

March 4, 1969

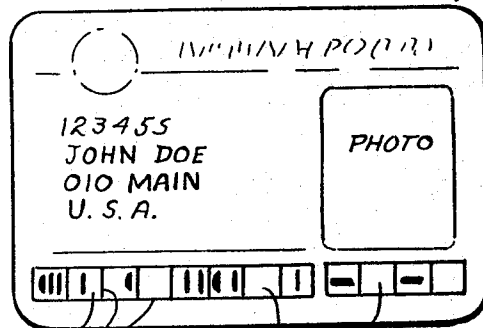
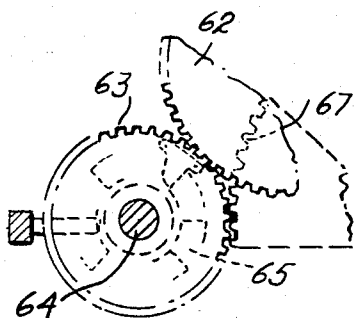
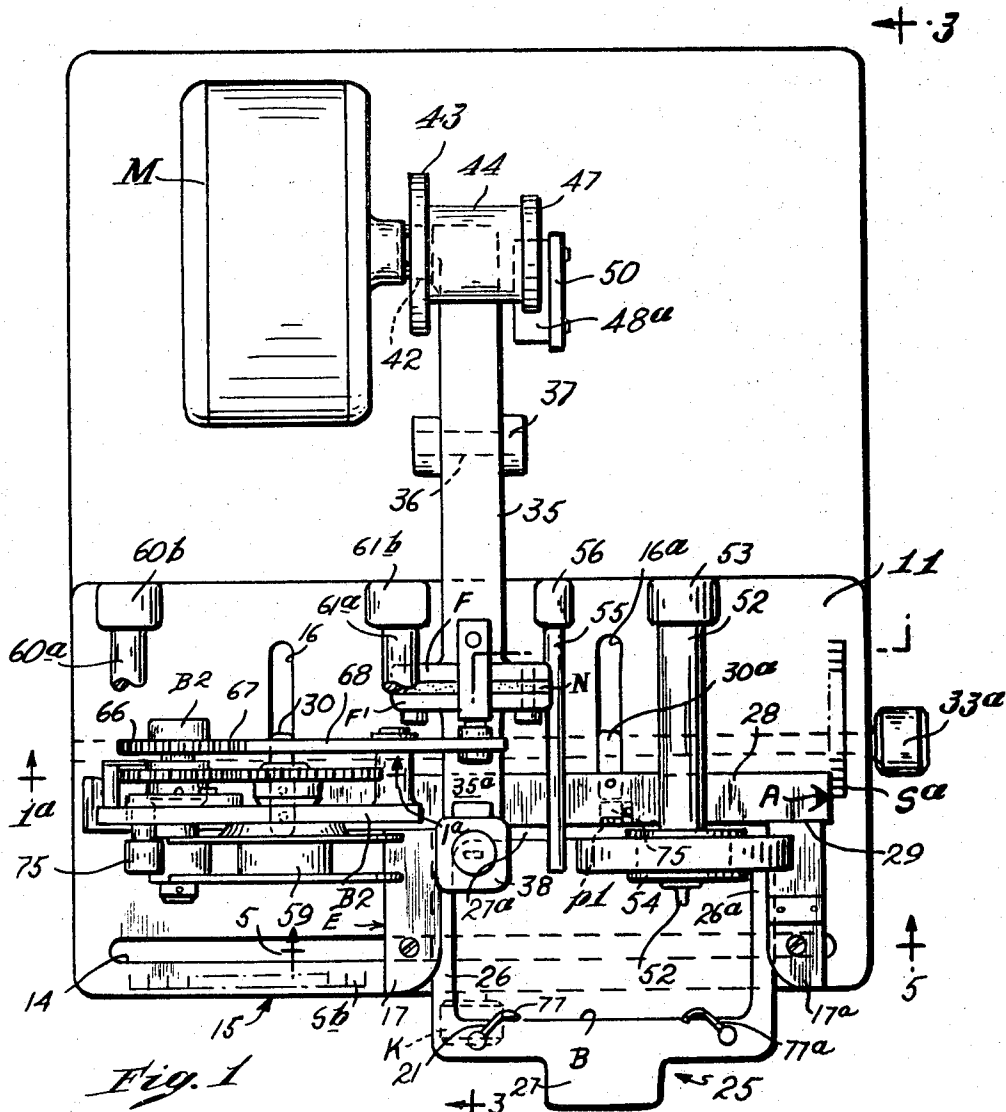
A. PETERS

