

(No Model.)

2 Sheets—Sheet 1.

B., F. & H. HOOKER.
PAPER CUTTER.

No. 582,288.

Patented May 11, 1897.

Fig. 2.

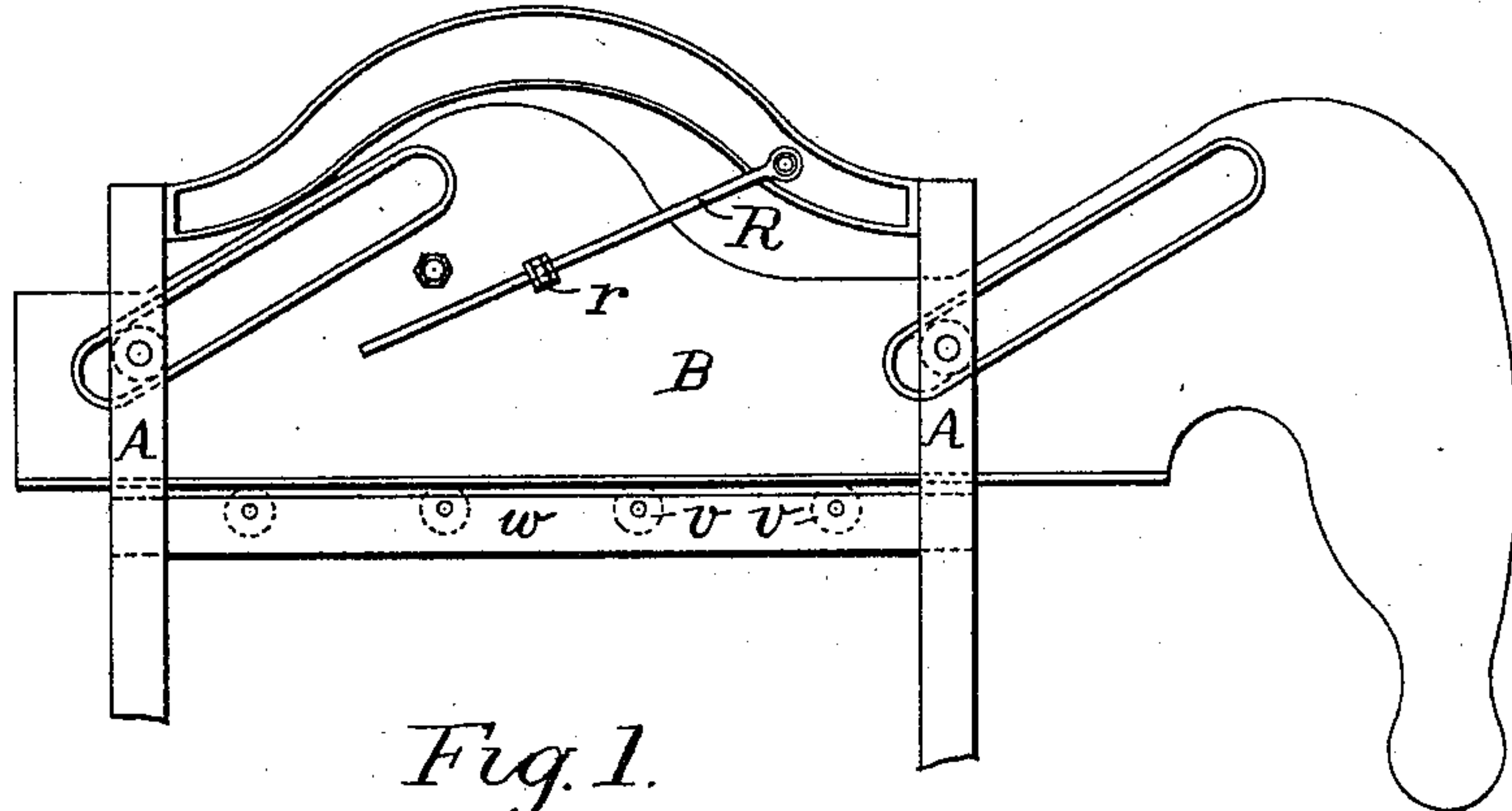
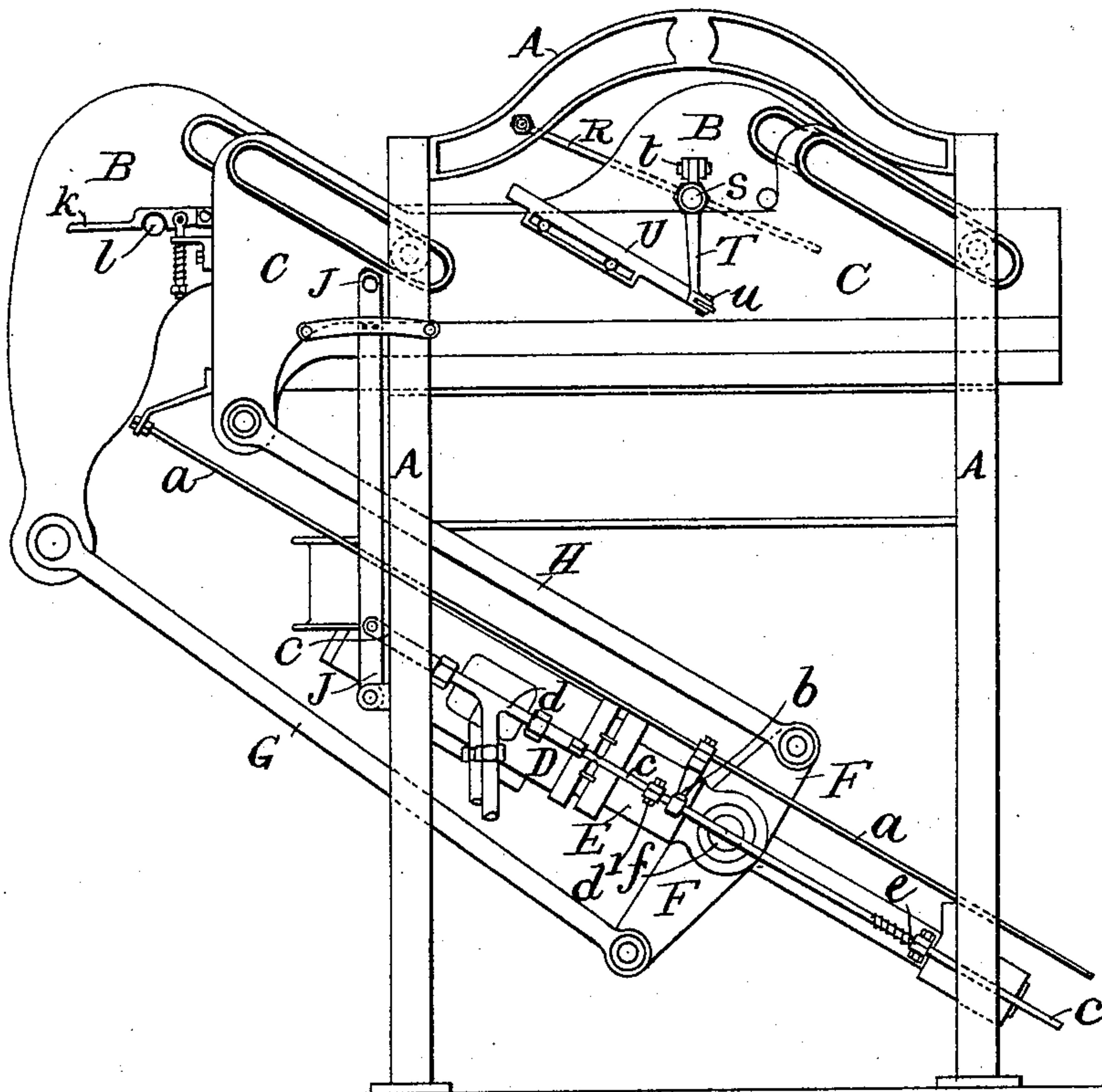


