No. 627,599. Patented June 27, 1899.

C. SEYBOLD.

CLAMP COUPLING DEVICE FOR AUTOMATIC PAPER CUTTERS.

(Application filed July 11, 1898.)

(No Model.)

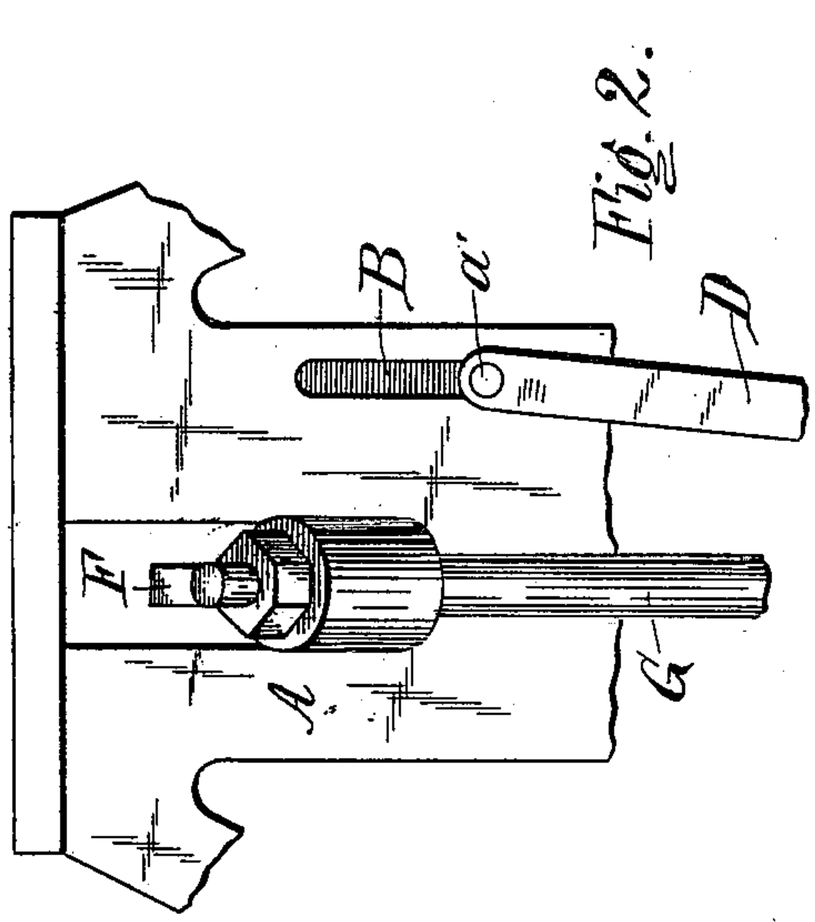
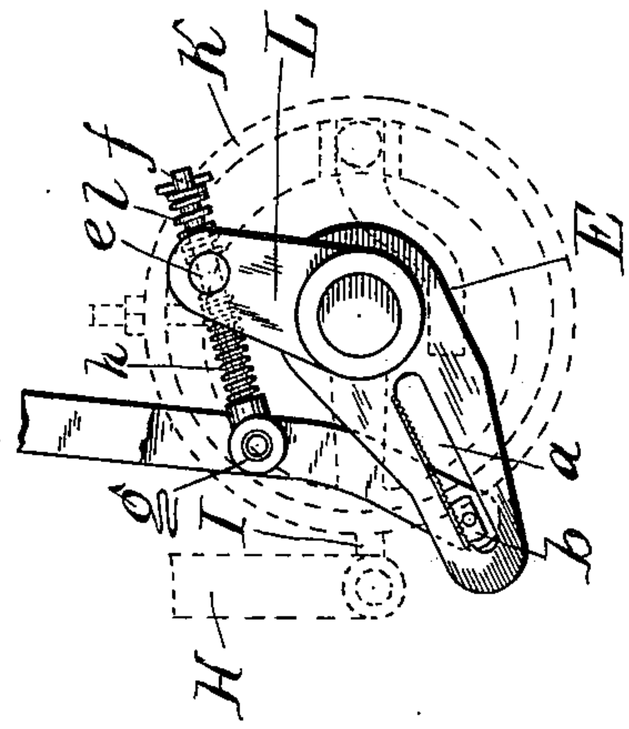


Fig. 2.



