PAPER PERFORATOR WITH AUTOMATIC REINFORCING DEVICE OF THE PAPER AT THE HOLES

INVENTOR
I. SKREBBA, GEB. STÜHLINGER

BY A. J. NIGSTICK
ATTORNEY
This invention relates to office machines which serve to perforate sheets of paper, cards, copy and other paper documents to allow them to be threaded, for instance, on the ‘spindles’ of files, and the invention relates more particularly to the type of machine which comprises an automatic feeding and sticking device for cutting reinforcing strips which are laid on the document, are stuck to it and which are perforated at the same time as the document to reinforce it at the place where the holes are made.

One of the objects of the invention is to realize a machine of this type in which the feeding mechanism for the reinforcing strips may be locked at will, to effect perforations only when it is not desired to reinforce the documents. Another object is to combine the mechanism and its actuating part in such a manner that when movement of the mechanism has started, no other movement of the mechanism can be started or effected before the completion of the started movement.

Other important objects and advantages of the invention will appear in the course of the following description of the appended drawings, in which:

Fig. 1 is a front view of the machine,
Fig. 2 is a top view,
Fig. 3 is an end view,
Fig. 4 is a section along line IV—IV of Fig. 2,
Fig. 5 shows details of the feed-drums for the reinforcing strip.
Fig. 6 shows details of a knife.

The machine comprises a rigid underpart or support 1 for example made of sheet-iron, provided with vertical edges 2 which serve to support the various elements mentioned hereafter. Those two vertical edges or walls extend along about the half of the length of the support 1, the other part of said support being covered by a table 4 for reception of the documents to be perforated. At its side adjacent to walls 2, the table 4 is provided with stops such as 5 against which the documents abut and the table 4 is formed to provide holes 6 in which the perforating punches 7 will enter during perforating operations. These punches are carried by a perforating top 8 extending transversally to the table 4 and fixed to the top end of a lever 9 pivoting around shaft 10 supported by the walls 2. A spring 11 tends to push lever 9 away from table 4. Around shaft 12, also supported by walls 2, is pivotally carried a lever 13 provided with a handle 14. This lever 13 embraces the top of lever 9 and, when pushed down, it is applied on to a rotatable roller 15 carried by top 8. When top 8 is pushed down, the punches 7 are actuated to perforate the documents not by a direct action on lever 9, but over lever 13 and roller 15. On account of the proximity of pivot 12 and top 8, this arrangement considerably lowers the effort necessary to perforate a certain number of documents at the same time. As shown by the drawings, when the perforating punches penetrate in the documents, the direction of the effort on roller 15 is exactly parallel to the downward movement of those punches. This permits all of the force to be applied to the perforating action and makes the device operate with a minimum of effort.

Each vertical wall 2 supports on the outside a drum or bobbin 16 carrying a reinforcing strip of paper 17. This paper strip unrolled from bobbin 16, passes through a feeding device which will be described hereafter and is then lead by the downward movement of lever 9 above the documents supported by table 4 exactly over the holes 6. Each of the punches 7 carries an elastic pressure pad 18 which when perforation is effected, presses strongly on strip 17 brought above the document to maintain said strip over the holes 6 during perforation and cutting operation and to stick it on the document.

Progress of strips 17 is realized between two drums or bobbins 19 and 20, for each strip; the two bobbins 19 are locked on the same shaft 21 and carried by walls 2 and which carries a metallic disc 22, provided with teeth 23 protruding from the plane of the disc. Preferably, those teeth are obtained by cutting out the edges of the disc and by bending down the cut-out parts at right angles to the plane of the disc. Lever 9 carries the pivot of a small lever or pawl 25 which is thus suspended under lever 9 and is resiliently applied against the end of an arm 27, by means of spring 26, said arm being pivoted at 28 and protruding from the plane of the disc 22. When arm 27 is in an extreme position and presents to lever 25 the small side of its terminal edge, said lever 25 is pushed back towards the pivot of lever 27, compressing spring 26, whilst in the other extreme position, the spring 26 acts and pushes lever 25 away from the pivot of lever 9.

In this last named position, when lever 9 is lowered, to realize a perforation, pawl 25 engages disc 22 by one of its teeth and provokes rotation thereof according to a determined angle, so that bobbins 19 are rotated sufficiently to advance the ends of the reinforcing strips 17 over the holes 6. Thus, in this position, the machine perforates and
provides the document with reinforcing strip. In the other position of arm 27, pawl 25 does not contact with disc 22 and the machine only perforates.