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HOT DIE RIBBON INKER STAMPING MACHINES

Filed Jan. 25, 1967

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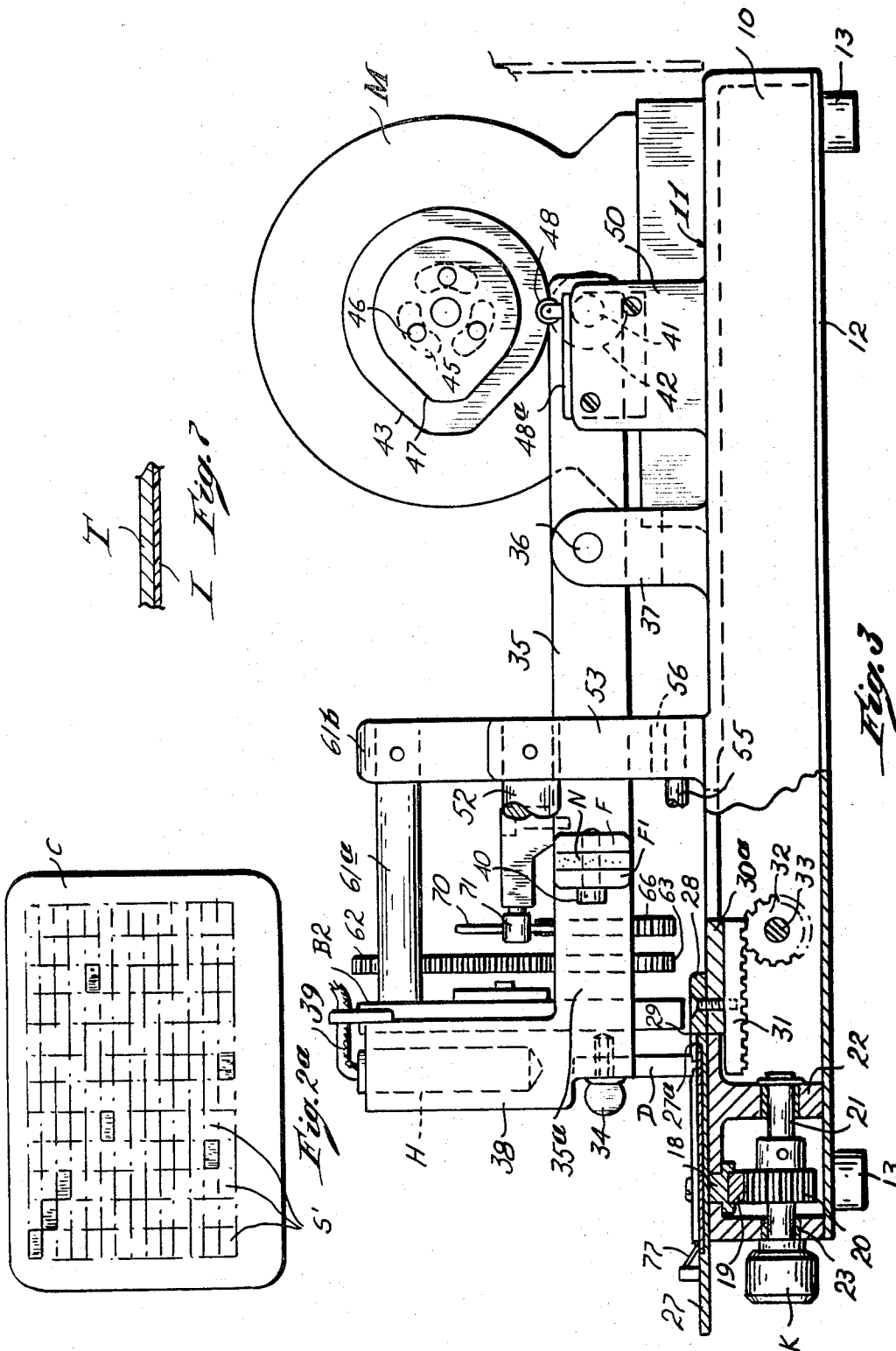
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HOT DIE RIBBON INKER STAMPING MACHINES

