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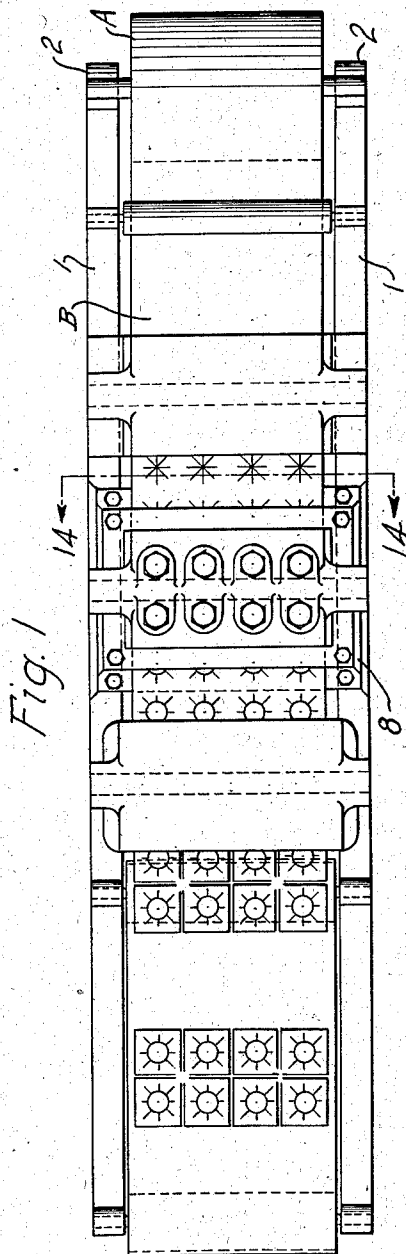
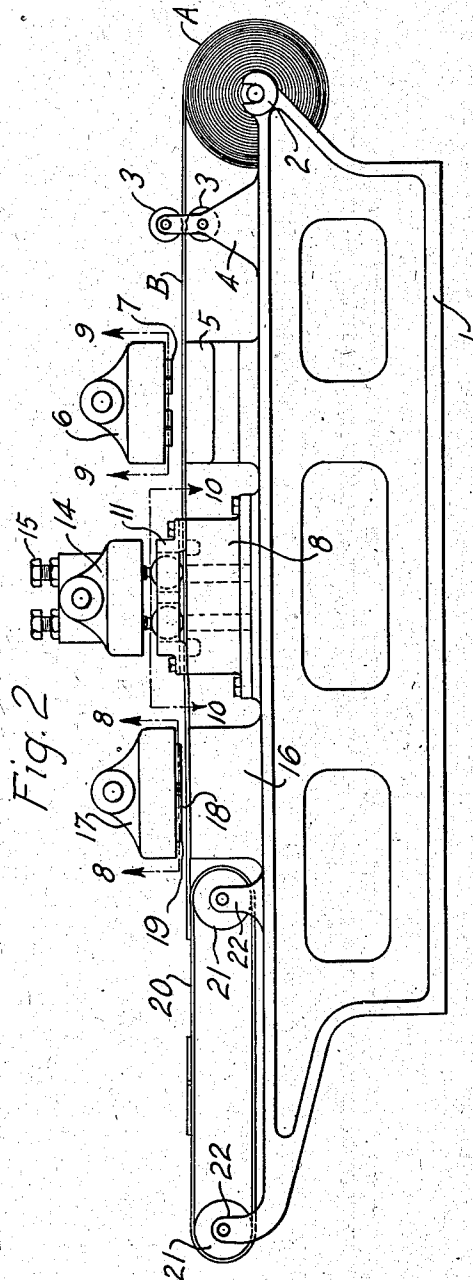
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METHOD AND MACHINE FOR PUNCHING OUT ARTICLES FROM STRIPS

