

March 10, 1964

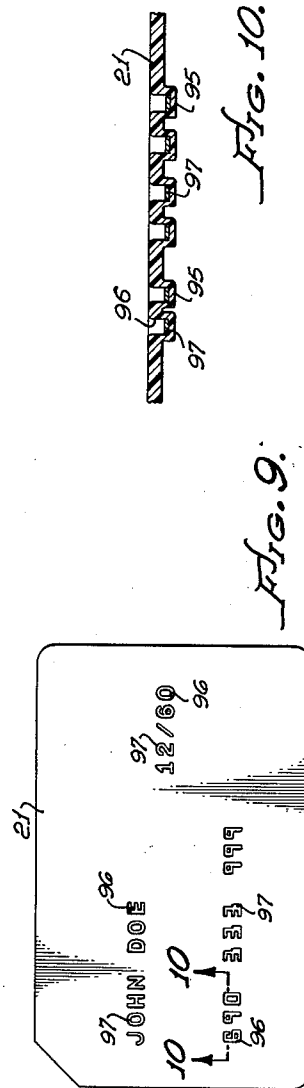
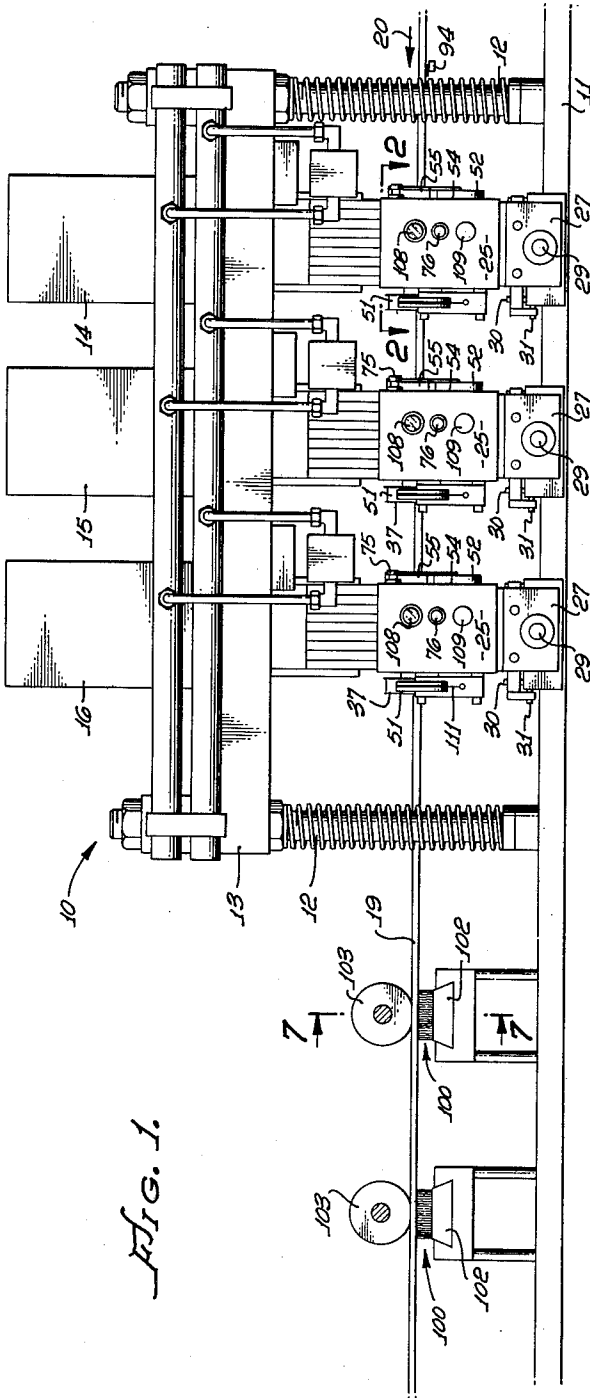
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3,124,064