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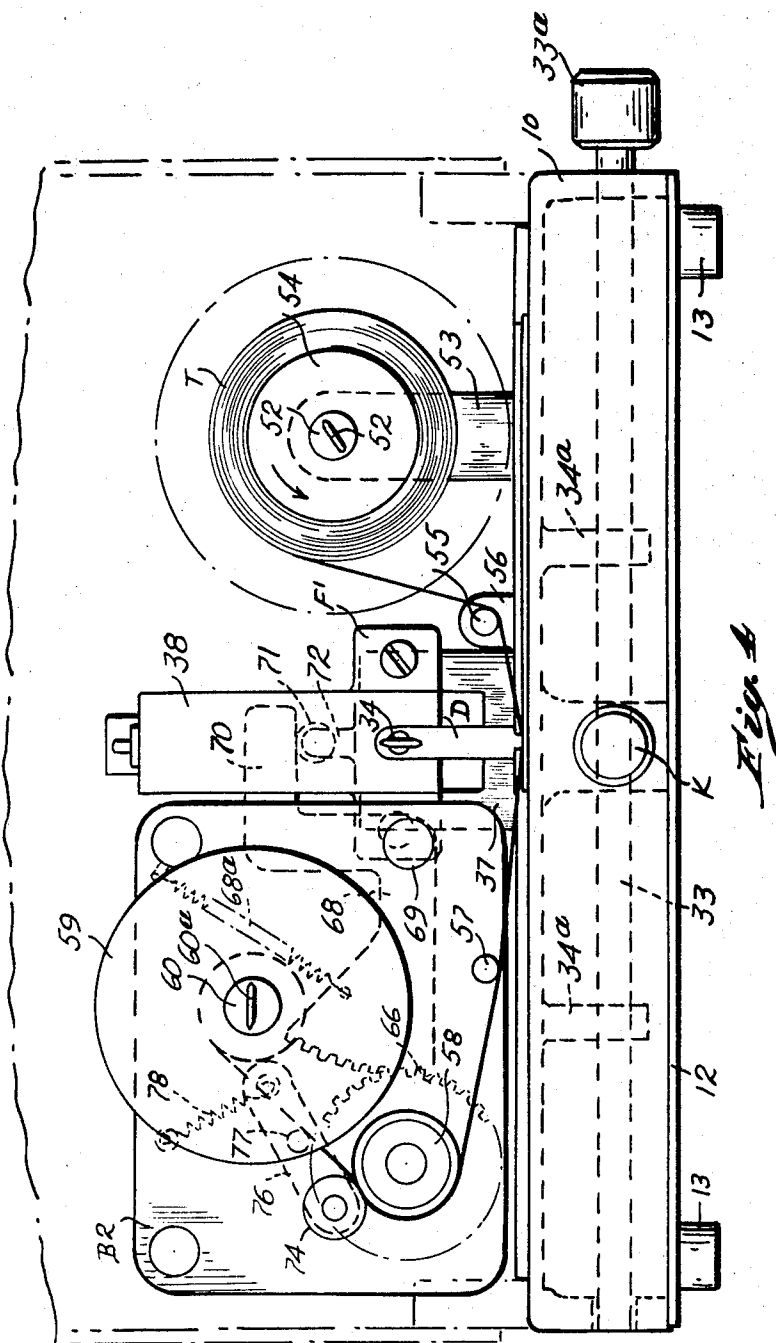
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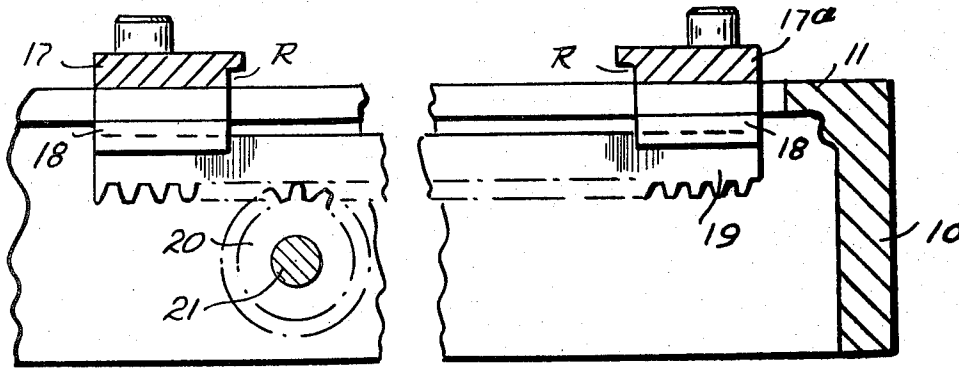


