March 12, 1963 H. A. SPLEES 3,080,781

PROGRESSIVE TRANSVERSE SEVERING DEVICE

Filed April 9, 1958

FIG. 1

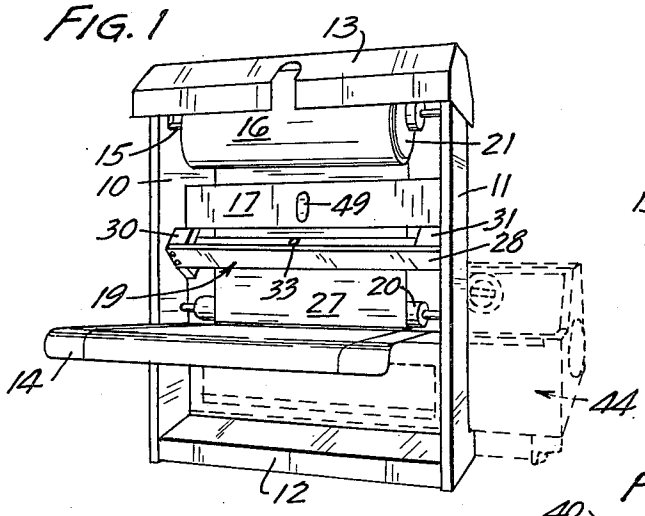


FIG. 3

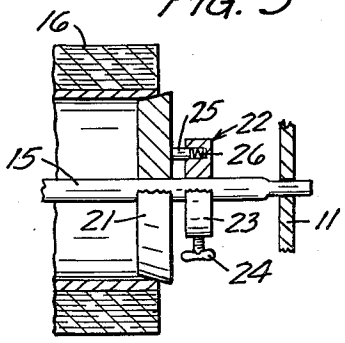


FIG. 4

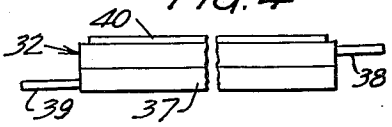


FIG. 6

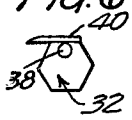


FIG. 2

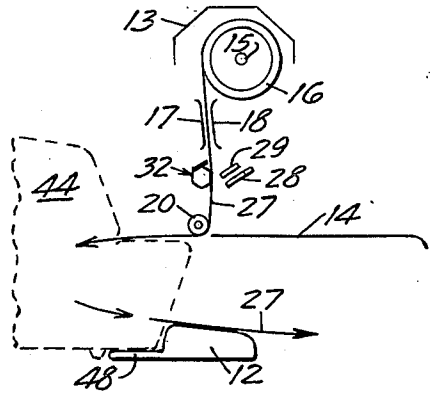


FIG. 5

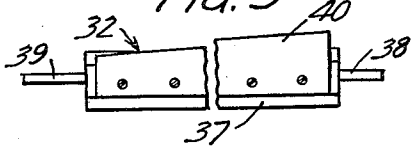


FIG. 7

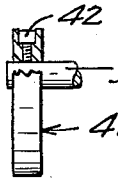


FIG. 8

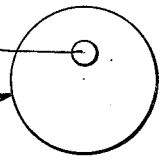


FIG. 10

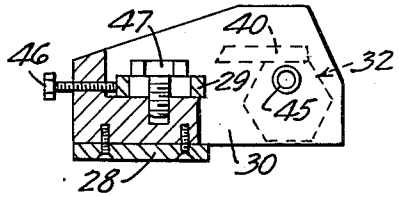


FIG. 9

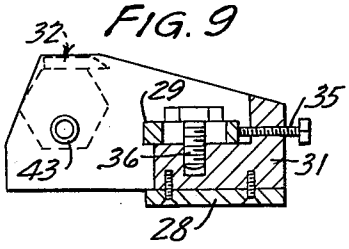


FIG. 12

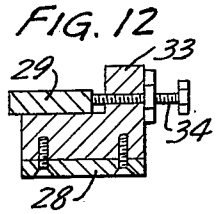
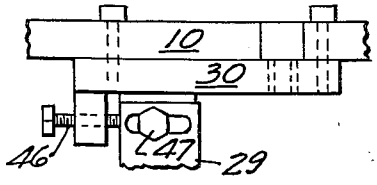


FIG. 11



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PROGRESSIVE TRANSVERSE SEVERING DEVICE

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2 Claims. (Cl. 83—162)

This invention relates to copying devices and in particular to an improved apparatus for copying extended-length graphic originals on heat-sensitive copying-paper.

