as well as all around, as shown in Fig. 8.

To each side of the carriages, and forming part of same, are the racks *F*⁴. Hinged to the forward ends of the carriages are the nippers

H and H', adapted to receive, hold, and turn the sheet, as required. Nippers H' are secured to shafts H², carrying on their ends small pinions h². The nippers H are secured to hollow sleeves H³, which surround the shaft H², and carry on their ends small pinions h³. The nippers H work through slots h⁵ in the sleeve H³, as shown in Fig. 9.

Pivoted to the rod h⁴ on the carriage F are the segmental rack-levers h', which mesh with the pinions h² and h³, and carry on their ends the friction-rollers H⁴, which work in the cam-grooves H⁵, which are secured to the frame A. There are two cam-grooves H⁵, one adapted to actuate the nippers H and the other to actuate nippers H'. The part W in one of the cam-grooves is adapted to open the nippers H from nippers H' as the carriages F are ascending before the fingers E to receive the paper. When the part W' is reached on the other cam-groove the paper is received and the nippers close upon each other, holding the paper fast, and when the part W³ is reached, which is the same in both cams, the nippers fold the paper back and over the type upon their own carriage. When the part U is reached the paper is raised from off one carriage and laid upon that next preceding, and the part V, which is only on one cam, is to open the nippers to allow the paper to be withdrawn.

In printing a book every alternate carriage is provided with the nippers; but when the machine is to be used to print circulars with either two or four sides, then each carriage is furnished with nippers, as shown. These nippers are made removable, so that the machine may be adjusted for the work to be done.

The carriages F pass over the inking-cylinders Q Q', which are provided with inking-faces q, to ink every alternate type-form, the cylinder Q inking those which are passed uninked by cylinder Q'. These inking-cylinders are secured to gear-wheels Q³, which mesh with the racks F⁴ on the carriages, and from which they receive their motion, and are made adjustable by screws Q⁴.

Q² are the inking slabs or plates, and q' q' the distributing-rollers. If desired, one inking-cylinder may be used having a complete circumference, with the exception of recesses to pass over the sleeves H³.

The carriages F pass under the impression-cylinders G G', which, for printing books, have impression-surfaces g, which make up one-half of the periphery, being adapted to take an impression from every alternate carriage. The cylinder G' prints from the carriages omitted by the cylinder G. The impression-surfaces g are covered with pads g', which are clamped in place by clamps g². These impression-cylinders G G' are provided with gears G⁵, which mesh with racks F⁴ on carriages F, and also with intermediate gear-wheel, G², by which they are rotated through the agency of a band-wheel, G³.

The cylinders G G' are supported in boxes adapted to slide in slots in frame A, said boxes

resting on springs A² and being adjusted by screws A'. When used for circulars the peripheries of cylinders G and G' are made continuous.

The paper X' is pressed between the tapes i, traveling over the rollers I. The rollers I next to the carriages F cannot be placed on shafts, as the nippers have to pass down between them. Therefore I support them in arms I', which extend back and are secured to the frame A, as shown in Fig. 5. The rollers I farthest from the carriages are secured to shafts I², which are geared together by spur-wheels I⁴, and are rotated by a belt, i', working over pulley i² and a flange, G⁶, on the cylinder G'. Pivoted to the frame A, at j, is the paste-vat J, carrying on the bottom a pasting or fastening wheel, J', which rolls upon wheel I³ on shaft I². This pasting or fastening wheel J' is arranged in line with the middle nippers. The paper is quickly withdrawn from the nippers H H' by the tapes i', and after being pasted or fastened down the middle, as shown in Fig. 5, it is received upon the fly-frame K and projection k, and is deposited upon the table M. The fly-frame K is oscillated by means of crank K', rod K², and cam G⁶ on the cylinder G'.

Pivoted to the crank K' is a pawl, K³, which works on a ratchet-wheel, L, secured upon a shaft carrying cams l l, which once in every revolution of said ratchet-wheel strike roller m of table M and push it forward, forcing the ends of the printed sheets between the rollers R R. The spring m² draws the table back again to its original position. There are as many teeth in the wheel L as there are carriages F, and the cam part on wheel l corresponds to one of said teeth. After placing a cover on the table M the printed sheets are laid upon it, and after being completed the table is moved forward and instantly discharges its contents. The rollers R R are geared together by spur-wheels R' R', and are driven by bevel-gears R² R³, shaft R⁴, bevel-gear R⁵ and G⁴ upon the cylinder G'. The sheets are then pressed together and fall on inclined table T over a slot, t, and the folding-knife P is projected down by bell-crank P', rod P², and cam P⁴ on cylinder G, said cam striking roller P³ on the end of rod P². The knife P doubles the papers and forces them between the rollers O O, and is then drawn back by the spring P⁴. The folded sheets are then passed between cutting-rollers O' O', by which the top and bottom are trimmed. The book is then passed between guides O² and slides down to feed-rollers O³, which feed it to the cutting-rollers O⁴, which trim the front, and the book is then received in the rack O⁵ completed. The folding-machine receives its power from the bevel-wheel S, and may be made after any suitable well-known design.

I do not limit myself to the particular form of apparatus shown to accomplish the required results, as it may be modified in various ways.