Because of this actuating device of bobbins 18, it will be understood that if, for any reason whatsoever, arm 9 has not been fully lowered and has risen disc 22 will be kept in the position which pawl 25 has conferred to it, through incomplete lowering of lever 8, any later movement to lower said lever will only determine movement of disc 22 from the moment when pawl 25 will engage said disc. That is to say in this later movement disc 22 will only rotate sufficiently to conclude its normal complete movement. The quantity of paper 17 which has advanced and has been fed during incomplete movement will thus not be lost and will be exactly completed during the following movement of lever 9.

To ensure proper and sure progress of reinforcing strip 17 and to ensure that they possess enough rigidity to enable proper cutting operation of said strips by means of head 8, the feeding drums or bobbins 19-20 are of special form to confer to the strips which comes out of between them, a transversally non-planer form, for instance arched. To that end the two lower bobbins 20 have their axis 29 carried by the end of a spring blade 30 combined with another lower blade 31. Blade 30 carries on its upper face a forked blade 32 passing over axis 29, said forked blade passing over axis 29 and its arms extending substantially to the neighborhood of the extreme edge of table 4. In one position, a rotating arm 33 playing the part of a cam, pushes back upwards, the assembly of springs 35-31, to resiliently apply the drum or roller 20 against the upper drum or bobbin 19.

Rollers 20 have their round surface provided with teeth or ribs and in cross section said ribbed edge is arched correspondingly to the form to be conferred to strip 17. The drums 19 comprise in their cylindrical surface a medium offset part 36 (hollow), the edges of which are transversally ribbed as shown at 34, the smooth parts of said cylindrical surface being lined by an edge as shown at 35 which guides strip 17. Roller 20 engages itself in the hollow part 36, so that strip 17 which passes through, between drums 19 and 20 is transversally arched, feeding being realized thanks to the ribs 34 and to the teeth of roller 20.

To lighten the construction, drums 19 may comprise three parts: a full or solid central part 36 to which are connected (by welding, etc.) the two hollow side parts. Solid part 36 can also be in form of a cylinder or ring with ribbed or grooved cylindrical surface lodged between two smooth cylindrical parts (see left of Fig. 3). In that case, roller 20 possesses a cylindrical surface the cross section of which is of frusto-conical form and which is ribbed on its small base.

The protruding arms of fork 32 serve to guide and support the edges of strip 17, between drum 19 and perforating table 4.

This guiding, in the direction exactly perpen-
dicular to that of table 4 can however only be realized by said fork to a certain extent because the arms of said fork cannot extend up to the table. To ensure this guiding until cutting operation by head 8 takes place, two protruding arms 39 for each knife 38 are provided, said arms extending longitudinally on each side of a knife, so that as head 8 gets nearer to table 4, said arms thus embrace the two sides of strip 17 which is well maintained against any transversal displacement during later lowering of knife 38. Moreover those guiding arms could be provided at the edge of the table itself.

To render the cutting operation more easy the cutting edge of the moving knife is inclined in respect to the horizontal and due to the form of said means 9 may be slightly arched in order to touch the extreme edge of table 4 when lowered (whilst the other arm does not touch it) in order to realize a cutting action comparable to that of scissors.

One of the disadvantages of the perforating machines, especially those which were at the same time a reinforcing strip provided with gum, consists in that the small discs cut out by the punches fall on the ground or on the support and soil other objects to which they could stick. To avoid this disadvantage, there is provided under that part of table 4 which juts out on each side of the support 1, a small receptacle such as 40, pivoted at 41 and which is normally under a hole 6 of plate 4. The small discs removed by the punches are received in said receptacles which may be emptied from time to time by pivoting them away from the table as shown by the dotted lines in Fig. 2.

The described machine is provided to work with strips 17 one side of which is coated with a dry paste or glue for use without heating. The machine can however be foreseen for use with strips coated with a sticking paste containing rubber and which necessitates a certain amount of heat.

Plate 42 is lodged in or under table 4 in the neighborhood of perforation holes 6 and it heats up table 4 sufficiently to ensure that the coating mass of strips 17 becomes plastic and sticky.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent is:

1. In a paper perforating device in combination, a base, a pair of punches mounted thereon, a pair of dies cooperating with said punches, an operating lever for actuating said punches, two reels of adhesive strip rotatably mounted on said base, means actuated by the operating lever for feeding said strips between said punches and dies, said means comprising an arm pivotally connected with said operating lever, and means for restoring said operating lever into its original position if said operating lever is released after preceding being actuated, a shaft mounted on said base, a ratchet wheel mounted on said shaft and adapted to be engaged and rotated by said arm if said operating lever is actuated, one drum at each end of said shaft, one roller adjacent to each drum, resiliently mounted on said base, between which rollers and drums said adhesive strips are drawn each time the operating lever is actuated, means for disengaging said pivotal arm from said operating lever at will and means mounted on said punches for simultaneously pressing said strips into contact with the paper and severing predetermined lengths from said strips.