Fig. 5

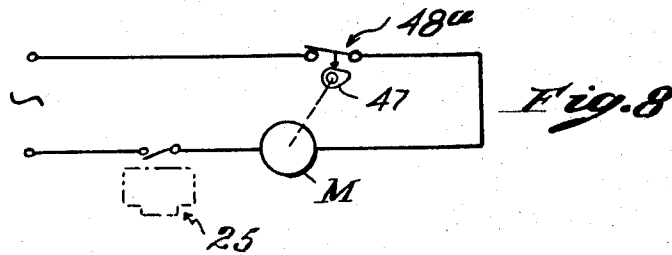


Fig. 8

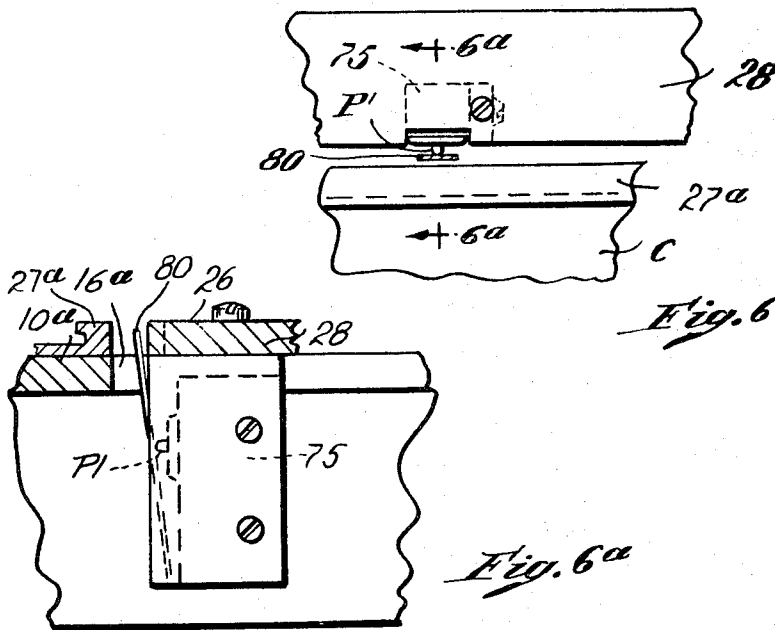


Fig. 6

Fig. 6a

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HOT DIE RIBBON INKER STAMPING MACHINES
Alec Peters, Scarsdale, N.Y., assignor to Omni-Card Systems, Inc., Maspeth, N.Y., a corporation of New York
Filed Jan. 25, 1967, Ser. No. 611,596

U.S. Cl. 101-27

2 Claims

Int. Cl. B44b 5/00; B41f 1/00, 31/16

ABSTRACT OF THE DISCLOSURE

A bed-and-platen, hot-stamping ribbon-inker printing machine having a movable bed for holding a card ruled to define a plurality of indicia-receiving spaces. The platen is devised removably to hold any selected one of a plurality of printing elements. The bed is accurately adjustable to dispose any selected card-space to receive an imprint from the printing element.

Background of the invention

It has become a common practice for colleges, preparatory schools and other institutions of learning to provide each student, at matriculation, with an identification card of durable material usually showing the student's signature and his picture, and ruled, or otherwise provided with one or more series of defined spaces, usually in rectilinear rows, designed to receive indicia showing, for example, the courses the student is to take; his class hours, or the like; and other indicia showing that he is entitled to certain privileges, for instance, to attend games, parties, or other forms of entertainment or to certain leaves-of-absence. Considering the number of cards to be marked in one of the larger schools, it is manifest that manual marking, which must be done accurately, is a time-consuming operation and even though it may be necessary to mark a large number of cards in the same space or spaces, the operator must carefully identify each space, which may be one of many, before making the mark.