Fig. 1.



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Fig. 3.

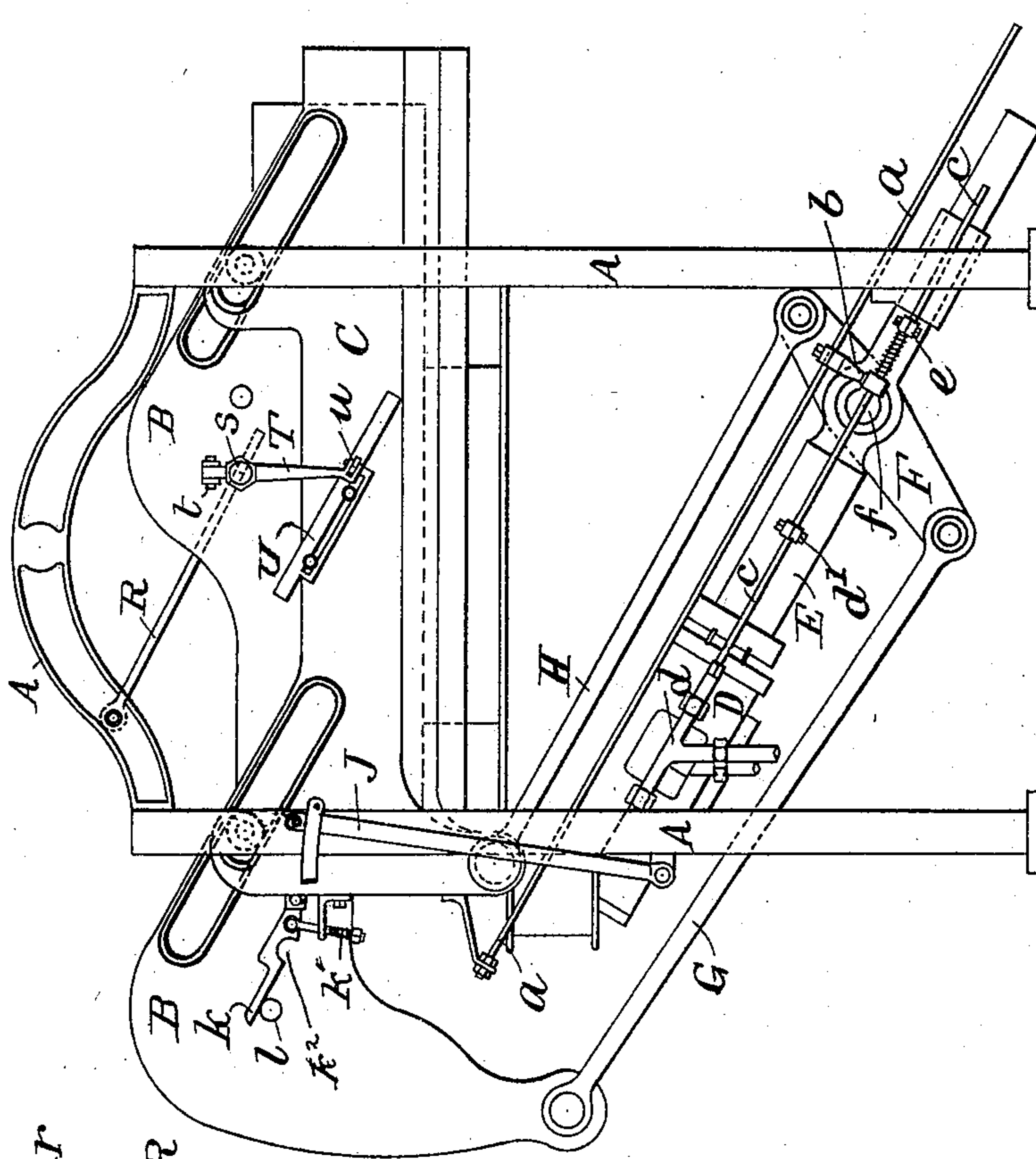
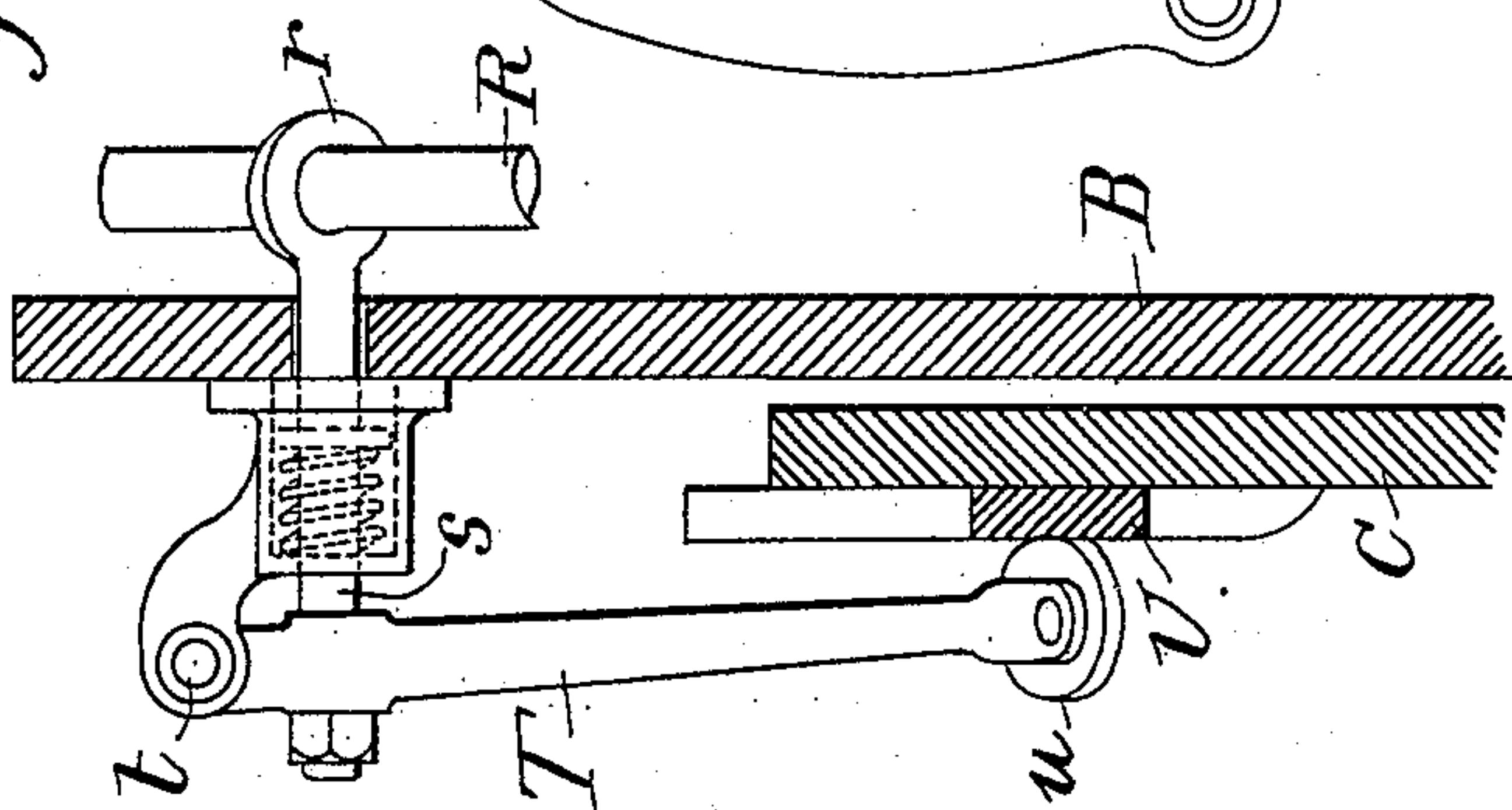


