Oct. 28, 1969 T. V. HEBBLETHWAITE 3,475,253

CARD-PREPARING MACHINE

Filed April 12, 1963 8 Sheets-Sheet 1

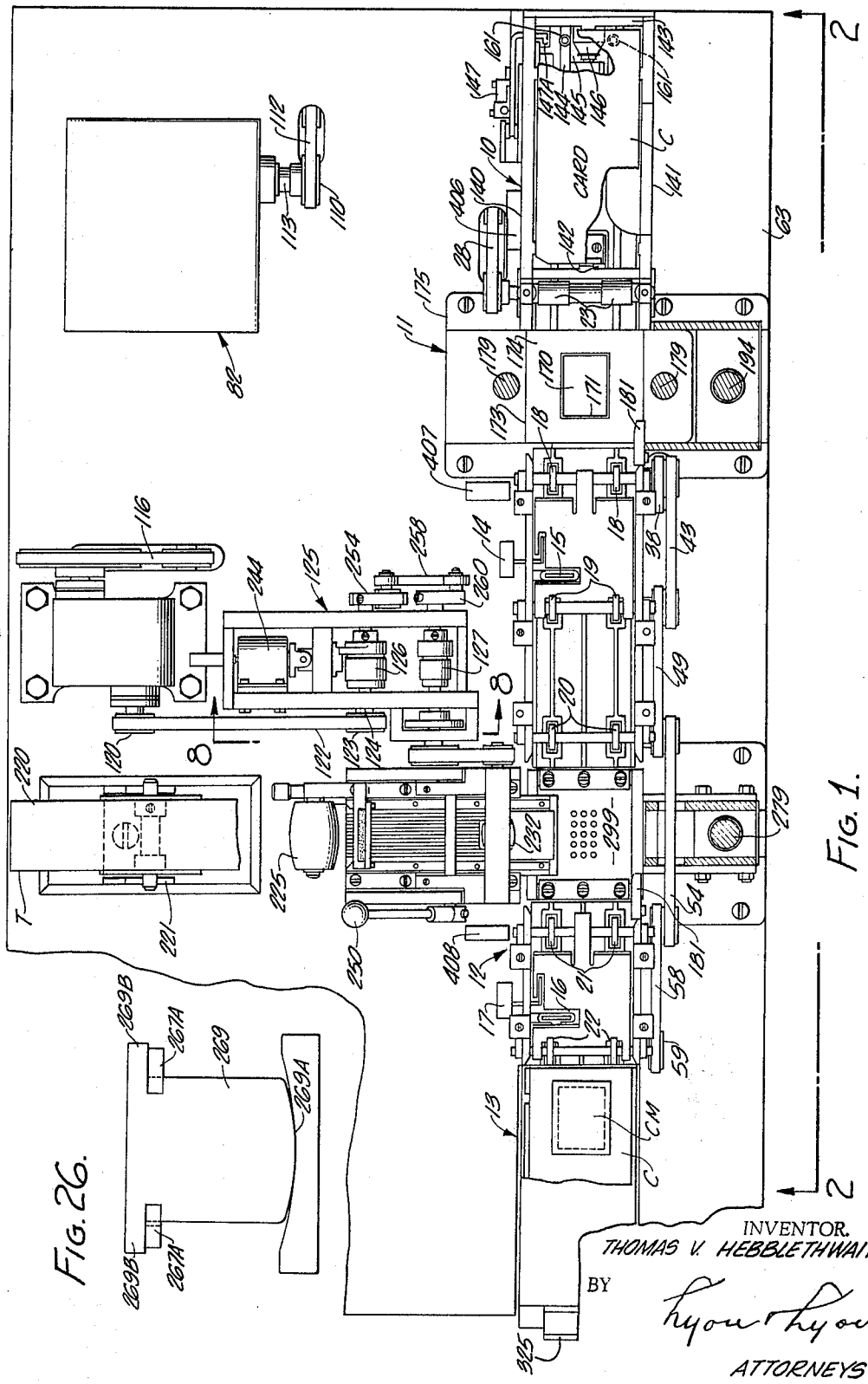


FIG. 1.

FIG. 26.

