(No Model.)

C. SEYBOLD.

CUTTING MACHINE.

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CUTTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 557,157, dated March 31, 1896.

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To all whom it may concern:

Be it known that I, CHARLES SEYBOLD, a citizen of the United States, residing at Dayton, Montgomery county, State of Ohio, have invented certain new and useful Improvements in Cutting-Machines, of which the following is a specification, reference being had to the accompanying drawings.

My improved cutting-machine is more especially designed and adapted for use in cutting round corners on cards, books, or other articles, the essential features of said improvement consisting of the means hereinafter set forth and claimed for operating the knife and clamp.

In the accompanying drawings, Figure 1 is a front elevation of a machine, as preferably constructed, embodying my invention; and Fig. 2 is a side elevation taken at right hand of Fig. 1. Fig. 3 is a top view of the machine shown in preceding figures, a portion of the top plate being broken away. Fig. 4 is a central vertical section taken through the top plate, knife, and its supporting-rod, showing the clamp in position on a pile of cards with the knife in the act of cutting the corners of said cards, said view also illustrating the relative position of the operating toggle-arms when the knife is in the position indicated. This view is on a diminished scale and taken through line 4 4 of Fig. 3, looking to the left, but with the crank-wheel which operates the toggles and which would be cut out by the section shown in dotted line. Fig. 5 is an enlarged detail sectional view of the preferred form of clutch mechanism for engagement with the driving-pulley mounted loosely upon the main shaft. Fig. 6 is an enlarged top view of the knife-guide attached to the top plate of the machine, said plate being broken away.

Referring to the drawings, A represents a hollow cast base, upon which the operating mechanism is mounted, and A^2 represents a top plate or table supported by the corner rods A^3, as shown.

The knife B is attached to the top portion of the rod B^2, which latter is supported in a vertical position by being passed through an opening in the base and top plate, said rod being capable of a vertical movement therein in the manner hereinafter set forth. This knife is preferably of a circular outline in cross-section to correspond with the desired outline to be cut on the corner of the cards or other articles; but the configuration of the cutting portion of the knife may be of any desired outline. The rod B^2 is provided near its lower end portion with a stop-collar B^3, adjustably connected thereto for the purpose of limiting the downward movement of said rod and knife, and also for the purpose of affording a leverage to lift the clamp-rod, as will presently appear. This stop-collar is preferably provided with a lateral arm *b*, provided with a vertical rod b^2, which latter is mounted within an opening in the base, which construction tends to prevent any rotary movement of the said rod B^2 after the said collar is attached thereto by a set-bolt b^3 or other suitable means.

The clamp D is adjustably connected to its operating-rod D^2 in any desired manner, preferably by means of the set-nuts *d*, in which event said clamp is provided with a rearward projection d^2, the latter having a vertical rod d^3, which enters an opening in the rear of top plate A^2, said projection and rod being adapted to prevent any lateral movement of said clamp when mounted on its rod, as shown. This clamp-rod D^2 is made to fit snugly within an opening in the base and top plate and is adapted to move therein in a manner similar to that of the knife-rod B^2 and in the manner presently to be described.

The knife-rod B^2 and clamp-rod D^2 are connected together and operated by means of a compound toggle connection, substantially as illustrated, said toggle mechanism being operated by a crank on the main shaft.

When constructed as shown, I provide two toggle-arms E, mounted at one end on the pins *e* attached to the knife-rod B^2, and two toggle-arms E^2, mounted at one end on the pins e^2 attached to the clamp-rod D^2, the inner end portion of said arms, at each side of said rods, being pivoted together and to the rear end of the bars E^3, as shown at e^3. The front end portion of bars E^3 are loosely mounted upon a crank-pin F, the latter being attached

to the peripheral side face of a wheel F^2, which wheel is attached to the inner end of the shaft F^3, as shown.

Any suitable operative driving mechanism may be employed for rotating the shaft F^3 and for automatically stopping the same.

In the drawings, G represents a collar having a feather-and-groove connection with the shaft upon which it is mounted, said collar being thus mounted between the sleeve G^2 and the hub of the band-wheel H, as more clearly shown in Fig. 5, the latter and sleeve G^2 being loosely mounted in a rotatable position on the shaft.

J represents a foot-treadle pivotally connected to the base of the machine, said treadle having the upwardly-projecting lever portion J^2 and lateral pin J^3, the latter entering a countersunk recess in the side face of sleeve G^2, as shown in Fig. 5. An elastic packing *j* is preferably interposed within the recess of said sleeve G^2 and pin J^3, as shown. A pin *g* is attached to the inner face of sleeve g^2, which pin engages within an angular groove or recess formed in a portion of one side face of collar G, as shown by dotted lines in Fig. 5, when said collar is in the position shown.

h represents openings formed at intervals around one side face of collar G, within one of which openings the spring-pressed pin h^2 on the hub of the band-wheel enters, said hub also having a similar pin h^3 with a head h^4, which latter rides in the same path as pin h^2, but will not enter said openings on account of the enlarged head.

The object of the clutch mechanism just described is to drive the shaft and automatically stop its rotation when it has made one revolution, and the operation of this mechanism is as follows: The band-wheel is continuously in motion upon its shaft while the machine is being operated. To rotate the shaft, the operator puts pressure upon the treadle J, the movement of which, through the medium of lever J^2 and pin J^3, will cause the collar G to slide over on its shaft toward the hub of the band-wheel, at the same time pressing the headed pin h^3 inward within said hub. So soon as the spring-pressed pin h^2 comes into line with any one of the openings *h* at that instant said pin h^2 will enter said opening, thus causing the collar G and its shaft to rotate with the band-wheel. The pin *g* being released from its angular recess in the manner just described, said pin will hold said collar in position until it has made almost one revolution, when the spring-pressed pin h^3 will act to force the collar G back into the position shown in Fig. 5, the pin *g* riding down the angular face of its recess. This last movement releases the collar from the pin h^2, which movement stops the rotation of the former and its shaft.