Fig. 4.



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UNITED STATES PATENT OFFICE.

BENJAMIN HOOKER, FREDERICK HOOKER, AND HENRY HOOKER, OF
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PAPER-CUTTER.

SPECIFICATION forming part of Letters Patent No. 582,288, dated May 11, 1897.

Application filed July 31, 1895. Serial No. 557,777. (No model.) Patented in England March 25, 1895, No. 6,141.

To all whom it may concern:

Be it known that we, BENJAMIN HOOKER, FREDERICK HOOKER, and HENRY HOOKER, subjects of the Queen of Great Britain and Ireland, residing at Pear Tree Court, Farringdon Road, London, England, have invented a new and useful Guillotine Cutting-Machine for Paper, Cardboard, and other Materials, (for which Letters Patent of Great Britain have been obtained on the 25th day of March, 1895, No. 6,141,) of which the following is a specification.

Our invention relates to an improved guillotine cutting-machine for paper, cardboard, and other materials in which the force required for operating the clamping and cutting devices is obtained by means of a hydraulic-pressure ram which is connected by suitable means to the said clamp and cutting-knife.

In order that our invention may be readily understood, reference is had to the accompanying drawings, which illustrate a guillotine constructed in accordance with our invention, parts of the machine being removed to show the essential features of the invention.

Figure 1 is a front view of the machine. Fig. 2 is a back view of the upper part of same, showing the clamp and a locking device hereinafter described. Fig. 3 is an elevation showing the position of the parts of the machine when the knife has descended to its lowest point and immediately before the return stroke is commenced; and Fig. 4 is a sectional elevation of details of locking device hereinafter described.