The present invention provides printing apparatus designed accurately to imprint such a card at any selected one of said defined spaces with the desired indicia and, if desired, so to mark a card of hard material, for instance plastic, as to provide an indelible imprint.

Summary

Briefly stated, the invention provides a bed-and-platen printing machine having a heated printing element and an inking ribbon, and with provision for securing any selected one of a plurality of printing elements to the platen, and having a bed comprising a card holder and means whereby a card may be removably attached thereto, and having means whereby the holder may be adjusted with ease and with accuracy to dispose a selected space of the card in the path of movement of the printing element. The apparatus also comprises means whereby an inked printing ribbon may be fed into the path of the printing element and whereby the card may be adjusted in directions at right angles to each other so as to imprint any space in any of a plurality of rows of spaces. Since these identification cards are intended to last at least for one semester and since they are frequently subjected to rough usage or at least abrasive wear, it is desirable to make them to some material which is durable, for example, a smooth, hard synthetic plastic. However, this material does not take and retain ordinary ink at all well and accordingly the present invention overcomes this difficulty by employing, instead of an ordinary ink ribbon, a color-coated hot-stamping foil, and by means of a hot printing element causes the plastic of the card to become sufficiently soft and adhesive to strip the color from the foil and thus form a permanent colored mark. In a preferred embodiment, the machine is

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also characterized in having motor means for moving the printing element toward and from the bed plate, and means whereby the mere placing of the card in proper position starts the motor, and whereby the motor is automatically stopped when the platen has completed one cycle of motion.

In the drawings:

FIG. 1 is a plan view of the machine;

FIG. 1a is a fragmentary section substantially on the line 1a-1a of FIG. 1;

FIG. 2 is a plan view showing one face of an identification card of the type hereinabove referred to;

FIG. 2a is a plan view showing the reverse side of the card;

FIG. 3 is a side elevation, with parts in vertical section, substantially on the line 3-3 of FIG. 1;

FIG. 4 is a fragmentary front elevation of the machine, to larger scale than FIG. 1;

FIG. 5 is a fragmentary vertical section, to larger scale, substantially on the line 5-5 of FIG. 1;

FIG. 6 is a fragmentary front elevation, to larger scale than FIG. 1, showing the switch whereby the motor circuit is closed automatically by the introduction of the card to be imprinted;

FIG. 6a is a fragmentary section on the line 6a-6a of FIG. 6;

FIG. 7 is a fragmentary edge elevation, to larger scale, showing a short length of the ink ribbon; and

FIG. 8 is a wiring diagram illustrative of the automatic starting and stopping of the machine.

Referring to the drawings, FIG. 2 is a face view of a card (for example, approximately 3½" x 2¼" in size) of the type of that above referred to, such a card usually having printed thereon the name of the school or other institution and a replica of its seal and has a space for a photograph of the student; a space for his serial number, if he has one; and his name and address, this data desirably being embossed by the card manufacturer into the substance of the card, and having a space for the student's actual signature. As shown in FIG. 2, the card has series or rows of spaces S and S1 defined by ruled lines L, each of the spaces being designed for the reception of a suitable symbol or code mark indicating, for example, the courses of study which the student is entitled to take; the subject in which he is majoring; and the semester and class; while the rear side of the card, as shown in FIG. 2a, may contain a gridwork of spaces S1 defined by ruled lines and affording locations for many items; for example, a code mark indicating that the particular student is entitled to attend certain specified campus activities such as football games; dances; parties; shows; or the like. It is manifest that each code symbol or other type of indicia applied (as required, by the school) by printing to these various spaces, must be applied to the correct space, as otherwise confusion would result.

The apparatus herein provided for applying such code symbols or indicia, as here illustrated, includes a generally rectangular hollow base 10 which may be a casting, having an approximately horizontal top wall 11 having a plane upper surface and a separate, detachable bottom plate 12, here shown as provided with cushioning pads 13 at its underside.