L represents two gages which are adjustably connected to the top plate or table A^2 by means of set-bolts *l* passed through an elongated opening in each angular base of said gage, as more clearly shown in Fig. 3. The gages L are set at a proper angle, so that one corner of the pile of cards M or other sheets of paper placed against said gages will be directly over the opening *m* in the top plate through which the knife B enters. This opening is provided with an overlapping guide-plate *n*, which has a rounded lip n^2, corresponding in outline to the inner face of the knife with which it coacts. This plate *n* is preferably attached to the top plate A^2 within a properly countersunk portion thereof, as shown by section in Fig. 4.

I will now describe the operation of the knife and clamp. The operator first places the pile of cards or other articles to be cut and cornered in position against the gages L, when he places his foot upon the treadle J, which will cause the shaft F^3 and its crank-wheel F^2 to rotate in the manner hereinbefore stated. When not in the act of cutting, the knife will be lowered below the table, while the clamp will be elevated to its highest point, as illustrated in Figs. 1 and 2, the collar B^3 of the knife-rod resting upon the base of the machine when said parts are in this position. So soon as the bars E^3 begin to draw the pivoted toggles E and E^2 inward the latter will act to force the rod D^2 and its clamp D downward, and as the clamp comes into contact with the pile of cards (see Fig. 4) or other articles said clamp will tightly compress them, at which time the farther downward movement of the clamp and its rod is stopped. The downward movement of the clamp-rod having been stopped in the manner just described the toggle-arms E will act to force the rod B^2 and its knife B upward, which movement cuts the corners of the pile compressed beneath the clamp. It will be seen that it takes but one-half of a revolution of wheel F^2 and its crank F to cause the clamp to descend and the knife to ascend in the manner aforestated. The last half of the revolution of said crank will cause a reverse movement of the bars E^3 and toggle-arms E and E^2, which movement will draw the rod B^2 and its knife downward until the collar B^3 strikes the base of the machine, at which instant the arms E^2 will act to force the rod D^2 and its clamp upward, thus releasing the pile of articles having had their corners cut, as aforestated.

From the description just given it will be seen that the knife-rod moves in a direction opposite that of the clamp-rod and that the clamp, resting on the articles to be cut, serves as a base or support to drive the knife upward, while the collar on the knife-rod (when lowered) acts as a base or support to drive the clamp upward after the knife has made its cut.

To counteract the weight of the clamp and its rod and to insure against any movement of the shaft after the latter is elevated, I have

provided a spring-pressed pin *t*, mounted within a hollow base T, the latter being made fast to the base of the machine. This pin *t* is adapted to enter a notch formed in the periphery of wheel F^2, and thus retain the latter and its shaft in a fixed position until operated upon by the driving mechanism in the manner aforestated.

When it is desired to remove the knife for grinding or to adjust it in any manner, I have provided the hand-wheel S on the end of the shaft, by the aid of which the shaft and its collar G may be rotated to elevate the knife and its rod above the top plate A^2 without operating the band-wheel. Having elevated the knife to proper position by means of said hand-wheel, all the parts will remain in that position until the knife is properly adjusted, when the band-wheel may be again set in motion.

It is preferred to provide the lower face of clamp D with a detachable strip of soft metal *a* to protect the cutting edge of the knife after having passed through the articles on its upstroke.

The advantages of my invention are many and apparent. The feature of having the knife and clamp connected and operated by the toggle mechanism insures the greatest possible clamping power, which is very essential in all corner-cutters. The more power that is required to drive the knife, by reason of its dullness, will insure that much more additional clamping force on the articles being cut, as the knife and clamp pull against each other, and any power applied to the knife must be transmitted to the clamp.

The machine as a whole is compactly and economically built, while the adjustment of the knife and clamp is quite simple and effective.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a cutting-machine, the knife attached to a vertically-supported rod, B^2, and a clamp adjustably connected to a rod D^2 parallel with rod B^2, said rods being movably mounted and connected by toggle-actuated mechanism for driving said rods in opposite directions, for the purposes specified.

2. In a cutting-machine, a knife mounted at top of a movable rod, the latter having a suitable stop for limiting its downstroke, and a clamp mounted upon a rod parallel with the knife-rod, said rods being suitably supported in a movable position and connected by toggle-actuated mechanism, substantially as set forth.

3. In a cutting-machine constructed substantially as set forth with a base A and top plate A^2, the latter having gages, L, a knife mounted upon a rod B^2 and adapted to pass through an opening in said top plate, a clamp mounted on a rod D^2, and suitable operative mechanism connected to said rods for moving them in opposite directions, for the purposes set forth.

4. In a cutting-machine, the base A, top plate A^2 suitably supported and having gages as L, rod B^2 having a knife and a stop for limiting the downstroke of said rod, rod D^2 having a clamp adjustably connected thereto, toggle-arms E and E^2 pivotally connected to said rods and to the horizontal bars E^3, the latter being attached to a crank mounted on the driving-shaft, and suitable means for rotating the latter.

5. In a cutting-machine having a knife and clamp adapted to be actuated by toggle mechanism, the main shaft, the crank-wheel secured upon said shaft, a link connecting the crank-pin of said wheel to the toggle mechanism, said crank-wheel having a notch in its peripheral face, the elastically-supported pin held in contact with the face of the crank-wheel and adapted to enter the notch in its face when the driving mechanism is disconnected, and act as a brake to prevent the wheel from turning backward by the weight of the clamp and its supports, substantially as set forth.

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