2. In a paper perforating device in combination, a base, a pair of punches mounted thereon, a pair of dies cooperating with said punches, an operating lever adapted to be depressed for actuating said punches, two reels of adhesive strip rotatably mounted on said base, means actuated by said operating lever for feeding said strips between the punches and dies, said means comprising a shaft mounted on said base, a ratchet wheel mounted on said shaft, an arm pivotally connected with said operating lever and adapted to engage a tooth of...
2,228,372

1. In a paper perforating device in combination, a base, a pair of punches mounted thereon, a pair of dies cooperating with said punches, an operating lever adapted to be depressed for actuating said punches, two reels of adhesive strip rotatably mounted on said base, means actuated by said operating lever for feeding said strips between the punches and dies, said means comprising a shaft mounted on said base, a ratchet wheel mounted on said shaft, an arm pivotally connected with said operating lever and adapted to engage a tooth of said ratchet wheel while said operating lever is depressed and to rotate said ratchet wheel at about an angle corresponding to the distance said operating lever is depressed, one drum at each end of said shaft, and one roller adjacent to each drum, resiliently mounted on said base, between which rollers and drums the adhesive strips are drawn. Each time said operating lever is depressed and to rotate said operating lever and said pivotal arm into their original positions if said operating lever is released after previously being depressed, and to rotate said ratchet wheel at about an angle corresponding to the distance said operating lever is depressed, the tooth of said ratchet wheel spaced so that the ratchet wheel must be rotated at an angle depending on the intended lengths of the fed strips before said pivotal arm can engage a new tooth, one drum at each end of said shaft, one roller adjacent to each drum, resiliently mounted on said base, between which rollers and drums said adhesive strips are drawn. Each time said operating lever is depressed, means for restoring said operating lever and said pivotal arm into their original positions if said operating lever is released after previously being depressed, whereby the operating arm reengages the same tooth of the ratchet wheel and finishes the rotation if released before finishing the rotation of the ratchet wheel corresponding to one tooth and actuated again, means for disengaging said pivotal arm from said ratchet wheel at will and means for simultaneously pressing said strips into contact with the paper and severing predetermined lengths from said strips.

3. In a paper perforating device in combination, a base, a pair of punches mounted thereon, a pair of dies cooperating with said punches, an operating lever adapted to be depressed for actuating said punches, two reels of adhesive strip rotatably mounted on said base, means actuated by said operating lever for feeding said strips between the punches and dies, said means comprising a shaft mounted on said base, a ratchet wheel mounted on said shaft, an arm pivotally connected with said operating lever and adapted to engage a tooth of said ratchet wheel while said operating lever is depressed and to rotate said ratchet wheel at about an angle corresponding to the distance said operating lever is depressed, the tooth of said ratchet wheel spaced so that the ratchet wheel must be rotated at an angle depending on the intended lengths of the fed strips before said pivotal arm can engage a new tooth, one drum at each end of said shaft, one roller adjacent to each drum, resiliently mounted on said base, between which rollers and drums said adhesive strips are drawn. Each time said operating lever is depressed, means for restoring said operating lever and said pivotal arm into their original positions if said operating lever is released after previously being depressed, whereby the operating arm reengages the same tooth of the ratchet wheel and finishes the rotation if released before finishing the rotation of the ratchet wheel corresponding to one tooth and actuated again, means for disengaging said pivotal arm from said ratchet wheel at will and means for simultaneously pressing said strips into contact with the paper and severing predetermined lengths from said strips.

5. In a paper perforating device in combination, a base, a pair of punches mounted thereon, a pair of dies cooperating with said punches, an operating lever actuating said punches, two reels of adhesive strip rotatably mounted on said base, means actuated by said operating lever for feeding said strips between said punches and dies, said means comprising an arm pivotally connected with said operating lever, a shaft mounted on said base, a ratchet wheel mounted on said shaft adapted to be engaged and rotated by said arm if said operating lever is actuated, one drum at each end of said shaft, one roller adjacent to each drum, between which rollers and drums said adhesive strips are drawn. Each time said operating lever is actuated, springs mounted on said base for supporting said rollers and means for bringing said rollers supported by said springs in or out of contact with said adhesive strips, means for disengaging said pivotal arm from said ratchet wheel at will and means mounted on said punches for simultaneously pressing said strips into contact with the paper and severing predetermined lengths from said strips.
with the paper and severing a predetermined length from said strip.