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2 Sheets-Sheet 1



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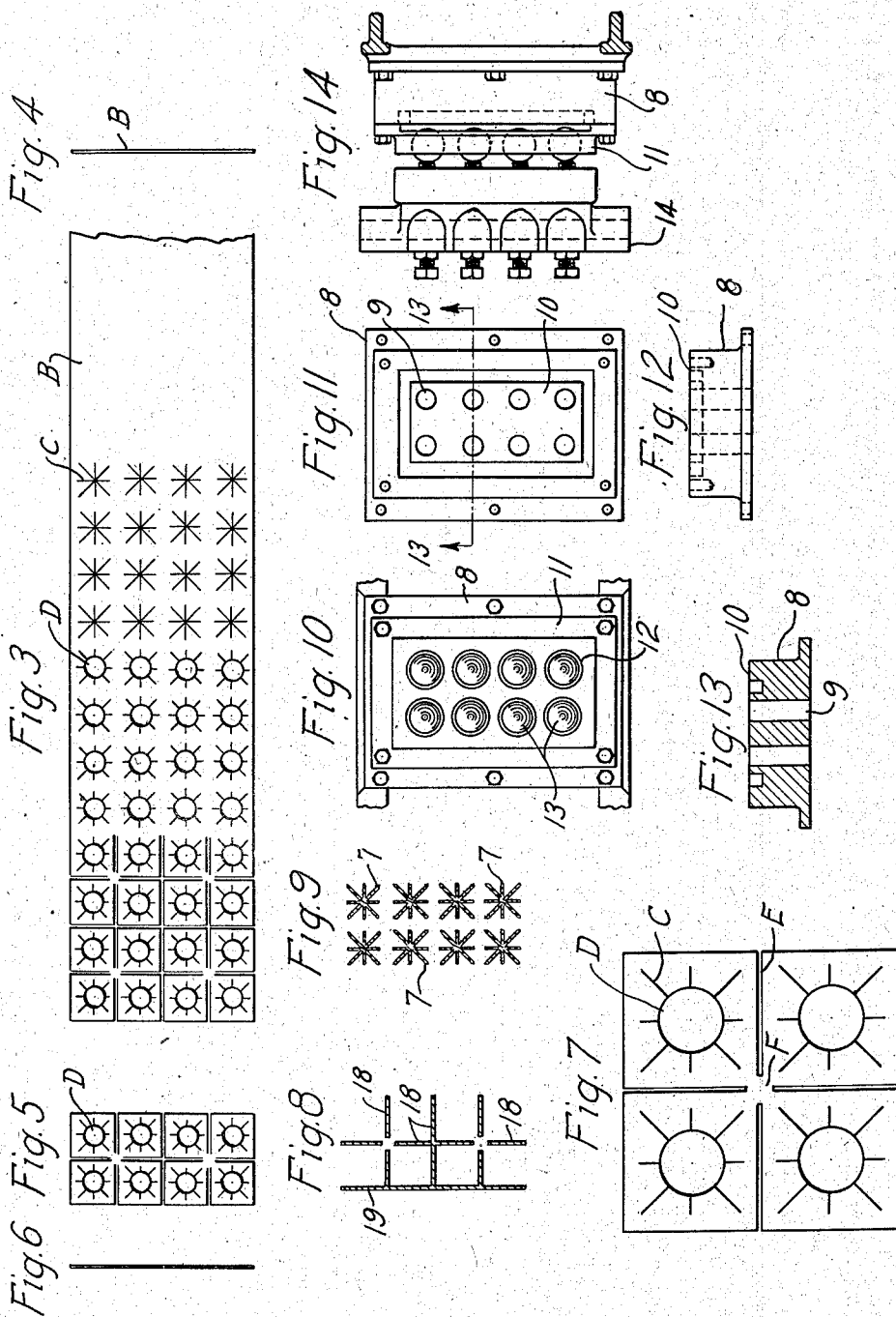
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METHOD AND MACHINE FOR PUNCHING OUT ARTICLES FROM STRIPS

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UNITED STATES PATENT OFFICE

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METHOD AND MACHINE FOR PUNCHING
OUT ARTICLES FROM STRIPSMelvin H. Sidebotham, Newton, Mass., assignor of
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Application August 16, 1944, Serial No. 549,756

11 Claims. (Cl. 164—22)

This invention relates generally to methods and devices for cutting articles from a web or strip of any material, by use of automatic machinery.

One object of my invention is to provide a machine for progressively die-cutting, punching, and severing articles from a web of any material.

Another object of my invention is to provide an improved method for making articles from a web of any material.

With said objects in view, and others herein-after explained, my invention consists in the method and machine, substantially as hereinafter described, and claimed.

Of the accompanying drawings:

Fig. 1 is a plan view of the essential parts of the machine for carrying out my improved method.

Fig. 2 is an elevation view of Fig. 1.

Fig. 3 is a plan view of a section of paper web showing the progressive steps for converting the web into finished articles of any material.