The operation is as follows: The machine being set in motion, the feed-disks C and B' feed

the paper intermittently to the printing mechanism, keeping a slack in the paper between the roll B and the tension-rolls *b* to prevent any change in the tension in the feeding devices C. The paper is then cut off in given lengths by knife D and fed onto the fingers E by rollers D² D³. The sheet is then caught by the nippers H H' and turned down upon the inked type-forms held upon the carriages F, and from which an impression is printed on one side of the sheet as it is passed under the cylinder G. The part U in cams H⁵ then causes the nippers to make a semi-revolution, thereby laying the unprinted side of the sheet down upon the type-forms held in the carriage F immediately before it, and in that position passes under the second cylinder, G'. The sheet is now printed on both sides, and as it travels on the part V in the cam H⁵ slightly separates the nippers, and the tapes *i* receive the printed sheet, pass it under the pasting (or fastening) roll J' and onto the fly-frame K, which turns it over upon a back previously laid on the table M by the operator. After the full number of sheets (each making four pages in the book) have been laid upon the table the cam *l* throws it forward, and the rolls R R receive them, press them together, and the knife P folds them. They are then trimmed by the rotary cutters O and O' and emerge in a finished condition. Each carriage prints two pages; hence the sixteen carriages shown would print a book of thirty-two pages from a continuous roll and at one continuous operation. The machine is particularly adapted to advertising-books—as almanacs and small pamphlets—but may be used for single-sheet circulars, if desired. In the former case every carriage contains different type matter, while in the latter case they all only contain two styles of type matter.

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

1. In a printing-machine to print from a continuous roll of paper, an endless chain of type-carriages, in combination with one or more inking-cylinders and two impression-cylinders, said cylinders being adapted to print from every alternate type-carriage, one of said cylinders printing from the type omitted by the other, substantially as and for the purpose specified.

2. In a printing-machine to print from a continuous roll of paper, an endless chain of type-carriages, in combination with nippers arranged upon said carriages and adapted to hold the sheet of paper, inking devices to ink the type, two impression-cylinders arranged to print from every alternate type-carriage, and mechanism, substantially as described, to cause said nippers to be oscillated in passing from one impression-cylinder to the other, for the purpose of laying the sheet upon the type-carriage immediately preceding, substantially as and for the purpose specified.

3. In a printing-machine, a feeding device adapted to feed given lengths of paper from a

continuous roll, a cutter or knife to cut said roll of paper into sheets, an endless chain of type-carriages provided with nippers adapted to catch and hold the paper, an inking device to ink the type on said carriages, and two impression-cylinders arranged to print from every alternate type-carriage, in combination with a cam to actuate said nippers to reverse and transfer the sheet to the next adjacent type-carriage after passing under one impression-cylinder and before it passes to the next, receiving bands or tapes, a pasting or fastening device to paste or fasten the sheet down the middle, a fly-frame, a receiving-table, and folding and trimming mechanism, substantially as described, said apparatus working to print and bind books from a continuous roll of paper, substantially as described.

4. In a printing-machine, the feeding device which consists of the notched disks C, rolling in contact, as shown and described, in combination with their shafts and means, substantially as described, to adjust and secure said disks side by side in pairs, substantially as and for the purpose specified.

5. In a printing-machine, the combination of the rollers *b*, shafts *c*, carrying disks C, gear-wheels C', cam O², arms O⁴, rods D' and D⁴, knife D, and rollers D² and D³, and fingers E, substantially as and for the purpose specified.

6. In a printing-machine, the carriages F, hinged together at *f* and running upon a track, F², by wheels F', and provided with means, substantially as described, to secure the type-forms in place, in combination with nippers H H', secured respectively to pinions *h*³ and *h*², segment-racks *h'*, and cams H⁵, to actuate said segment-racks, substantially as and for the purpose specified.

7. In a printing-machine, a type-carriage, F, provided with nippers H H', secured to shafts H³ H², pivoted at one end of said carriage, in combination with mechanism, substantially as described, to operate said nippers during the movement of said carriage, substantially as and for the purpose specified.

8. In a printing-machine, the combination of the endless chain of carriages F, carrying nippers H H', pivoted at one end, and racks F⁴, inking devices to ink the type on said carriages, two impression-cylinders, G G', having impression-surfaces *g*, gears G⁵, and adapted to print from every alternate carriage, fingers E, receiving-tapes *i*, cams H⁵, and intermediate mechanism, substantially as described, to actuate the nippers to the end that the nippers of every alternate carriage F shall open and catch the paper from fingers E, lay it upon the carriage, and after passing under cylinder G shall reverse the sheet and lay it upon the next adjacent carriage, then pass under cylinder G', and open slightly to allow the sheet to be run off quickly by the tapes *i*, substantially as and for the purpose specified.

9. In a printing-machine, the combination of the endless chain of carriages F, having

racks F⁴, cylinders G and G', having teeth G⁵, and intermediate gear-wheel, G², substantially as and for the purpose specified.

10. In a printing-machine, the endless chain
5 of type-carriages and their nippers, in combination with tapes *i*, wheels I, shafts I², arms I', pasting or fastening wheel J, fly-frame K, receiving-table M, rollers R, mechanism, substantially as described, to reciprocate said table,
10 ble, and folding and trimming mechanism, substantially as and for the purpose specified.

11. In a combined printing and binding machine, the combination of the reciprocating receiving-table M, with rollers R, oblique table
15 T, with slot *t*, folding-knife P, trimming rotary cutters O' and O⁴, and mechanism, substan-

tially as described, to reciprocate the table and folding-knife at given intervals, substantially as and for the purpose specified.

12. In a printing-machine, the combination 20 of the cam G⁶, rod K², crank K', pawl K³, ratchet-wheel L, cams *l*, rollers *m*, receiving-table M, frame A, spring *m*², and rollers R R, substantially as and for the purpose shown and described.

In testimony of which invention I hereunto
25 set my hand.

HENRY P. FEISTER.

Witnesses:

L. J. MÁTOS,
R. A. CAVIN.