COLOR TAPE FEED MECHANISM FOR EMBOSSING MACHINE

Filed April 21, 1961

4 Sheets-Sheet 1



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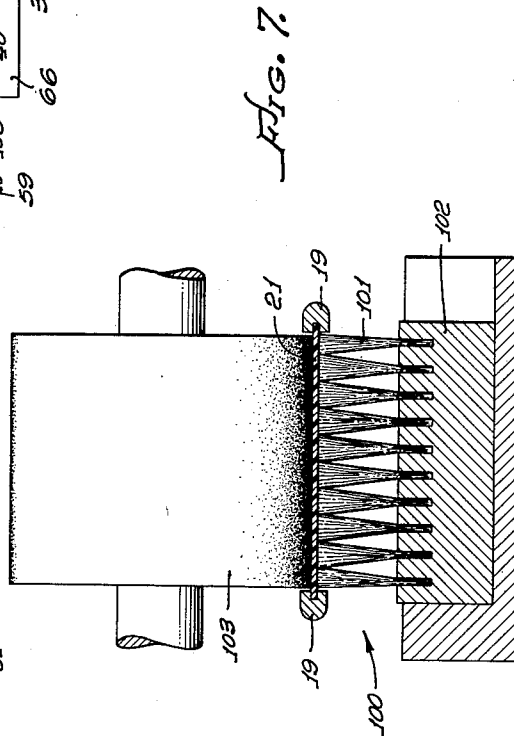
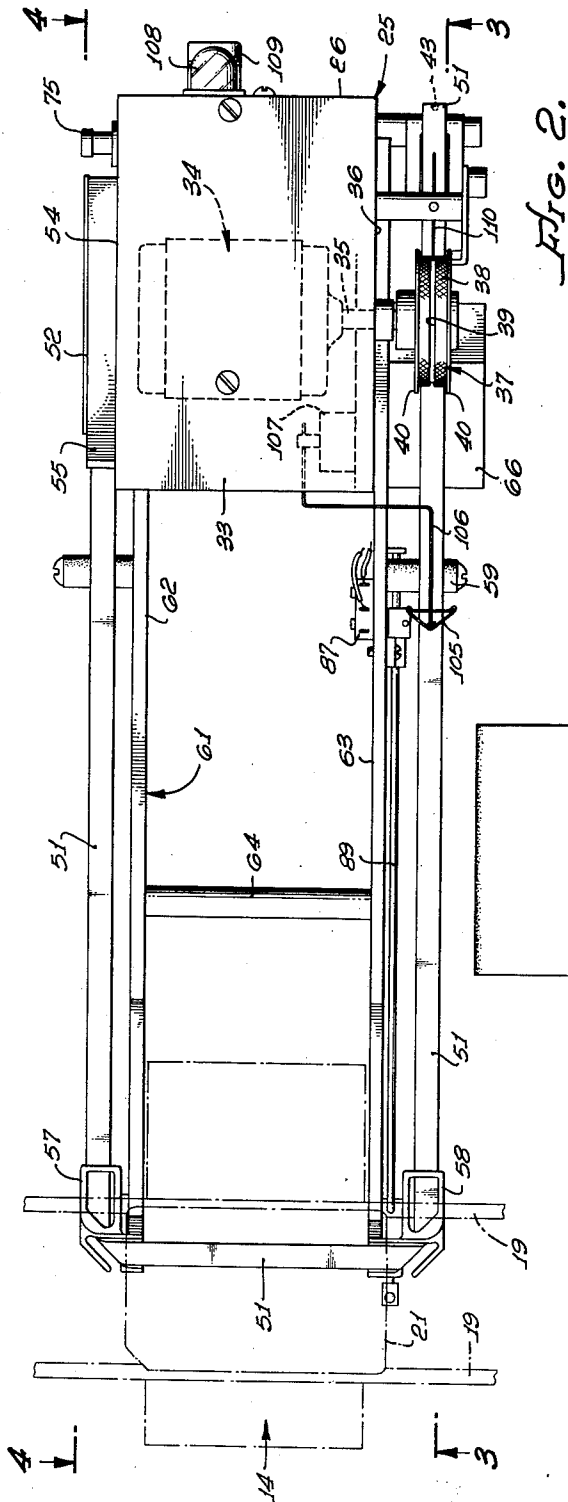
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4 Sheets-Sheet 2



