

APPLICATION FILED NOV. 23, 1908.

Patented Sept. 28, 1909.

2 SHEETS—SHEET 1.



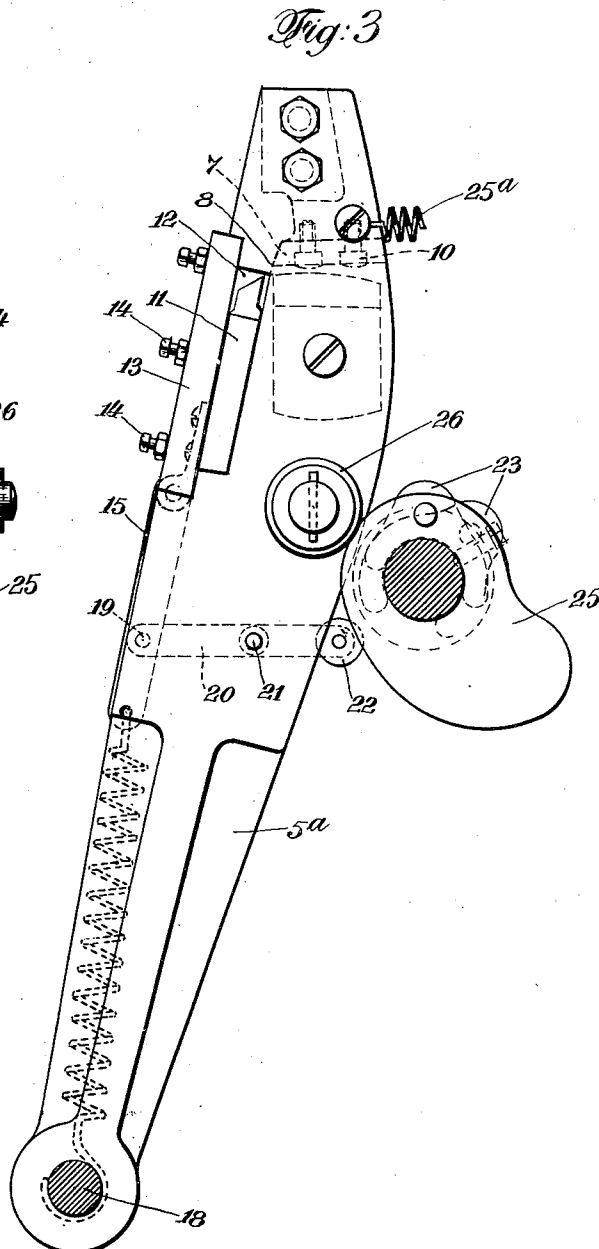
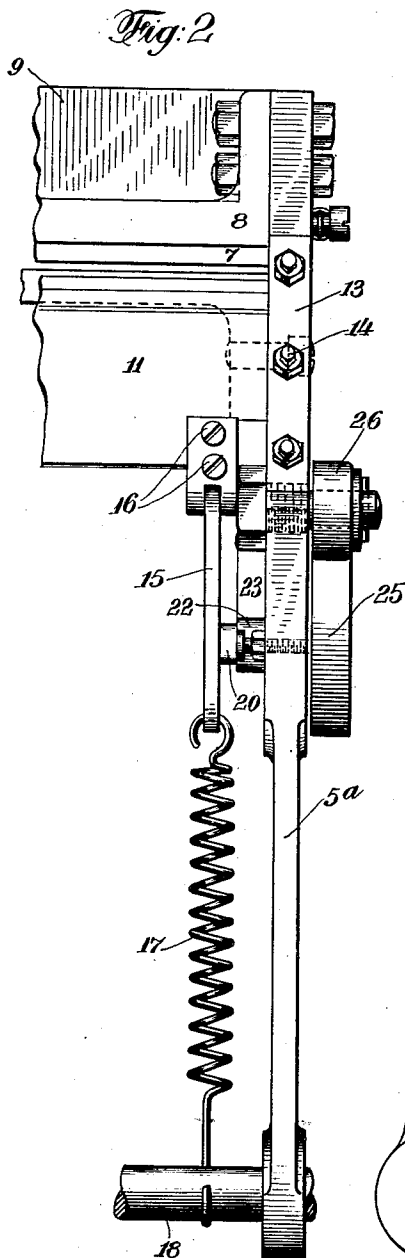
Charles Van Duesenworth, Inventor
By his Attorneys
Prindle and Wright

C. VAN MIDDLESWORTH.
PAPER CUTTING DEVICE.
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935,340.

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2 SHEETS—SHEET 2.