As shown more particularly in FIG. 1, the top wall 11 of the base is provided with an elongate slot 14 extending parallel to the front edge 15 of the base and spaced a short distance from the front edge. The top wall 11 also has slots 16 and 16a extending at right angles to the slot 14. The slot 14 provides a guideway for a carriage comprising laterally spaced, rigid guide members 17 and 17a, which are rigidly connected by members 18 (FIG. 5) passing through the slot 14 and adjustably fixed to a rack bar 19 which meshes with a spur gear 20 (FIG. 3)

fixed to a shaft 21 whose rear end has a bearing in a bracket 22 secured to the base. The shaft 21 projects forwardly through a bushing in a hole in the front wall of the base, as shown at 23, for the reception of a knob K by means of which the shaft may be turned. By rotating this shaft the rack bar 19 and the guide members 17 and 17a may be moved as a unit longitudinally of the slot 14, that is to say from right to left. As illustrated in FIG. 5, the opposed edges of the members 17 and 17a have rabbets R to constitute guides for a card holder. The card holder 25 (FIG. 1) is of generally rectangular shape in plan view, comprising the parallel legs 26 and 26a united by the transverse front member 27 and at the rear end by a transverse member 27a, the legs being received in the rabbets R in the guide members 17 and 17a respectively, so that the card carrier may be moved from front to rear relatively to the carriage. The parts 26, 26a and 27, 27a are so shaped and dimensioned as to form a shallow chamber or cavity for the reception of a card, the bottom of this chamber desirably consisting of a thin sheet of rubber or the like which rests upon the smooth upper surface 11 of the base. To the rear of the members 17 and 17a and slidable on the upper surface 11 of the base there is disposed an elongate stop bar 28 (FIG. 1) whose front edge 29 is parallel to the slot 14, this bar 28 being connected, by parts 30, 30a (FIG. 1) which pass down through the slots 16 and 16a respectively, to corresponding rack bars 31 (FIG. 3) which mesh with corresponding gears 32 (FIG. 3) fixed to a shaft 33 turning in bearings 34a fixed to the base. The shaft 33 projects out through the side wall of the base and has affixed to it a knob 33a (FIG. 4) by means of which it may be turned. By turning this knob the stop bar 28 may be moved from front to rear, its forward edge 29 constituting a limiting stop to determine the rear-most possible position for the rear edge of the card holder.

Desirably, one end of the stop bar 28 is provided with an index arrow A (FIG. 1) cooperating with a graduated scale Sa on the upper surface of the base, the scale being so marked that by moving the arrow A to correspond to a selected graduation, the card will be accurately placed in a front-to-rear direction to insure the imprinting of the code mark or other indicia on a card space disposed at the selected distance from the front edge of the card. To determine the space in which the code mark is to be placed widthwise of the card, the top surface of the base may be provided near its forward edge with a graduated scale Sb (FIG. 1) for cooperation with a side edge E of the carriage member 17, so that by turning the knob K (FIG. 3) the card carriage may be disposed in the proper position transversely of the base to insure the placing of the indicia in the proper card space measured from left to right.

The printing element D (FIG. 3) which forms the desired imprint on the card is removably attached by a thumb screw or bolt 34 to the forward end of a rigid member 38 forming the forward end portion of a lever 35 fulcrumed on a shaft 36 journaled in a post 37 fixedly secured to or forming an integral part of the top member of the base. The member 38 of the lever 35 is shaped (FIG. 3) to provide a chamber for the reception of a heating unit H supplied with current through a flexible conduit 39.

To prevent undesirable transfer of heat from the heating unit, the lever is desirably formed in two sections, the rear section 35 being fulcrumed on pivot 36 and the forward section 35a being that which carries the printing element and the heating unit. These sections 35 and 35a are provided at their proximate ends with integral flanges F and F1 having interposed between them a layer of insulating material N, for example, asbestos or a foamed plastic, the flanges F and F1 being rigidly connected by suitable bolts 40. The right-hand end of the lever 35, as viewed in FIG. 3, is provided with a pin 41 on which is

journaled a roller 42 constituting a cam follower engageable with a cam 43 (FIG. 1) fixed to one end or being a part of a rigid sleeve 44 (FIG. 1) which is secured to the end of the shaft of the electric motor M. Desirably the connection between the shaft and the sleeve 44 comprises slots 45 and pins 46 (FIG. 3) thereby to permit angular adjustment of the sleeve 44 relatively to the motor shaft. The sleeve 44 is also provided with a cam 47 which, at times contacts the actuating element 48 (FIG. 3) of a normally closed microswitch 48a mounted on a support 50 projecting upwardly from the top of the base. As the motor shaft turns, the lever 35 is rocked and thus the printing element D is moved up and down, the arrangement being such that in its lowermost position the printing element is in position to imprint the card.