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COLOR TAPE FEED MECHANISM FOR EMBOSING MACHINE

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4 Sheets-Sheet 3

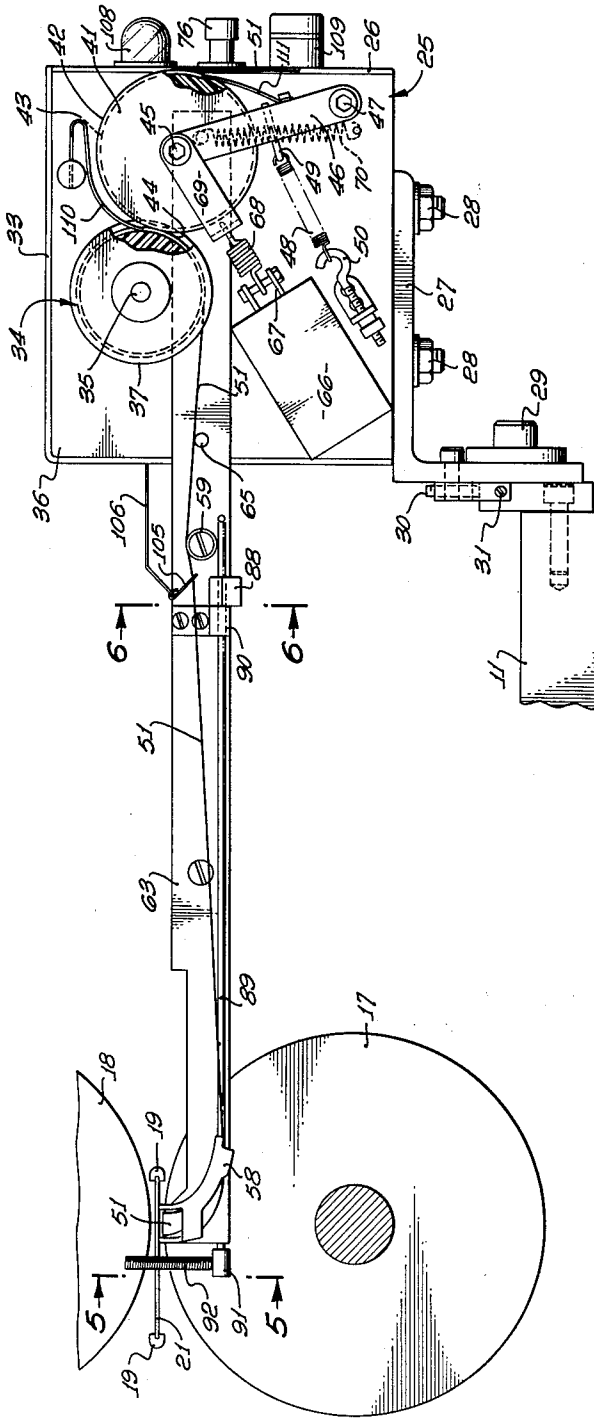


FIG. 3.

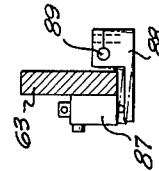


FIG. 6.

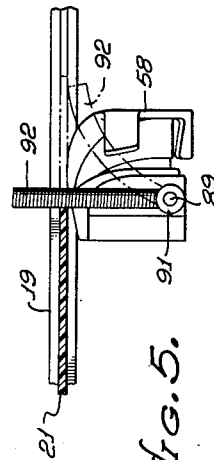


FIG. 5.