Witnesses:
M. Meikle
A. Newcomb

Inventor
Charles Van Middlesworth
By his Attorney
Prindle and Wright.

UNITED STATES PATENT OFFICE.

CHARLES VAN MIDDLESWORTH, OF BROOKLYN, NEW YORK, ASSIGNOR TO VAN DYCK
GRAVURE COMPANY, OF NEW YORK, N. Y.

PAPER-CUTTING DEVICE.

935,340.

Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed November 23, 1908. Serial No. 464,095.

To all whom it may concern:

Be it known that I, CHARLES VAN MIDDLESWORTH, of Brooklyn, in the county of Kings and in the State of New York, have invented a certain new and useful Improvement in Paper-Cutting Devices, and do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to an improvement in cutting mechanisms, and especially to cutting mechanisms designed to be used in printing presses for cutting a traveling strip of paper into sheets.

It relates especially to a cutting mechanism which is adapted to cut the sheet of paper while the same is in motion, the mechanism by which I accomplish this constituting in part a traveling knife.

A further feature of my invention comprises mechanism by which one of the cutting edges of the knife is given a shearing motion with relation to the other cutting edge, so as to insure an effective cutting of the sheet at each cutting operation of the knife.

I have shown one embodiment of my invention in the accompanying drawings, in which—

Figure 1 represents a side view of a portion of a printing machine comprising the cutting mechanism; Fig. 2 is a vertical elevation of a portion of the reciprocating frame carrying the knives; and Fig. 3 is a side view of the same showing the actuating cams diagrammatically.

In the drawings, 1 is a side frame at one side of the machine, there being a similar side frame at the other side thereof not shown, for supporting the various movable parts. A traveling web of paper is adapted to be led into the machine beneath a feed roller 2 which has a plurality of cooperating feed rollers 3 located beneath the same. The paper after passing beyond the rollers 2 and 3 is led between a pair of small guide rollers 4, which are supported upon stationary arms 5 projecting from one portion of the frame 1. Between the rollers 2 and 3 and the rollers 4 there is a reciprocating knife-frame 5^a; the lower end of which is pivoted in journals 6 at the lower end of the frame, as shown in Fig. 1. The frame 5^a carries at its upper end a transverse horizontal knife 7 having at one side a cutting edge 8, said knife being supported upon a bracket 9 by

means of screws 10. The other knife, or lower knife 11, is supported for reciprocation in an approximately vertical direction within the slots 12, there being one of these slots at each end of the frame 5^a. A removable plate 13 is situated at each side of the frame 5^a for the purpose of retaining the ends of the lower knife 11 within the slots 12. These plates are locked into position by means of lock nuts 14, shown in Fig. 3. The two ends of the lower knife 11 are adapted to be reciprocated independently of each other through the agency of links 15, one of which is situated at each side of the frame 5^a. The upper end of each of these links is attached by screws 16 to the knife 11. At the lower end of each of the links 15 there is attached a spring 17, one end of which is extended around a shaft 18 passing from one side of the frame 5^a to the other. The springs 17 normally hold the knife 11 in its lowermost position, and in order to effect the raising of the knife at the proper times, I make use of a cam mechanism which I will now describe.