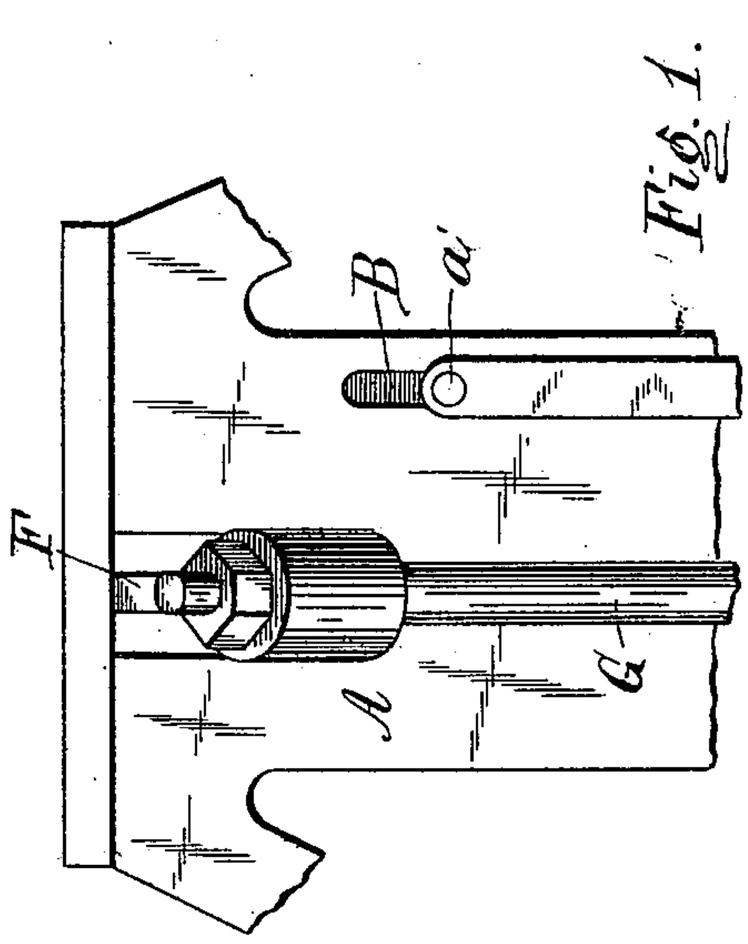
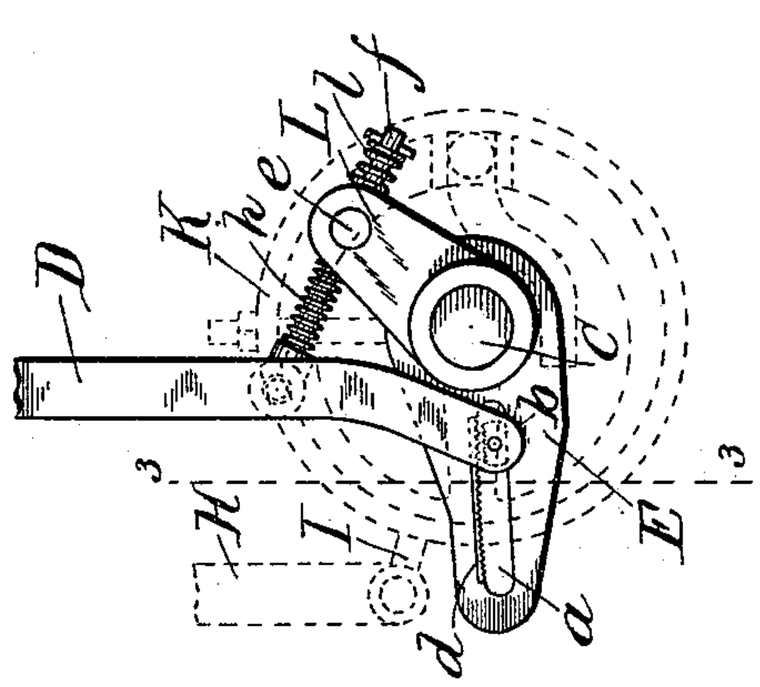


Fig. 1.