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CARD-PREPARING MACHINE

Filed April 12, 1963 8 Sheets-Sheet 2

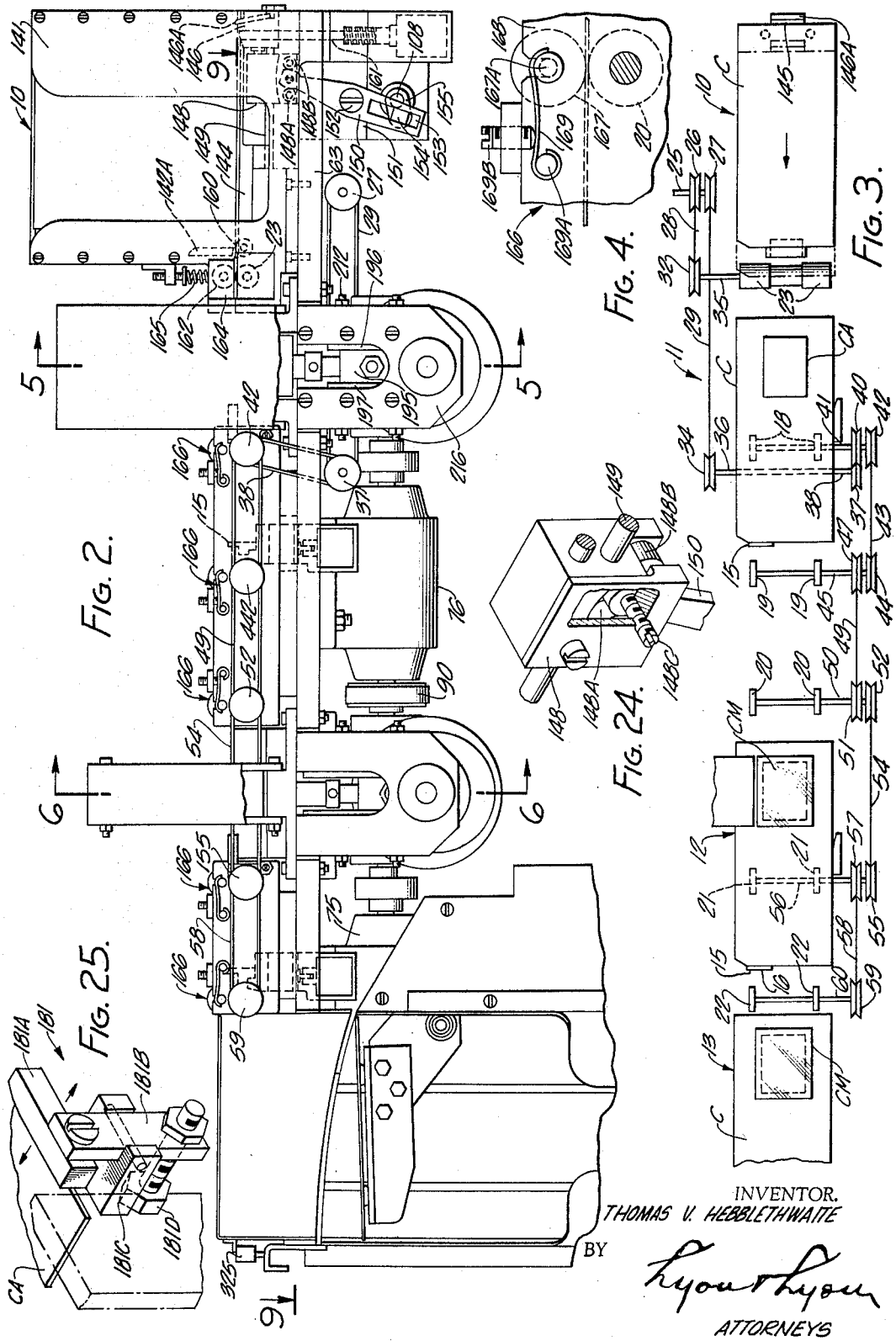


FIG. 2.

FIG. 4.

FIG. 3.

FIG. 24.

FIG. 25.

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CARD-PREPARING MACHINE

Filed April 12, 1963 8 Sheets-Sheet 3

FIG. 7.

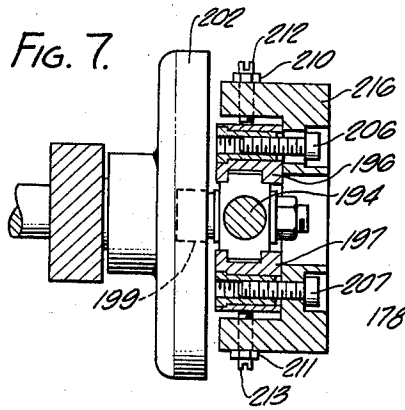


FIG. 5.

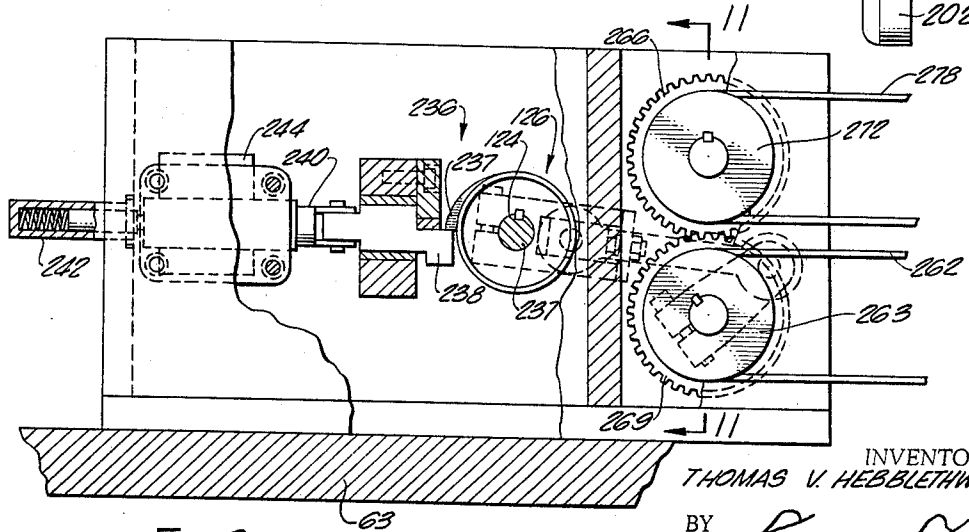


FIG. 8.