Each of the links 15 has pivoted thereto near its center at 19 a lever 20, which lever 20 is pivoted to one of the side frames 1 upon the journals 21. The levers 20 carry at their free ends rollers 22, each of which is designed to run upon a cam 23. The cams 23 are situated upon and driven in unison with a shaft 24, upon which the feed rollers 3 are located. The cams 23, however, are located in such a manner that the high portions thereof do not register with each other, the effect of this arrangement being such that one of the levers 20 and its attached roller 22 is operated upon by one of the cams 23 before the corresponding lever and its roller on the other side of the frame 5^a is operated upon by the remaining cam 23. As a result, one side of the reciprocating knife 11 is raised prior to the elevation of the other side thereof, thus producing a shearing action between the knife 11 and the knife 7. At the same time that the shearing action is taking place, the frame 5^a carrying the knives 7 and 11 is caused to travel forwardly in the same direction as, and with the same speed as the traveling web of paper, this being effected by a large cam 25 also situated on the shaft 24 and adapted to operate upon a roller 26 pivoted directly upon the frame 5^a. The frame 5^a

is maintained in contact with the cam 25 by a spring 25^a connecting the upper end of the frame with the standard 1. The traveling web of paper is thus cut while situated at a point between the rollers 2 and 3.

The cut sheets after being fed through the rollers 4 are received by gripping mechanisms carried upon a rotary frame 27 journaled at 28 to the side frames 1. The rotary frame 27 comprises a plurality of S-shaped arms 28^a, the outer turns of which are curved in a circular direction concentric with the journals 28 of the frame. The rotary frame 27 further comprises two end members 29 situated upon the transverse shaft 30 which carries the frame 27, which end members 29 are secured together by longitudinal bars 31 extending from one end of the frame 27 to the other and situated on opposite sides of the end members 29. Near the ends of the end members 29 I have located two shafts 32 which are movably carried in said members. The shafts 32 carry a plurality of gripper fingers 33, the ends of which extend over the edges of the longitudinal bars 31. To the shaft 32 I also attach lever arms 34 carrying in their ends rollers 35 which are designed to run over the surface of a stationary cam 36 attached to the side frame 1. The rollers 35 are maintained in contact with the cam 36 through the action of springs 37 attached at one end to the lever arms 34 and at the other end to the end members 29. When the rollers 35 are in contact with the cam 36 the gripper fingers 33 are raised so as to be in the position to receive a sheet of paper. When, however, the rollers 35 have passed beyond the cam 36 the fingers 33 are adapted to be seated upon the longitudinal bars 31 so as to firmly grip the sheet of paper. The upper feed roller 2 is connected by a band 38 to the upper feed roller 4 so as to provide power for positively driving the feed rollers 4. The lower rollers 3 are connected by means of a chain 39 and sprockets 40 and 41 with the shaft 30, so as to positively drive the rotary frame 27.

In order to insure that the paper will be received between the opening fingers 33 and against the longitudinal bar 31 cooperating therewith, I provide an automatic mechanism for projecting the edge of the sheet of paper into the teeth of the grippers. The same portion of the frames 1 which carries the stationary arms 5, also supports at each side of the device an additional stationary arm 42, said arm 42 carrying therein a movable shaft 43, which shaft carries a series of fingers 44. These fingers 44 are supported within brackets 45, in which they may be adjusted by the movement of screws 46. The brackets 45 are also adjustable upon the shaft 43 by the adjustment of screws 47 passing through the bodies of the brackets.

The finger 44 which is nearest to one end of the shaft 43 is projected into the path of movement of a pin 48 carried upon each end of one of the end members 29. The remaining fingers 44 are set at a different angle, as shown in Fig. 1, so that when the first mentioned finger 44 is moved by contact with the finger 48, the remaining fingers 44 are caused to project the free edge of the paper into the jaws of the grippers.