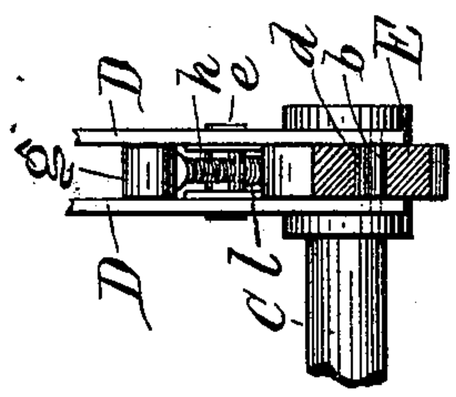


Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES SEYBOLD, OF DAYTON, OHIO.

CLAMP-COUPLING DEVICE FOR AUTOMATIC PAPER-CUTTERS.

SPECIFICATION forming part of Letters Patent No. 627,599, dated June 27, 1899.

Application filed July 11, 1898. Serial No. 685,578. (No model.)

To all whom it may concern:

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

My improvements relate to devices for coupling the clamp to the driving mechanism in an automatic paper-cutter in that class of machines in which the driving mechanisms for the clamp and for the knife are connected by a friction-clutch to hold rigid the paper, but to allow the knife to continue its operation by the slipping of the friction-clutch while the clamp stops on the paper. In machines of this class when the clamp is connected directly to the driving mechanism it is evident that the clamp-pressure will be dependent entirely on the friction-clutch. Now for very tough papers in which great power must be expended to drive the cutting-knife through the paper the friction-clutch may be loaded to its extreme limit and still the clamp-pressure will not be sufficient to hold the paper. Heretofore to overcome this difficulty I have provided means whereby the clamp-pressure might be increased or doubled by connecting the clamp-pulling bars with the clamp in such a way that the moment the clamp should reach the paper the power of compression should be at once doubled or increased in such amount as might be desired, as fully set forth in my Letters Patent No. 597,069, of January 11, 1898.

In the improvements set forth in my above-mentioned patent, while the requisite increased power of the clamp is effectually obtained, no provision is made for varying the clamping-pressure with reference to the height or thickness of the bundle of paper operated upon. With many qualities of paper to exert the same clamping-pressure thereon when only a few sheets are to be cut that is exerted when many sheets are to be operated upon gives too little pressure for the high or too much for the low pile. The clamp should exert more pressure with a high package of paper than with a low package. In machines of the class under consideration, also, where it is desirable that the driving mechanism for the cutting-knife should also actuate the clamp it is evident that the clamp should reach and exert its pressure on the paper before the knife commences to cut. As the travel of the knife is constant from the top of its stroke to the cutting-table at each operation; while the travel of the clamp depends upon the height of the paper bundle to be cut, if the clamp-driving mechanism be coupled directly to the clamp, so that the travel of the clamp is constant, and any provision be sought to be made to increase the power of the clamp by increasing the pulling leverage in proportion to the height of the paper pile, provision must also be made to allow a more rapid movement of the clamp for the low pile than for the high package of paper or the result will be that the knife will reach the paper before the clamp, because it is evident that if we increase the pulling leverage we will in exact proportion decrease the clamp travel unless provision be made to hasten the clamp movement. It is the purpose of my invention, therefore, to provide these requisites and to arrange for an automatic variable clamp-pressure in direct proportion to the height of the paper bundle and a speed movement which will always insure clamp-pressure before the knife begins to cut.