In accordance with the present invention the marking material which is imprinted by the printing element upon the card is provided as a dry film of ink I (FIG. 8) carried by a thin ribbon T (FIG. 8) of inked foil. For supporting a roll of this foil with its ink film there is provided a horizontal stub shaft 52 (FIGS. 1 and 4) fixedly secured at one end to a post 53 projecting up from the base. At its forward end the shaft 52 is shaped to constitute a pivotal support or spindle for a spool 54 carrying a supply of the inked film T. By means of a thumb screw 52a and washer the spool is removably secured to rotate on the shaft 52. The foil T (FIG. 7) carrying the ink is drawn off from the spool 54 (FIGS. 1 and 4) and passes beneath a fixed guide pin 55 secured at one end in a post 56 projecting up from the base. The foil then passes transversely across and below the path of vertical movement of the printing element D and beneath a second guide pin 57 and thence about an idler roll 58 on its way to a take-up spool 59. The take-up or wind-up spool 59 is removably and coaxially secured to the forward end of a shaft 60 by means of a thumb screw 60a, the shaft 60 being journaled to turn in a bearing carried by a vertical plate B² fixedly supported to horizontal rods 60a, 61a (FIG. 1) projecting from fixed posts 60b, 61b rising from the base 10. A gear 62 (FIG. 1a) is fixed to the shaft 60 and meshes with a gear 63 (FIG. 1a) which is connected to a shaft 64 by a one-way clutch 65 (FIG. 1) of conventional type. A gear 66 (FIG. 4) fixed to the shaft 64 meshes with a gear segment 67 formed on one arm 68 of a bell-crank lever which rocks about a fixed shaft 69, the other arm 70 of this bell-crank being arranged to overlie an antifriction roll 71 mounted on a bracket 72 (FIGS. 3 and 4) which is fixed to the forward end of the lever member 35. A tension spring 68a (FIG. 4) tends to turn the bell-crank lever, and the segment gear 67 in a clockwise direction. A pressure-applying roll 74 (FIG. 4) contacts the inked foil as the latter passes over the roll 58 and flattens the foil prior to its delivery to the wind-up spool 59. The roll 74 is mounted on a lever 76 fulcrumed at 77 upon a suitable pin and is urged by tension spring 78 in a direction such as to press the roll 74 against the foil.

In the above arrangement the ink-carrying ribbon is drawn off from the supply roll 54 step by step, being advanced at each upward movement of the antifriction roll 71 as the platen rises. However, by reason of the clutch 65, the wind-up roll does not rotate reversely during the downward motion of the platen. Thus, when the printing element reaches the operating position the ribbon beneath it is stationary.

The microswitch 48a (FIGS. 3 and 8) is actuated by the cam 47 once for each revolution of the motor shaft so as to stop the motor.

For starting the motor there is provided another microswitch 75 (FIG. 6) mounted on bar 28 and having a pin P1. As shown in FIG. 6a, a resilient motion-transmitting leaf 80 extends upwardly across the pin P1 and into the path of the forward edge member 27a of the card holder. As the card holder nears its most forward position, in readiness for the imprinting of the card, the contact of

part 27a with the free upper part of leaf 80 pushes the pin P1, thus closing the motor circuit and starting the motor M. Thus as each card is put in place the machine starts, the motor making one revolution, and then stopping so that there is ample opportunity between successive downstrokes of the die for the ink ribbon to be advanced and for the operator to remove the imprinted card and put another in place. As above noted, the dies are removably secured to the platen so that any selected die may be put in operative position in accordance with the symbol or code character to be imprinted.

The bars 17 and 17a of the card holder carriage are so secured to the rack bar which connects them that they can be moved toward or from each other to adjust them to cards of different widths and because the stop bar 29 is adjustable from front to rear the apparatus is adaptable to receive cards of different front-to-rear widths.

Desirably the space B in the card holder 25 between the parallel arms 26 and 26a may have placed therein a thin layer of rubber on which the card will rest, thus providing a certain degree of resiliency as the imprinting blow is struck and for holding the card in place in this chamber B spring fingers 77 and 77a or equivalent devices are provided.