In the operation of the device, a traveling web of paper is fed between the rollers 2 and 3 and is thence guided between the feed rollers 4. Between the rollers 2 and 3 and the rollers 4 the reciprocating knife is adapted at proper intervals, regulated by the position of the cam 25 and by its speed, to cut the web of paper into sheets. This is effected by the frame 5^a being caused to travel at the same rate of speed, at the point thereof where the knives are situated, with the web of paper, and the simultaneous elevation of the knife 11 with a shearing movement against the edge of the upper knife 7. The severed sheets of paper after passing through the rollers 4 are grasped by the grippers 33, and having been carried around with the rotary frame 27 are deposited in the usual manner beneath the rotary frame 27 whence they may be removed in any desired way. It will be observed that whenever the rollers 35 are in contact with the cam 36 the grippers will be in their open position. That is to say, when a roller 35 strikes the lower portion of the cam 36, the gripper arm 33 connected therewith is raised so as to release the sheet of paper, and when the same roller reaches the upper portion of the cam 36, the finger 33 attached thereto is raised in a similar manner to receive a new sheet of paper. As each set of grippers reaches the place where the free edge of a sheet of paper is to be grasped, the pin 48 adjacent thereto comes into contact with one of the fingers 44 so as to move the remaining fingers 44 downwardly and project the sheet of paper into the jaws of the grippers. If it were not for the provision of some mechanism of this character the sheet of paper would not be always fed into the open jaws of the grippers.

While I have described my invention above in detail, I wish it to be understood that I consider my invention to be a broad one and capable of many changes and adaptations without departing from the spirit thereof.

I claim:—

1. In a device of the character described, the combination of means for moving a sheet of paper, a reciprocating cutting device, means for moving it with the movable sheet of paper, and means for giving the cutter a scissors-like shearing movement to sever the paper by cutting the same from one side to and through the other side.

2. In a device of the character described, the combination of means for moving a sheet of paper, a reciprocating cutting device, means for moving it at the same speed as the movable sheet of paper, and means for giving the cutter a scissors-like shearing movement to sever the paper by cutting the same from one side to and through the other side.
3. In a printing press, a pivoted reciprocating knife carrying a plurality of knives, and means to move said knives so as to produce a scissors-like shearing movement beginning at one side and extending to and through the other side.
4. In a device of the character described, the combination of a rocking frame, a horizontal flat knife carried thereby and a vertical knife carried thereby.
5. In a device of the character described, the combination of a rocking frame, and two knives thereon, one of which is reciprocable to produce a scissors-like shearing action of the knives beginning at one side and extending to and through the other side.
6. In a device of the character described, the combination of a rocking frame, two knives thereon, one of which is reciprocable, and movable cams to effect said reciprocation of the knife upon the frame to produce a scissors-like shearing action of the knives.
7. In a device of the character described, the combination of a rocking frame, two knives thereon, one of which is reciprocable to produce a shearing action of the knives, and movable cams to effect said reciprocation of the knife upon the frame to produce a scissors-like shearing action of the knives.
8. In a device of the character described, the combination of a rocking frame, two knives thereon, one of which is reciprocable,

and non-alined movable cams to effect said reciprocation.

9. In a device of the character described, the combination of a rocking frame, two knives thereon, one of which is reciprocable to produce a shearing action of the knives, and non-alined movable cams to effect said reciprocation.

10. In a device of the character described, the combination of a rocking frame, means for reciprocating the same, comprising a movable cam, a knife, a reciprocable knife on said frame, and cam-mechanism for reciprocating the knife to produce a scissors-like shearing action of the knives.

11. In a device of the character described, the combination of a rocking frame, means for reciprocating the same, comprising a movable cam, a stationary knife, a reciprocable knife on said frame, and cam-mechanism for reciprocating the knife to produce a scissors-like shearing action of the knives.

12. In a device of the character described, the combination of two knives, one of which is reciprocable, and a cam for independently operating each end of the reciprocable knife for giving it a shearing action.

13. In a device of the character described, the combination of two knives, one of which is reciprocable, a lever attached to each end of the reciprocable knife, and a cam for cooperating with each of said levers independently to produce a shearing action of the knives.

In testimony that I claim the foregoing I have hereunto set my hand.

CHARLES VAN MIDDLESWORTH.

Witnesses:

CHARLES W. SAALBURG,
A. R. RICHARDS.