6. In a paper perforating device in combination, a base, a pair of punches mounted thereon, a pair of dies cooperating with said punches, an operating lever for actuating said punches, two reels of adhesive strip rotatably mounted on said base, means actuated by the operating lever for feeding said strips between said punches and dies, said means comprising an arm pivotally connected with said operating lever, a shaft mounted on said base, a ratchet wheel mounted on said shaft and adapted to be engaged and rotated by said arm if said operating lever is actuated, one drum at each end of said shaft, one roller adjacent to each drum resiliently mounted on said base, between which rollers and drums said adhesive strips are drawn each time the operating lever is actuated, said drums having a substantially concave peripheral surface and said rollers having a substantially convex peripheral surface forming substantially complementary surfaces to the peripheral surfaces of said drums and means for restoring said operating lever and said pivotal arm into their original positions if said operating lever is released after precedingly being actuated, means for disengaging said pivotal arm from said ratchet wheel at will and means mounted on said punches for simultaneously pressing said strips into contact with the paper and severing predetermined lengths from said strips.

9. In a paper perforating device in combination, a base, a pair of punches mounted thereon, a pair of dies cooperating with said punches, an operating lever for actuating said punches, two reels of adhesive strip rotatably mounted on said base, means actuated by said operating lever for feeding said strips between said punches and dies, said means comprising an arm pivotally connected with operating lever, a shaft mounted on said base, a ratchet wheel mounted on said shaft and adapted to be engaged and rotated by said arm if said operating lever is actuated, one drum at each end of said shaft, one roller adjacent to each drum, resiliently mounted on said base, between which rollers and drums said adhesive strips are drawn each time the operating lever is actuated, said drums having peripheral surfaces with a centrally disposed angular channel, said rollers having peripheral surfaces substantially complementary to the peripheral surfaces of said drum and adapted to engage with said angular channels and means for restoring said operating lever and said pivotal arm into their original positions if said operating lever is released after precedingly being actuated, means for disengaging said pivotal arm from said ratchet wheel at will and means mounted on said punches for simultaneously pressing said strips into contact with the paper and severing predetermined lengths from said strips.

10. In a paper perforating device in combination, a base, at least one punch mounted thereon, at least one die cooperating with said punch, an operating lever for actuating said punch, at least one reel of adhesive strip rotatably mounted on said base, means actuated by said operating lever for feeding said strip between said punch and said die, said means comprising an arm pivotally connected with said operating lever, a shaft mounted on said base, a ratchet wheel mounted on said shaft and adapted to be engaged by said arm, a drum at at least one end of said shaft, a roller resiliently mounted on said base, between which roller and drum said adhesive strip is drawn each time the operating lever is actuated, said drum having a peripheral surface with a centrally disposed angular channel, said roller having a peripheral surface substantially complementary to the peripheral surface of said drum and adapted to engage with said angular channel and means for removing said resiliently mounted roller from contact with said adhesive strip, means for disengaging said pivotal arm from said Ratchet wheel at will and means mounted on said punch for simultaneously pressing said strip into contact with the paper and severing a predetermined length from said strip.

11. In a paper perforating device in combination, a base, at least one punch mounted thereon, at least one die cooperating with said punch, an operating lever for actuating said punch, at least one reel of adhesive strip rotatably mounted on said base, means actuated by said operating lever for feeding said strip between said punch and said die, said means comprising an arm pivotally connected with said operating lever, a shaft mounted at least one end of said shaft, a roller resiliently mounted on said base, between which roller and drum said adhesive strip is drawn each time the operating lever is actuated, said drum having a peripheral surface with a centrally disposed angular channel, said roller having a peripheral surface substantially complementary to the peripheral surface of said drum and adapted to engage with said angular channel and means for removing said resiliently mounted roller from contact with said adhesive strip, means for disengaging said pivotal arm from said ratchet wheel at will and means mounted on said punch for simultaneously pressing said strip into contact with the paper and severing a predetermined length from said strip.

12. In a paper perforating device in combination, a base, at least one punch mounted thereon, at least one die cooperating with said punch, an operating lever actuating said punch, at least one reel of adhesive strip rotatably mounted on said base, means actuated by said operating lever for feeding said strip between said punch and said die, said means comprising an arm pivotally connected with said operating lever, a shaft mounted on said base, a ratchet wheel mounted on said shaft and adapted to be engaged and rotated by said arm if said operating lever is actuated, a drum at at least one end of said shaft and one roller adjacent to said drum resiliently mounted on said base between which roller and drum said adhesive strip is drawn each time said operating lever is actuated, means for disengaging said pivotal arm from said ratchet wheel at will and means mounted on said punch for simultaneously pressing said strip into contact with the paper and severing a predetermined length from said strip.

IDA SKREBB 888. STÜHLINGER.