With this arrangement it is possible to locate a card so that any one of the defined spaces designed to receive indicia of one sort or another may be placed directly and accurately beneath the downcoming die, it being noted that by the use of the graduations provided at S and S1 (FIG. 1) which may be spaced and properly designated to correspond to the spaces on the card, the operator can set the machine very quickly and accurately to mark a card in anyone of the spaces. Furthermore, having once adjusted the machine to imprint in a particular space, all the operator has to do in order to duplicate the marking of other cards is to pull the card holder 25 far enough out from the guides 17 and 17a to admit a card to the chamber B of the holder and then, in pushing the holder 25 back until the forward edge of the holder actuates the switch pin P1, the machine is automatically started and the die comes down and imprints the desired symbol in the selected space on each successive card.

As above noted, the cards may have spaces on either side for the reception of marks of various types and since the holder is capable of receiving the card, regardless of which side may be up, it is adapted to mark cards of this kind on both faces.

By the use of the hot printing element and the color-carrying foil the downstroke of the printing element applies sufficient heat to the plastic card to make the latter adhesive to a sufficient extent so that it pulls off from the foil some of the dry color sufficient to form the desired mark and without any danger of spreading the material of the mark as is a common result when liquid ink is employed, the resulting mark being slightly sunken in the softened surface film of the card. Moreover, in this manner it is possible to place permanent markings on hard surfaced plastic cards to which ordinary adhesive does not readily adhere.

While one desirable embodiment of the invention has herein been disclosed by way of example, it is to be understood that the invention is broadly inclusive of any and all modifications falling within the scope of the appended claims.

I claim:

1. A printing machine for applying indicia to any selected one of a plurality of blank but defined areas on the face of a stiff hard surfaced identification card, wherein some of said areas may be near a front-to-rear edge of the card and others of which may be near a transverse edge of the card, said machine comprising a vertically reciprocable printing element and a bed for supporting a card to be imprinted, said bed comprising a carriage, means so supporting the carriage that it may be moved transversely from right-to-left, the carriage comprising guide means for a card holder having a shallow cavity of

a size and shape such as to receive the card with a close fit, the guide means being such as to permit the holder to be moved from a card-receiving position to an indicia-receiving position, manually actuatable indexed means whereby the carriage may be adjusted laterally to position a selected area of a card, which has been placed in the holder, in the front-to-rear vertical plane of movement of the printing element, and manually adjustable indexed stop means operative to terminate motion of the holder toward the path of the printing element when said selected area of the card is in the path of the printing element, an electric motor, means driven by the motor for reciprocating the printing element, means for so disposing a flexible ribbon of foil, having on one face a dry coating of a coloring material, that the colored face of the foil will be interposed between the card and the printing element as the printing element approaches the surface of the card, means operative automatically to start the motor when the card holder, in moving toward the indicia-receiving position, engages said stop means, means operative automatically to stop the motor whenever the printing element arrives at the upper limit of its reciprocating motion, and means for so heating the printing element that contact of the printing element with the uncoated side of the foil, while pressing the coated side of the foil against the thermoplastic surface of the card, will cause said surface of the card to become so sticky as to strip the coloring from the foil and leave a colored replica of the printing element on the selected area of the card.

2. A printing machine for applying indicia to any selected one of a plurality of definitely defined areas on the surface of a rectangular card, and wherein some of said areas may be near a transverse edge of the card and others may be near a front-to-rear edge of the card, said machine comprising a vertically movable printing element, and means for reciprocating said element, a horizontally movable card holder movable from a card-receiving position to a marking position where a portion of a card which has been placed in the holder lies athwart the path of the printing element, and means whereby the holder is constrained to follow a path in moving toward the marking position such as to dispose any predetermined selected one of said areas in the path of the printing element, further characterized in having a lever fulcrumed to rock about a horizontal axis, said lever comprising two independent, rigid aligned portions, means so connecting the printing element to the free end of one of said portions that the printing element may move in a vertical plane, said last-named portion carrying a heating unit, further characterized in that the other of said portions of the lever carries a cam follower roll; means so connecting said portions of the lever as to minimize the transfer of heat from the heating unit longitudinally of the lever, a cam shaft which is driven by the motor through approximately one revolution of each downstroke of the printing element, a cam fixed to said shaft which engages the cam follower roll carried by the lever, and means operative automatically to stop the motor as the printing element nears the upper limit of its stroke thereby providing time for the operator to retract the card holder, remove the finished card and introduce another into the holder before the printing element again descends.

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