In the drawings, Figure 1 is a side elevation of a portion of a paper-cutting machine with my device attached, showing the clamp in its elevated position. Fig. 2 is a similar view with the clamp compressing the paper. Fig. 3 is a front sectional elevation of the clamp-coupling device, taken on lines 3 3 of Fig. 1.

A is a portion of the frame of one side of a paper-cutter.

B is one end of the clamp.

C is the clamp-driving shaft, connected with the clamp-pulling bars D D by the crank E, keyed thereto, the pulling-bars D D being pivoted to the clamp at a'.

F is one end of the knife-bar and G one of the connecting-rods for the knife-bar to the knife-driving plate, one end of which is shown in dotted lines at H.

K is an expansion-band friction-clutch (shown in dotted lines) mounted on the clamp-

shaft C and connected with the knife-driving bar H by bar I, so that when the knife mechanism is oscillated the shaft C will be oscillated by the friction-clutch K. I have not illustrated these parts in detail, as they form no part of my present invention, and the means for driving the knife mechanism may be any of the well-known methods, while the method of actuating the clamp-shaft C is the same as that shown in my prior patent, No. 511,972, of January 2, 1894.

In illustrating the novel features of my present invention I have shown but one side of the machine. It will be understood, however, that the clamp-coupling parts are all in duplicate, one set for each side of the machine, so that the description of one set of parts will apply to the other set on the other side of the machine.

Heretofore, as in my above-mentioned patent, No. 597,069, of January 11, 1898, provision was made for doubling the clamp-pressure upon the clamp reaching the paper pile, but no arrangement was suggested for varying the pressure in proportion to the height of the package. To accomplish this in my present invention, I form the slot *a* in the crank E and pivot the clamp-pulling bars D D therein by the dog *b*, the studs on the dog pivoting same to the pulling-bars. This dog is preferably rectangular in cross-section and is smooth on its lower side, so as to slide readily on the base of the slot *a*, while teeth *c* are formed on its upper surface to engage the teeth *d* on the upper face of the slot *a* in the crank E, as will be hereinafter described.

L is an arm formed integral with or rigidly secured to the crank E. The outer end of this arm is slotted or bifurcated and carries the pin *e*, through which the rod *f* passes loosely. The inner end of this rod *f* carries the collar *g*, by means of which the rod is pivoted to the pulling-bars, the collar *g* being preferably mounted on a collar through which the coupling-bolt passes, so that the coupling-bolt may be used to brace the pulling-bars D D together at the same time that it serves for a pivot-pin for the rod *f*. Surrounding the rod *f* and bearing between the collar *g* and pin *e* is the coiled spring *h*, while outside the pin *e* and bearing between it and a plate on the end of the rod is a similar spring *l*, only somewhat stronger and stiffer than spring *h*. When the clamp is in its upper position, the crank E and its slot *a* are almost horizontal, and the weight of the clamp acting on the pulling-bars will cause the dog *b* to rest in the base of the slot *a* out of engagement with the teeth *d* and free to slide in the slot. As the knife starts in its downward stroke, the clamp-shaft C is oscillated through the friction-clutch and the clamp descends freely by its own weight until it reaches the paper. The moment the clamp reaches the paper the pulling-bars D D and the dog *b* stop, and the further oscillation of the shaft C and crank E brings the teeth of the crank into engagement with the dog, and the pulling-bars are locked at once to the crank.

As has already been stated, the pulling-bars and cranks are in duplicate, one set on each side of the machine, and as one of the dogs might not move in its slot as readily as the other without some arrangement to enforce immediate and similar movement of both dogs they might not engage the cranks E at the same distance from the center of the clamp-shaft C and the pull on the clamp would not be uniform at each end. For this reason I provide the rod *f*, forming a connection between the arm L and the pulling-bars D D, so that the oscillation of the crank E will swing the bars forward and cause a uniform travel of the dogs *b* in their respective slots in the cranks E. As above stated, the pulling-bars become locked to the crank E the moment the clamp reaches the paper, and the subsequent oscillation of the clamp-shaft and crank exerts the pressure on the paper. After the pulling-bars become locked to the crank to permit further movement of the crank and arm L the pin *e* merely compresses the spring *h*, which is necessary, as the points of attachment of the pulling-bars to the dog and rod *f* then become fixed points.