Fig. 4 is an end view of the strip or web.

Fig. 5 is a plan view, of two sets of four each, of articles as they are severed from the web.

Fig. 6 is an end view of Fig. 5.

Fig. 7 is a plan view, drawn to a large scale, of one set of four articles.

Fig. 8 is a section through the cutting and severing knives at 8—8 of Fig. 2.

Fig. 9 is a section through the "star" cutting dies at 9—9 of Fig. 2.

Fig. 10 is a partial view of the punching device at 10—10 of Fig. 2.

Fig. 11 is a plan view of the die base shown in Figs. 1 and 2.

Fig. 12 is an elevation view of Fig. 11.

Fig. 13 is a section at 13—13 of Fig. 11.

Fig. 14 is a partial section at 14—14 of Fig. 1.

Similar reference characters indicate similar parts or features in all of the views.

It will aid toward an understanding of the machine and of the method of making paperboard collars, to first describe the product made by the machine and the operation of the machine. Fig. 5 illustrates two units of four each of paperboard collars as they are delivered from the machine. Fig. 7 illustrates at a larger scale one unit of four collars wherein C indicates "star" cuts; D indicates circular openings and E represents division slots which partially divide the unit to provide four individual collars. The division slots E do not completely divide the unit into separate collars, because a small connecting portion F is left to hold the four collars together for handling and packaging purposes. Before the collars are used they are separated by tearing at F to provide four individual collars.

In the operation of the machine a web of paperboard B (Figs. 1 and 2) is first drawn from

the supply roll A, and the "star" cuts C made in the web. The punching operation follows to cut a circular opening D in the center of each "star" cut. The advancing web is then cut and severed to provide a succession of units of paperboard collars as shown by Fig. 5.

Referring to Figs. 1 and 2 of the drawings, the different parts or members of the machine are mounted on a suitable base 1.

Mounted in bearings 2 at one end of base 1 is a roll of paper A from which is drawn the paperboard web B. The web B is drawn uniformly and intermittently from the said roll A by the action of feed rollers 3 journaled in brackets 4 secured to base 1. It will be understood that the feed rollers 3 are in practice driven as required and at the proper speed to intermittently draw the web of paperboard from the roll A and advance it to the cutting and punching devices.

From the feed rollers 3 the paper web is first advanced to the "star" cutting unit which comprises a die platen 5 secured to base 1. Mounted above the die platen 5 is a die head 6 having secured thereto a number of sets of cutting knives 7 (Figs. 2 and 9). The knives of each set extend radially outward from a predetermined point, to make "star" cuts when pressed against the web of paperboard. The die head 6 is operatively positioned over the die platen 5, and reciprocally operated in timed relation with the advancing web to make "star" shaped cuts C in the web as shown in Fig. 3.

From the "star" cutting unit the web B is advanced to a punching device which punches round holes D out of the web at the center of each "star" C previously cut in the web. The punching unit comprises a punch platen 8 (Figs. 1, 2, 10, 11, 12, 13 and 14) secured to base 1 in advance of the "star" cutting unit. The punch platen 8 is provided with a plurality of circular openings 9 each of the size of the holes desired to be made in the web B. The edge portion, of the top surface 10 of the punch platen 8, around each opening 9 serves as a cutting edge. Mounted on and secured to the top surface of the punch platen 8 is a ball cage 11 (Figs. 2 and 10) which is provided with a plurality of openings 12 each of which guides and retains a spherical steel ball 13. The openings 12 are somewhat larger than the diameter of the steel balls 13. Positioned above the ball cage 11 is a punch head 14 reciprocally operated in timed relation with the advancing web B, to strike the steel balls 13 positioned on the said web, with the result that the steel balls press the web against the edges of the openings 12 on the top surface 10 of the punch platen to punch out circular sections of the web B to provide openings D (Figs. 3, 5 and 7). Secured in the punch head 14 are adjusting screws 15 which project below the bottom surface of the

punch head 14 and serve as the contact element between the punch head and the steel balls 13. The adjusting screws 15 serve to make uniform the striking force of the punch head against the steel balls.

When the punch head 14 is in raised position the steel balls 13 rest on the web B. The web, however, is free to advance, because the steel balls will roll on the web when the web is moved forward over the punch platen.