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4 Sheets-Sheet 4

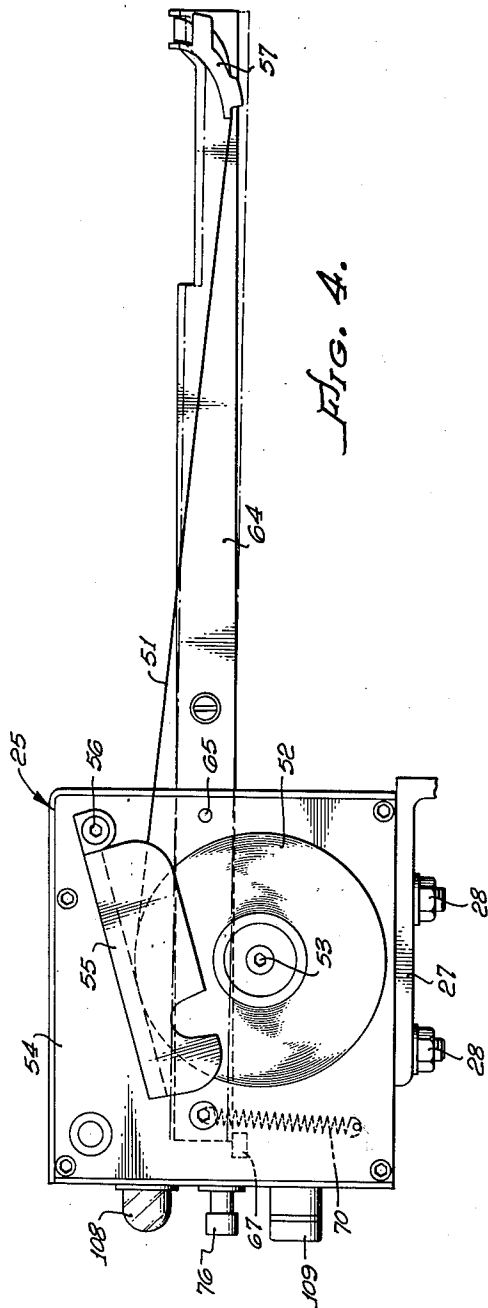
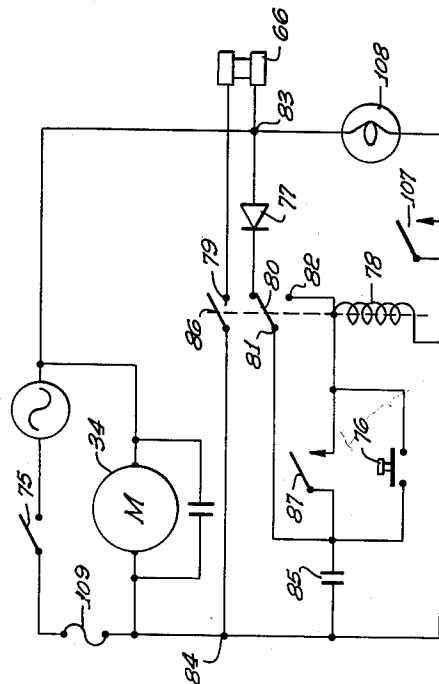


Fig. 4.



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3,124,064

COLOR TAPE FEED MECHANISM FOR EMBOSSEING MACHINE

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Filed Apr. 21, 1961, Ser. No. 104,658
8 Claims. (Cl. 101-18)

This invention relates to an attachment or an auxiliary device for use with an embossing machine for the purpose of depositing colored material within the indentations produced by the embossing type. The colored material contrasts with the color of the card to make the numbers, letters or characters easier to read. This invention finds particular usefulness in connection with embossing of certain information such as name, number, date, etc., on so-called "credit cards." Prior to this invention, it has been commercial practice to deposit colored material in such indentations by a manual process wherein a number of workers wearing rubber gloves rubber paste-like colored material into the indentations and then wiped off the excess material. That manual process was too slow and too expensive.

Another object is to provide a colored ribbon or colored tape device of this type which is acted on directly by the type of the embossing machine so that the indentations are produced and colored at the same time, rather than requiring a separate coloring operation after the indentations have been produced.

It is an important object of this invention to eliminate the manual operation and to substitute a tape or ribbon bearing a colored material which may be employed with the type of the embossing machine in a manner similar to the use of a typewriter ribbon in a typewriter.

Another object is to provide a novel form of color tape-feeding device which uses a continuously running electric motor to cause intermittent feed of the tape as required.

Another object is to provide a device of this type having means for facilitating separation of the tape from the type elements after each embossing operation is completed.

A more detailed object is to provide several tape-feeding devices embodying this invention, one device for each embossing station of the embossing machine, together with means for initiating action of each tape-feeding device by means of trigger apparatus located on an adjacent device.

Other and more detailed objects and advantages will appear hereinafter.

In the drawings:

FIGURE 1 is a side elevation in diagrammatic form showing a three-station embossing machine equipped with three color tape-feeding devices embodying this invention.

FIGURE 2 is a top plan view of one of the color tape-feeding devices embodying this invention, taken substantially on lines 2-2 as shown in FIGURE 1.

FIGURE 3 is a sectional side elevation taken substantially on the lines 3-3 as shown in FIGURE 2.

FIGURE 4 is a side elevation taken substantially on the lines 4-4 as shown in FIGURE 2.

FIGURE 5 is a sectional detail taken substantially on the lines 5-5 as shown in FIGURE 3.

FIGURE 6 is a sectional detail taken substantially on the lines 6-6 as shown in FIGURE 3.

FIGURE 7 is a sectional elevation in diagrammatic form taken substantially on the lines 7-7 as shown in FIGURE 1.