The copying of typewritten correspondence, printed reports, pencil sketches and various other graphic originals on heat-sensitive copying-paper by thermographic processes has been described in Miller Patent No. 2,740,896. One form of apparatus which has been found particularly useful in business offices for duplicating typewritten letters and the like carries the graphic original, together with the sheet of heat-sensitive copying-paper, past a source of intense radiation, by means of a continuous belt and a supporting roller. Radiation which is preferentially absorbed in the printed characters then produces a corresponding heat-pattern in the heat-sensitive copying-paper, resulting in a visible copy of the graphic original. The apparatus will produce copies of typewritten letters of the usual 8½ x 11 inch size at a rate of one every few seconds.

The present invention makes possible the copying of graphic originals of extended length, such as charts, graphs, etc., on the letter-copying apparatus as just described and without any modification. The heat-sensitive copying-paper is made available in any desired length and at any width up to the capacity of the copying-machine. The copying-paper is easily cut to desired length during the copying operation, i.e. while the strip is in motion, and without endangering the copy, the original, or the machine. Adjustment of the copy-machine controls is accomplished without interference. These and other advantages are provided by means of novel adapter apparatus as herein described, and of which a preferred form is illustrated in the accompanying drawings. In the drawings,

FIGURE 1 is a view in perspective of the adapter apparatus shown in conjunction with an office thermocopying machine such as the "Fourteen" Model 20 "Thermo-Fax" copying machine, indicated in dotted lines;

FIGURE 2 is a schematic representation of components of the adapter and machine showing the path of the copying-paper;

FIGURE 3 is a detail, partly in section, of a roll support and brake member;

FIGURES 4–6 are detail views of the movable cutter knife assembly;

FIGURE 7 is an edge elevation, partly in section, and FIGURE 8 is a side elevation of a handle member for said cutter knife;

FIGURE 9 is an elevation, partly in section, of a mounting block for one end of the movable cutter knife bar;

FIGURE 10 is an elevation, partly in section, and FIGURE 11 is a plan view of a mounting block for the other end of the cutter knife bar; and

FIGURE 12 is a detail sectional view of a center support member for the fixed cutter blade.

The adapter of FIGURE 1 consists generally of side frame members **10** and **11**, base **12**, removable cover **13**, and shelf **14**, together with a shaft **15** carrying the roll **16** of heat-sensitive copy-paper, guides **17** and **18**, cutter assembly **19**, and roller **20** all supported by the side frame members.

As shown in FIGURE 3, the roll **16** is supported at each end on a conical core member **21** rotatably mounted

on shaft **15** and held in place by a movable brake member **22** consisting of collar **23**, thumb-screw **24**, and brake pin **25**, the latter being pressed against the rotatable core **21** by a compression spring **26**. The end of the shaft **15** is flattened to fit within a supporting slot in the frame member **11**, thus to prevent rotation of the shaft. The roll **16** is thereby held under constant light braking action so that the copying-paper **27** is removable under constant light tension.

The cutter assembly **19** consists of a movable cutter knife assembly **32**, a support or brace **28** and a fixed cutter blade **29** mounted on end blocks **30**, **31**. These end blocks, further illustrated in FIGURES 9–11, are rigidly attached to the side frame members **10**, **11**, as indicated for block **30** in FIGURE 11. A brace **33**, further illustrated in FIGURE 12, is attached to the support **28** approximately midway between its ends, and a lock screw **34** provided for adjusting and supporting the cutter blade **29** at that point. The ends of the blade are adjustably held to blocks **30**, **31**, as illustrated in FIGURE 9 by screws **35** and **36** and in FIGURES 10 and 11 by screws **46** and **47**.

The movable cutter knife assembly **32** includes a rigid hexagonal shaft **37** having extended offset axle members **38**, **39** and carrying a cutter blade **40**. The blade **40**, firmly attached to a flat surface of the hexagonal shaft **37**, extends well beyond the underlying edge of the shaft at the end carrying the adjacent axle **39**, and just above or slightly behind such edge at the end carrying the opposing axle **38**. The extended edge is ground to a small and inwardly offset arc, as indicated in FIGURE 6. The assembly is supported by bearings **43** in block **31** and **45** in block **30**, the elongate axle **38** extending past the block **30** and upright **10** for carrying at its end the weighted handle member **41** of FIGURES 7 and 8, the same being held in place by screw **42**.