During the operation of locking the dogs on the pulling-bars to their respective cranks it might sometimes happen that the outer edges of the teeth of the dogs and crank-slots would engage and the dogs not lock securely to the cranks. If the tendency were for the dog to go forward to make perfect engagement, the compression of the spring *h* would permit this movement; but if the tendency of the dog were to move in the other direction perfect engagement could not be had, and for this reason I supply the outer end of rod *f* with spring *l*, as described, so as to allow a slight back movement of the dog and pulling-bars should it be necessary to allow perfect engagement of the parts. This spring *l* is much heavier and stiffer than spring *h*, as it is only necessary to allow for a very slight movement of the dog, and in the back stroke the rod *f* and spring *l* must sustain the weight of the clamp in pulling back the bars D and dog to the original position in the slot of the crank.

From the foregoing description the operation of the clamp-coupler will be evident. At the top of the clamp stroke the dog *b* is in a position to be locked to the crank at a short distance from the center of the clamp-shaft C, so that if the package of paper is high the maximum amount of power is exerted on the package, while with each fraction of an inch decrease in the height of the paper pile the pulling-bars lock to the crank at a corresponding greater distance from the center of the clamp-shaft, thus decreasing the power of the clamp in exact proportion to the height of the package of paper. Moreover, the clamp will

always reach the paper before the knife begins to cut, as the clamp is free to move by its own gravity until the paper is reached.

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

1. In a clamp-coupling device for paper-cutters, a clamp and driving mechanism therefor, with sliding attachment intermediate said clamp and driving mechanism normally free when the clamp is not in operation, and means for locking the clamp to the driving mechanism, the moment the clamp reaches the paper, at varying distances from the fulcrum of the driving power in proportion to the travel of the clamp to the paper.

2. In a clamp-coupling device for paper-cutters, the combination, with a clamp and crank for operating same, of a sliding clutch intermediate said clamp and driving cranks, normally free when the clamp is not in operation, and driving mechanism for locking said clutch to the cranks, the moment the clamp reaches the paper, at varying distances on said cranks in proportion to the travel of the clamp to the paper.

3. In a clamp-coupling device for paper-cutters, the combination, with a clamp and pulling-bars therefor, of a driving-shaft, with cranks mounted thereon, said cranks being slotted lengthwise and formed with teeth on one surface thereof, dogs pivoted to said pulling-bars mounted to slide freely in said slots when the clamp is not in operation, but locking to said cranks, the moment the clamp reaches the paper, at varying distances thereon in proportion to the travel of the clamp to the paper.

4. In a clamp-coupling device for paper-cutters, the combination, with a clamp and pulling-bars therefor, of a driving-shaft, with cranks mounted thereon, said cranks being slotted lengthwise and formed with teeth on one surface thereof, dogs pivoted to said pulling-bars mounted to slide freely in said slots when the clamp is not in operation, but locking to said cranks, the moment the clamp reaches the paper, at varying distances thereon in proportion to the travel of the clamp to the paper, and springs acting between said pulling-bars and cranks to enforce said sliding movement of the dogs.

5. In a clamp-coupling device for paper-cutters, the combination, with a clamp and pulling-bars therefor of a driving-shaft, with cranks mounted thereon, said cranks being slotted lengthwise and formed with teeth on one surface thereof, dogs pivoted to said pulling-bars mounted to slide freely in said slots when the clamp is not in operation, but locking to said cranks, the moment the clamp reaches the paper, at varying distances thereon in proportion to the travel of the clamp to the paper, and double-acting springs acting between said pulling-bars and cranks to enforce said sliding movement of the dogs and to allow a slight backward movement thereof to insure the locking to the cranks.

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