FIGURE 8 is a wiring diagram.

FIGURE 9 is a plan view of a typical credit card having three-series of indentations embossed thereon.

FIGURE 10 is a sectional detail on an enlarged scale taken substantially on the lines 10-10 as shown in FIGURE 9.

Referring to the drawings, the embossing machine generally designated 10, includes a stationary base 11 having a plurality of vertical posts 12 supporting a vertically movable head 13. Means (not shown) are provided for reciprocating the post 12 and the head 13. Embossing stations 14, 15 and 16 are provided on the base 11 and reciprocating head 13 and at each of these stations a plurality of type wheels 17 and back-up wheels 18 are provided. Means (not shown) are provided for turning the type wheels 17 to bring any desired number, letter or character into operative position. Guide rails 19 support cards for intermittent movement in the direction of the arrow 20 as shown in FIGURE 1. The cards 21 may be of the general type shown in FIGURE 9, and may be formed of any material suitable for embossing. Suitable mechanism (not shown) is provided as a part of the embossing machine 10 for intermittently advancing the cards 21 along the stationary guide rails 19.

In the general plan of operation, cards 21 are delivered to the rails 19 from a feed mechanism (not shown), and the cards are moved to each of the stations 14, 15 and 16 in sequence. The cards remain stationary while the head 13 of the embossing machine reciprocates to cause the type characters of the wheels 17 to be impressed upward from the underside into the material of the cards. Each stroke of the embossing machine may simultaneously emboss a card at each of the stations 14, 15 and 16. It should be noted that the card shown in FIGURE 10 is inverted from its position when traveling through the embossing machine.

In accordance with this invention, means are provided for interposing a color-carrying flexible tape between the type characters of the embossing machine and the cards to be embossed, so that colored material is deposited in the embossed cavities or indentations produced in the cards. A color tape feed device, generally designated 25, is located at each of the embossing stations 14, 15 and 16. Since these are substantially identical, only one need be described. As shown in the drawings, the device 25 includes a stationary housing 26 fixed to a bracket 27 by fastenings 28. The bracket 27 is adjustably mounted on the stationary base 11 by means of the clamp fastenings 29 and the adjusting screws 30 and 31. A removable, L-shaped cover plate 33 is mounted on the housing 26 and forms a part thereof.

Within the housing 26 is positioned an electric motor 34 having a shaft 35 projecting through the wall 36 of the housing 26. A drive roller or pulley 37 is fixed to the overhanging portion of the motor shaft 35. This drive pulley 37 may be provided with an outer cylindrical surface 38 having a central groove 39 and having side flanges 40. An idler roller or pulley 41 is provided with a cylindrical outer surface 42 having a central groove 43. The pulley 41 extends between the side flanges 40 on the drive pulley 37. The outer surface 42 of the idler pulley 41 lies in close proximity to the outer surface 38 of the drive pulley 37 and forms a bight 44 therebetween. The idler pulley 41 is movably mounted with respect to the drive pulley 37, and as shown in the drawings, is pivotally mounted at 45 on the swinging end of an arm 46. The arm 46 is pivotally attached at 47 to the wall 36 of the housing 26. A coil spring 48 is connected at one end to a fitting 49 clamped to the swinging arm 46 and is connected at the other end to a hook 50 adjustably positioned on the wall 36 of the housing 26. The spring 48 acts in a direction to swing the arm 46 to bring the idler pulley 41 into contact with the drive pulley 37.

The flexible color-carrying tape 51 is contained on a supply reel 52 mounted at 53 on the side wall 54 of the housing 26. A shield 55 pivoted on the side wall 54 at 56 rests on the outer periphery of the supply reel 52. The flexible tape may be formed of any suitable material, for example, the Du Pont product known as "Mylar" and is coated with coloring material on its upper surface. This coloring material may be of any suitable or desirable color including black. The tape 51 passes from the supply reel 52 to the guide 57, then turns at right angles and crosses to the guide 58, again turns at right angles and passes over the roller 59 around a portion of the drive pulley 37 and into the bight 44 between the pulleys 37 and 41, then around the idler pulley 41 and downward into a receptacle (not shown). The horizontal run of the tape 51 as it passes from the guide 57 to the guide 58 is positioned under the card 21 and above the type characters which are to be impressed into the card. The color material on the tape 51 is provided on the face which contacts the card 21, that is, the upper surface of that portion of the tape 51 which passes between guides 57 and 58. Each of the guides 57 and 58 is provided with a smooth curved surface which contacts the other side of the tape 51.