The oppositely offset position of the bearings for the axles **38**, **39**, together with the taper of the knife **40**, on rotation of the knife assembly **32** cause the extended edge of the knife **40** to make uniform contact with the edge of the blade **29** progressively along the entire length. The forward edge of the knife **40** is lightly rounded, and the extended corner may also be slightly rounded if desired, to permit the knife to enter into contact with the blade without initial catching. With the structure illustrated, a smooth rapid cutting action across the entire width of the sheet is obtained. The weight and position of the handle **41** are normally effective in holding the knife assembly in open position when not in use.

As illustrated in FIGURE 2, the base **12** includes a forward extension **48** which fits beneath the copy-machine **44**, the position of which is indicated in part by dotted lines, and between the supporting feet thereof. The extension **48** is preferably covered with felt or the like to provide increased friction between adapter and machine. No hooks, braces, or other means of attachment are required; the adapter is easily fitted to the machine by simply sliding in place; it remains in position while in use, and is then easily slid away from the machine when no longer needed. However it may be left in place while copying on conventional letter-size copy-paper, without interference.

In preparing the adapter for use, and with the adapter in position at the front of the copy-machine and a roll **16** of copy-paper in place, the paper is first threaded down between the guides **17** and **18**, between the knife assembly **32** and the blade **29**, and out onto the shelf **14**. An opening **49** provided in the guide **17** provides access to the paper at this point for convenience in urging it forward during the threading procedure. The free end of the paper is then folded under, an edge of the printed sheet or other graphic original is inserted within the

fold, and the composite urged along the shelf beneath the roller **20** and into the copying machine. The action of the machine advances the composite through the copying area and out at the base **12** as indicated in FIGURE 2, the copy-paper **27** meanwhile being drawn from the supply roll **16**. As soon as the end of the original is reached, the knife assembly is rotated sufficiently to start the cutting action, the forward motion of the paper itself then causing the action to continue until the web is severed.

Rather than carry out the printing or reproduction step in a copying-machine as hereinbefore identified, and which employs a transparent carrier belt and metal print roll for advancing the copy-paper and original in heat-conductive pressure-contact, it is possible to omit the carrier belt and advance the copy-paper and original over the print roll by mechanically driving said print roll or a separate drive roll. In this modification the tension on the copy-paper is maintained sufficient to provide the desired pressure-contact between the copy-paper and the underlying original. Alternatively the original may be made the outer layer and maintained under tension against the underlying copy-paper on the continuously advancing surface of the print roll. In either case the composite is strongly and briefly irradiated as it passes over the print roll.

What is claimed is as follows:

1. An adapter providing for processing of extended-length graphic originals in a thermographic copying machine as herein described, comprising a frame fitting against said machine without obstruction of operational areas thereof and, supported on said frame, (1) a stationary shaft fitted with rotatable core members for supporting a roll of heat-sensitive copy-paper and with brake means for positioning said roll under slight constant resistance to rotation, (2) a pair of flat plate guide members for directing copy-paper from said roll toward a cutter device, (3) a rapid-action cutter device including a fixed blade member having a straight cutting edge and a freely rotatable knife member having a straight cutting edge and supported at oppositely offset axles in position to produce a progressive smooth cutting action between said edges across said copy-paper, said knife member being normally biased to a position in which said edges are not in contact to provide a slot-like space between said blade and said knife members for unobstructed advance therebetween of said copy-paper, said knife member being disposed for selective contact with said copy-paper during the forward pull of the same so as to rotate said knife member to thereby cause the cutting edges to be positioned for cutting contact, (4) a roller for guiding the copy-paper and associated graphic original into said copy-machine, and (5) a shelf in line with the bottom of said roller, extending in the direction opposite the position of said copy-machine, and providing an entry area for aligning said original with said copy-paper.

2. A cutter assembly suitable for providing a progressive smooth cutting action across a continuously advancing strip of heat-sensitive copy-paper and including a fixed blade member having a straight cutting edge and a cooperating freely rotatable knife member rotatably supported at oppositely offset axles and having a straight cutting edge uniformly equidistant from the axis of rotation of said knife member, said freely rotatable knife member being normally biased with its cutting edge out of contact with the cutting edge of said fixed blade member to provide a slot-like opening between said blade and said knife for free travel therethrough of said copy-paper and being disposed for selective contact with said copy-paper during the forward pull of the same so as to rotate said rotatable knife member to thereby cause the cutting edges to be positioned for cutting contact.

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