The frame A of our improved machine is substantially of similar design and construction to that hitherto employed in machines of this description, being provided with guides in the side frames or standards for the vertical movement of the clamp B and knife-carrier C, which rise and fall therein in the ordinary and well-known manner.

The hydraulic mechanism for operating the clamping and cutting devices consists of a cylinder D, the ram or plunger E, which is connected to the said clamp B, and knife-carriage C, in the manner to be described. The said hydraulic cylinder D is arranged beneath the bed or table of the machine, and

the longitudinal axis of the said cylinder is parallel to the direction of the movement of the clamp and cutting-knife, as shown.

The ram or plunger E of the cylinder D is provided at its outer end with a transverse rocking arm F, which extends on opposite sides of the said plunger, being mounted thereon on a center *f*. One end of the said rocking arm F is connected by the rod G to the end of the clamp B and the other end by a similar rod H to the end of the knife-carrier C.

The cylinder D is provided with a valve *d*, controlling the admission and escape of the fluid, the valve being of the usual and well-known slide pattern and operated in the following manner: *a* is a rod parallel to the axis of the cylinder D, connected at one end to the knife-carrier C and moving therewith. *b* is an adjustable striker or arm mounted on and carried by said rod *a*. The valve-rod *c* is connected at one end to a starting or hand lever J and carries dogs or stops *d'* and *e*, respectively.

The operation of the machine is as follows: The material to be cut being adjusted on the table of the machine (not shown in the drawings) in the ordinary manner, the hand-lever J is moved so as to open the valve and admit the operating fluid behind the ram, forcing out the latter, which, moving outward, carrying the arm F with it, brings down the clamp B and knife-carrier C. When the clamp B has descended to the required distance—viz., when it rests on the top of the material to be cut—the descent of the clamp is arrested and the end of the arm F, connected to the clamp by the rod G, is likewise arrested, but the continued motion of the ram E rotates the arm F on the center *f* and causes the motion of the ram, through the connecting-rod H, to bring down the knife, thus effecting the cut. When the knife reaches the lowest point of its descent, the striker *b* comes in contact with the stop *e* on the valve-rod and forces it downward, thereby throwing over the valve and allowing the fluid to be admitted to the opposite side of the ram, forcing up the latter and raising the clamp and knife-carrier to their original position. On the return stroke the striker *b* contacts with the dog *d'* and shuts

off the valve-inlet, and opening the exhaust permits the fluid within the cylinder to escape.

In order to insure sufficient pressure upon the clamp, after the latter comes in contact with the surface of the material, until the cut is commenced, we hinge at the end of the knife-carriage a lever k , held down by a spring k' and having a notch k^2 , adapted to receive a roller l on a stud on the clamp. When in operation, therefore, on the stoppage of the clamp the continued motion of the knife-carrier exerts pressure on the roller-stud l by means of the lever until the cut is commenced, when, owing to the pressure exerted by the continued downward movement of the knife-carrier, the lever will be caused to have a slight pivotal movement sufficient to cause it to free the roller l , as seen in Fig. 3. During the cut the clamp is locked by means of a device consisting of a rod R , fastened to the upper part of the frame, the said rod R having a sleeve r thereon, which is attached to a stud or bolt s , passing through the clamp. The outer end of the bolt s is connected to a lever T , fulcrumed at t and having a roller u at its other end which travels on an inclined plate U on the knife-carriage, the lower edge of the said plate being beveled or sloped off, so that the roller u may readily ride onto said plate U . On the arrest of the descent of the clamp the end of the lever T carrying the roller u will be forced outward by the plate U , thus causing the sleeve r to exert pressure on the rod R and securely lock the clamp until the return stroke of the knife-carrier releases the lever T and allows the clamp to be raised.

As the movement of the clamp is in a diagonal direction and a direct vertical pressure is required on the surface of the material, we provide the clamp at its lower edge with a loose bar w , having a vertical motion in guides on the framing, antifriction-rollers v being interposed between the upper side of said bar and under side of the clamp.

By reason of the bar w being loosely arranged, and the provision of the antifriction-rollers, the tendency of the material to shift or move diagonally under the diagonal pressure of the clamp is avoided, or at least considerably lessened, inasmuch as the rollers will under such pressure turn, thus avoiding any resistance in an opposite direction, which would be caused were the said rollers and bar not provided and a firm unyielding support for the material employed.