This novel punching device is easily sharpened by simply grinding the top surface 10 of the platen 11 to provide a new cutting surface around the upper edge of holes 9. The steel balls 13 being free to rotate present an infinite succession of punching surfaces. Thus the steel balls may be used for a long time without being resurfaced or replaced.

From the punching unit the web B is advanced to the slitting and severing unit which operates to divide and sever the web into units of paper collars as shown in Figs. 5 and 7. The slitting and severing unit comprises a die bed 16 (Fig. 2) secured to base 1. Positioned above the die bed 16 is a die head 17 reciprocally operated in timed relation with the advancement of the web B. Secured to the underside of the die head 17 are slitting knives 18 and severing knife 19 (Figs. 2 and 8) which, when the die head 17 is moved downward, presses the web B against the platen 16 and slits and severs the web to provide units of paper collars from the web.

It will be obvious that with each downward operation of the die head 17 the severing knife 19 cuts free from the web the two previously slit units of collars, while at the same time knives 18 slit the following units of collars. The completed units of paper collars are drawn from the slitting and severing unit by a delivery belt 20 driven by rolls 21 journaled in bearings 22 secured to base 1. The units of paper collars are picked up from the delivery belt and packed for shipment.

It will be readily understood, without need of illustration, that any suitable motor may be employed for operating the machine; and that suitable gearing, mountings and other mechanisms are employed in practice to cause the various mechanisms to operate at the proper speed, to effect travel of the web through the machine, and to cause the several units of the machine to operate in the sequence described.

Having now described my invention, what I claim is:

1. In a machine for die cutting, punching and severing a web of material to provide articles, means for advancing a web of material from a roll, a die cutting device for making a number of sets of pattern cuts within the margins of the web, a punching device for cutting a circular opening in the web at each set of pattern cuts, and a cutting unit for cutting and severing the web to provide articles from the web.

2. In a machine for making paper collars, means for feeding a web of paper, a die cutting device for making a set of cuts within the margins of the web, the cuts being radially directed away from a central point on the web, a punching device for cutting a circular opening in the web at the point of beginning of the said radially directed cuts, and means for severing predetermined sections from the web.

3. In a machine for making articles, means

for advancing a web of material from a roll, a die cutting device for making a number of sets of radially directed cuts in the web, a punching device for cutting a circular opening in the web at the center of each set of radially directed cuts, and a die cutting unit for cutting and severing the web to provide articles from the web.

4. In a machine for making paper articles, means for advancing a web of paperboard, a die cutting device for making a number of sets of radially directed cuts in the web, a punching device for cutting a circular opening in the web at the center of each set of radially directed cuts, and a die cutting unit for cutting and severing the web.

5. In a machine for making paper collars, means for feeding a web of paper, a die cutting device for making sets of radially directed cuts within the margins of the web, a punching device for cutting a circular opening in the web at the point of beginning of each set of radially directed cuts.

6. The method of producing flat articles from a web, consisting of making a plurality of sets of cuts in the web, the cuts of each set of cuts being radially directed away from a central point, punching a circular opening at the central point of each set of radially directed cuts, and then cutting the web to provide articles having an opening in the center with radially directed cuts.

7. The method of producing paperboard collars from a web of paper, consisting of making a number of sets of cuts in the web, the cuts of each set of cuts being radially directed away from a central point, punching a circular opening at the central point of each set of radially directed cuts, and then cutting the web to provide units of four collars detachably connected together, each collar having an opening and radially directed cuts in the central portion.

8. The method of producing paperboard collars from a web of paper, consisting of making a number of sets of radially directed cuts in the web, and then cutting the web to provide an opening therethrough at a point on each set of radially directed cuts, and then cutting the web into sections to provide individual collars.

9. The method of producing flat paperboard collars from a web of paperboard, comprising, making a plurality of sets of radially directed cuts in the web, punching a circular opening at the central point of each set of radially directed cuts, and then cutting the web to provide rectangular shaped collars having an opening in the center with radially directed cuts.

10. The method of producing paperboard collars from a web of paper, comprising, making a number of sets of radially directed cuts in the web, punching a circular opening at the central point of each set of radially directed cuts, and then cutting the web to provide units of four collars tearably connected together, each collar having an opening and radially directed cuts in the central portion.

11. The method of producing paperboard collars from a web of paper, comprising, making a number of sets of radially directed cuts in the web, and then cutting the web to provide an opening therethrough at a point on each set of radially directed cuts, and then cutting the web into sections to provide individual collars.

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