A frame 61 comprising parallel side members 62 and 63 connected by cross bar 64 is pivotally mounted at 65 on the side walls 36 and 54 of the housing 26. Coil springs 70 act to hold the frame against stops 67. The guide 57 is mounted on the outer end of the side member 62 and the guide 58 is mounted on the outer end of the side member 63. While the housing 26 is fixed relative to the base 11 of the embossing machine 10, the frame 61 and its arms 62 and 63 are not; therefore, contact between the guides 57 and 58 with the vertically reciprocating parts on the head 13 serves to depress the outer swinging ends of the arms 62 and 63 to a position shown by the phantom lines in FIGURE 4. This action serves to bring the tape 51 into contact with the type characters which are to be embossed into the card 21. When the head 13 moves upward after the embossing operation, the frame 61 together with its side members 62 and 63 and guides 57 and 58 swing upward under action of the springs 70 to the full line position shown in FIGURE 4. This action serves to lift the tape 51 out of contact with the type characters, so that the individual type wheels 17 may be rotated to new positions without danger of breaking the tape 51.

Means are provided for intermittently advancing the tape 51 to bring a fresh portion into position between the guides 57 and 58, and this advancing movement is timed to occur during the intervals as the cards 21 are being transferred from one station to the next along the rails 19. An electric solenoid, generally designated 66, is mounted on the wall 36 of the housing 26 and has a movable armature 67 connected by means of a stiff coil spring 68 to a yoke 69 attached to the swinging arm 46 at its pivotal connection 45 with the idler pulley 41. When the solenoid 66 is energized, it retracts its armature 67, tensioning the spring 68, and this serves to increase the pressure between the surfaces of the pulleys 37 and 41, thereby applying a friction drive to the flexible tape 51. The duration of the force applied by the solenoid armature 67 to the swinging arm 46 is such as to move the flexible tape 51 for a distance substantially equal to the distance between the guides 57 and 58. This is accomplished by means of the electrical apparatus shown diagrammatically in FIGURE 8. Closing of the "on-off" switch 75 serves to cause the motor 34 to operate continuously, thereby turning the drive pulley 37 continuously. Whenever the manual switch 76 is closed, a circuit is completed through the rectifier 77 and relay 78. The action of the relay is to close the switch 79 and to swing the switch part 80 to connect the terminals 81 and 82. An electric circuit is then closed through the solenoid 66 from the terminal 83 to the terminal 84. The re-

lay 78, however, remains energized only for such period of time as established by the size of the capacitor 85 as compared to the inductance of the relay 78. After that period of time has elapsed, for example, one-half second, the flow of current through the relay ceases, and the switch parts 80 and 86 are returned to the position shown in FIGURE 8. This interrupts the supply of current to the solenoid 66 and this in turn relaxes the pressure between the pulleys 37 and 41. The friction drive of the flexible tape 51 is thereby interrupted.

A card-operated switch assembly 87 is placed in parallel with the manual switch 76. The switch 87 is conveniently mounted on the side arm 63 (FIGURE 6) and is actuated by means of a crank 88 clamped to a torsion bar 89. As shown in FIGURE 3, this torsion bar 89 is mounted in a bearing 90 on the side member 63 and in another bearing provided in the guide 58. The extending end of the torsion bar 89 is provided with a fitting 91 which carries a finger in the form of a coil spring 92. This coil spring finger projects upward into the path of movement of the cards 21. When a card 21 moving along the rails 19 encounters the spring finger 92, it deflects the finger to the phantom line position shown in FIGURE 5, thereby turning the torsion bar 89 and causing the crank 88 to actuate the switch 87. This has the same effect as closing of the manual switch 76, as described above. The solenoid 66 is energized, thereby increasing the pressure between the idler pulley 41 and the drive pulley 37, and effecting a friction drive of the tape 51.

It should be noted that the switch 87 does not energize the solenoid on the tape feed unit 25 on which it is mounted. Instead, each switch 87 is electrically connected to the tape feed unit at the next embossing station. Thus, the switch 87 on the tape feed unit at station 14 is electrically connected to operate the tape feed unit 25 at embossing station 15. The card 21 at one embossing station does not encounter the coil spring finger 92 until it begins movement away from that station. The tape feed unit 25 at the first embossing station 14 is energized by means of a remote spring finger switch 94, as shown in FIGURE 1.