The pressure exerted by the ram being distributed between the knife-carrier and clamp, it will be readily understood that the pressure on the latter will be in a definite ratio to that on the carrier. Thus should an extra pressure be required on the knife owing to the dullness of its edge, the nature of the material, or other cause the clamp will exert an extra pressure in like proportion.

In ordinary self-clamping guillotines the pressure on the clamp is entirely independent of the cut, and it frequently happens that the

extra pressure on the cut from the causes previously stated moves the material and spoils the cut. This objection is entirely obviated by our invention, a sufficient pressure being exerted by both knife and clamp according to requirement.

A further advantage obtained by our invention is that in a machine constructed in accordance therewith the depth of the cut can be regulated according to the height of the work by simply adjusting the stop d' to open the valve-exhaust at the required point on the return stroke of the ram. The hand-lever J , connected to the valve-rod, also allows the operator to raise or lower the clamp and cutting-knife at will and from any point between their highest and lowest positions, while the speed of the cut is regulated by the extent to which the valve is opened.

The fluid-pressure required can be obtained from any convenient source without departing from the spirit of our invention.

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

1. In a cutting-machine of the character described, the combination with a movable knife-carrier, and a movable clamp, of a hydraulic cylinder having its longitudinal axis in a plane parallel to the direction of movement of the carrier and clamp; a ram operating in said cylinder, a rock-arm pivotally mounted on said ram, and rods connecting opposite ends of said rock-arm with the carrier and clamp, as and for the purpose specified.

2. In a cutting-machine of the character described, the combination with a movable knife-carrier and a movable clamp, of a hydraulic cylinder having its longitudinal axis in a plane parallel to the direction of movement of the carrier and clamp, a ram operating in said cylinder, a rock-arm pivotally mounted on said ram, rods connecting opposite ends of the rock-arm with the carrier and clamp, and a locking device for temporarily locking the clamp to the carrier until after the knife on the latter has begun its cut.

3. In a cutting-machine of the character described, the combination with a movable knife-carrier and a movable clamp, of a hydraulic cylinder having its longitudinal axis in a plane parallel to the direction of movement of the carrier and clamp, a ram operating in said cylinder, a rock-arm pivotally mounted on the ram, rods connecting opposite ends of the rock-arm with the carrier and clamp, an arm pivotally mounted on the carrier, said arm being provided with a notch and a roller or stud on the clamp, and a spring operating upon the said pivoted arm to cause the same to be temporarily engaged by the roller or stud entering within the notch of the arm.

4. In a cutting-machine of the character described the combination with a movable knife-carrier and a movable clamp, of a hy-

draulic cylinder having its longitudinal axis in a plane parallel with the direction of movement of the carrier and clamp, a ram operating in the cylinder, connections between the
5 ram, and the carrier and clamp, a valve controlling the admission of the operating fluid to opposite sides of the ram, a valve-rod, dogs or stops on the valve-rod, a rod connected and moving with the knife-carrier and
10 a striker on the latter rod adapted to come in contact with the stops on the valve-rod and operate the latter in the manner described.

5. In a cutting-machine of the character described, the combination with a movable
15 knife-carrier and a movable clamp, of a hydraulic cylinder having its longitudinal axis in a plane parallel with the direction of movement of the carrier and clamp, a ram operating in the cylinder, connections between the
20 ram and the carrier and clamp, a valve controlling the admission of the operating fluid to opposite sides of the ram, a valve-rod, dogs or stops on the valve-rod, a rod connected and moving with the knife-carrier, a striker
25 on the latter rod adapted to come in contact with the stops on the valve-rod and operate

the latter, and a hand-lever connected with the valve-rod, for the purpose specified.

6. In a cutting-machine of the character described, the combination with a movable
30 clamp, and a movable knife-carrier, of a locking device for locking the clamp in a clamping position said locking device being operated by the carrier in its downward and upward movements to lock and release the
35 clamp respectively.

7. In a cutting-machine of the character described, the combination with a movable clamp and a movable knife-carrier, of an inclined plate on the carrier, a rod, a sleeve
40 movable thereon, and attached to a bolt on the clamp, and a lever fulcrumed on the bolt and carrying a roller adapted to travel on the inclined plate, all as described for the purpose specified.

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