The feature whereby each tape feed unit is energized by means of a card-actuated switch on the next adjacent unit is an advantageous one. It insures that advancing movement of the color-carrying tape 51 on each unit occurs only when a card 21 is about to be positioned at the embossing station for that unit. Experience has shown that it is wasteful of color-carrying tape 51 to cause each of the tape feed units 25 to be energized on each stroke of the head 13 of the embossing machine 10. Sometimes only one card bearing a particular code number is required; sometimes two or more are required. Accordingly, it is not possible to program the feeding of the cards to the machine so that one card is always present at each of the embossing stations. Consequently, considerable amounts of color-carrying tape 51 can be saved by causing a tape to be fed only when a card is approaching the particular tape feed unit.

In the particular installation shown in FIGURE 1, the first embossing station 14 may be employed to emboss the name on the card 21 while the stations 15 and 16 may be employed to emboss the date and code number, respectively, on the card 21. The embossing operation at each station produces a series of raised letters, figures or characters 95 on each card 21. On the opposite side of the card 21 from these projections 95 are produced correspondingly shaped indentations or recesses 96, each having a layer of color material 97 deposited in the lower portion thereof. After the cards 21 have passed through all of the embossing stations, they pass through one or more brush assemblies 100 in order to remove any excess color material which may adhere to the surface of the card 21. Each of these brush assemblies 100 includes a plurality of brush bristles 101 mounted in a stationary member 102. A back-up roller 103 is mounted in posi-

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tion to contact the card 21 directly over the brush bristles 101.

Means are provided on each tape feeding unit 25 for indicating breakage of the color-carrying tape 51. A slipper 105 rests on the tape 51 in a position in advance of the roller 59 and this slipper 105 is carried on a support element 106 connected to actuate a switch 107 positioned within the housing 26. If breakage of the tape 51 should occur, the slipper 105 drops down, allowing the support element 106 to close the contacts of the switch 107, thereby closing an electric circuit through the warning light 108. A fuse 109 protects the parts against overload.

The accumulation of static electricity on the tape 51 sometimes tends to make it cling to the surface of the pulleys 37 and 41. In order to prevent such undesirable action, a stationary curved spring finger 110 projects into the circular groove 39 provided in the outer cylindrical surface 38 of the drive pulley 37. The finger 110 is very nearly tangential to the surface of the pulley 37 at the location where it enters the circular groove 39. The tape 51 rides over the surface of the finger 110 and is thus positively separated from the drive pulley 37. Similarly, a stationary spring finger 111 extends into the central circular groove 43 formed in the outer surface 42 of the idler pulley 41. This finger 111 serves to separate the tape 51 from the surface 42 of the idler pulley 41 so that it may drop straight downward into a suitable receptacle (not shown).

Having fully described my invention, it is understood that I am not to be limited to the details herein set forth, but that my invention is of the full scope of the appended claims.

I claim:

1. For use with an embossing machine having transfer apparatus for moving cards to an embossing station where type characters are impressed into the cards, the improvement comprising, in combination: spaced guides for positioning a flexible tape in a location between the type characters and one of the cards, the tape having color material on a side adjacent the card, a stationary housing, a continuously rotating motor on the housing, a pair of pulleys rotatably supported on the housing and forming a bight through which said tape extends from one of said guides, means whereby at least one of said pulleys is driven by said motor, and means actuated by movement of said cards for closing the bight to tension the tape and move a fresh portion thereof into position between said spaced guides.

2. For use with an embossing machine having transfer apparatus for moving cards to an embossing station where type characters are impressed into the cards, the improvement comprising, in combination: spaced guides for positioning a flexible tape in a location between the type characters and one of the cards, the tape having color material on a side adjacent the card, a stationary housing, a continuously rotating motor on the housing, a pair of pulleys rotatably supported on the housing and forming a bight through which said tape extends from one of said guides, means whereby one of said pulleys is driven by said motor, an arm pivotally mounted on the housing and rotatably supporting the other pulley, and intermittent means actuated by movement of said cards for swinging said arm to close the bight and thereby tension the tape and move a fresh portion thereof into position between said spaced guides.

3. The combination set forth in claim 2 in which said intermittent means includes a solenoid connected to swing said arm, and an electrical sensing element in the path of movement of said cards operatively connected to actuate the solenoid.

4. For use with an embossing machine having transfer apparatus for moving a series of cards to an embossing station where type characters are impressed into the cards, the improvement comprising, in combination: a

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stationary housing, a frame projecting from the housing and including side members, spaced guides mounted on the ends of the side members for positioning a flexible tape in a location between the type characters and one of the cards, the tape carrying color material on a side adjacent the card, a continuously rotating motor on the housing, a supply reel on one side of the housing, a pair of pulleys rotatably supported on the housing on the other side thereof and forming a bight therebetween, the tape extending from the supply reel to one of said guides, then to the other of said guides, and then into said bight, means whereby at least one of said pulleys is driven by said motor, and intermittent means actuated by movement of said cards for closing the bight to tension the tape and move a fresh portion thereof into position between said spaced guides.

5. For use with an embossing machine having transfer apparatus for moving a series of cards horizontally to an embossing station where type characters are impressed into the cards by vertical movement of parts of the machine, the improvement comprising, in combination: a stationary housing, a frame mounted on the housing for pivotal movement about a horizontal axis, the frame including side members projecting horizontally from the housing, spaced guides mounted on the projecting ends of the side members and adapted to be contacted by the moving parts of the machine, said guides acting to position a flexible tape in a location above the type characters and below one of the cards, the tape having color material on the upper side adjacent the card, resilient means acting on the frame to swing the side members in a direction to move the tape guides upward, stop means limiting relative pivotal movement of the frame and the housing, a tape supply reel on one side of the housing adjacent one side member, tape advancing means including a power driven rotary member supported on the housing on the other side thereof adjacent the other side member, the tape extending from said reel along one side member to one of the guides, then to the other guide, and then along the other side member to the power driven rotary member, and means actuated by movement of said cards for causing said rotary member to advance the tape.

6. For use with an embossing machine having transfer apparatus for moving a series of cards to an embossing station where type characters are impressed into the cards, the improvement comprising, in combination: a stationary housing, a frame mounted on the housing and including parallel side members projecting from the housing, a tape guide mounted on the projecting end of each side member, said guides being spaced for positioning a flexible tape in a location between the type characters and one of the cards, the tape having color material on a side adjacent the card, each tape guide having a curved surface to cause the tape to turn through substantially a right angle, a tape supply reel on one side of the housing adjacent one side member, tape advancing means including a power driven rotary member supported on the housing on the other side thereof adjacent the other side member, the tape extending from said reel along one side member to one of the guides, then to the other guide, and then along the other side member to said power driven rotary member, and means actuated by movement of said cards for causing said rotary member to advance the tape.

7. For use with an embossing machine having transfer apparatus for moving cards horizontally in sequence to a plurality of embossing stations where type characters are impressed into the cards at each station, the improvement comprising, in combination: a plurality of color tape feeding devices, one at each station, each device including a stationary housing, a frame mounted on the housing and including side members projecting horizontally from the housing, spaced guides mounted on the projecting ends of the side members for positioning a flexible tape in a location above the type characters and below the cards, the tape having color material on a side adjacent the card,

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a supply reel on one side of the housing, tape advancing means including a power driven rotary member supported on the housing on the other side thereof, the tape extending from said reel along one side member to one of the guides, then to the other guide, and then along the other side member to the power driven rotary member, and means on one feeding device actuated by movement of said cards for causing the rotary member on another feeding device to advance the tape thereon.

8. For use with an embossing machine having transfer apparatus for moving a series of cards to an embossing station where type characters are impressed into the cards, the improvement comprising, in combination: a stationary housing, a frame mounted on the housing and including parallel side members projecting from the housing, a tape guide mounted on the projecting end of each side member, said guides being spaced for positioning a flexible tape in a location between the type characters and one of the cards, the tape having color material on a side adjacent the card, each tape guide having a curved surface to cause the tape to turn through substantially a right angle, a tape supply reel on one side of the housing adjacent one side member, tape advancing means including a power driven rotary member supported on the hous-

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ing on the other side thereof adjacent the other side member, the tape extending from said reel along one side member to one of the guides, then to the other guide, and then along the other side member to said power driven rotary member, brush means for removing excess color material from said cards, and means actuated by movement of said cards for causing said rotary member to advance the tape.

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