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Oct. 28, 1969 T. V. HEBBLETHWAITE 3,475,253

CARD-PREPARING MACHINE

Filed April 12, 1963 8 Sheets-Sheet 4

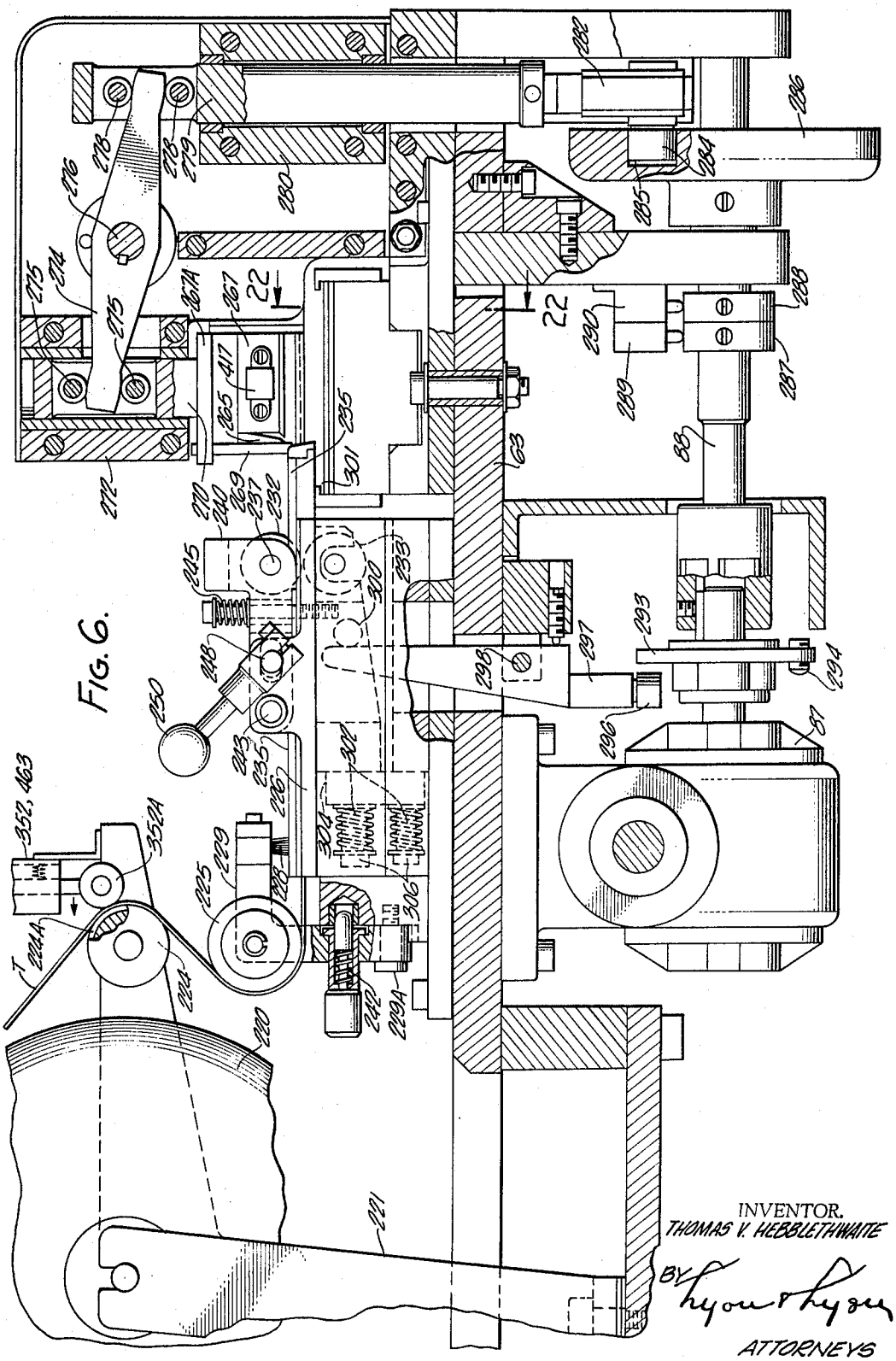


FIG. 6.

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Oct. 28, 1969 T. V. HEBBLETHWAITE 3,475,253

CARD-PREPARING MACHINE

Filed April 12, 1963 8 Sheets-Sheet 5

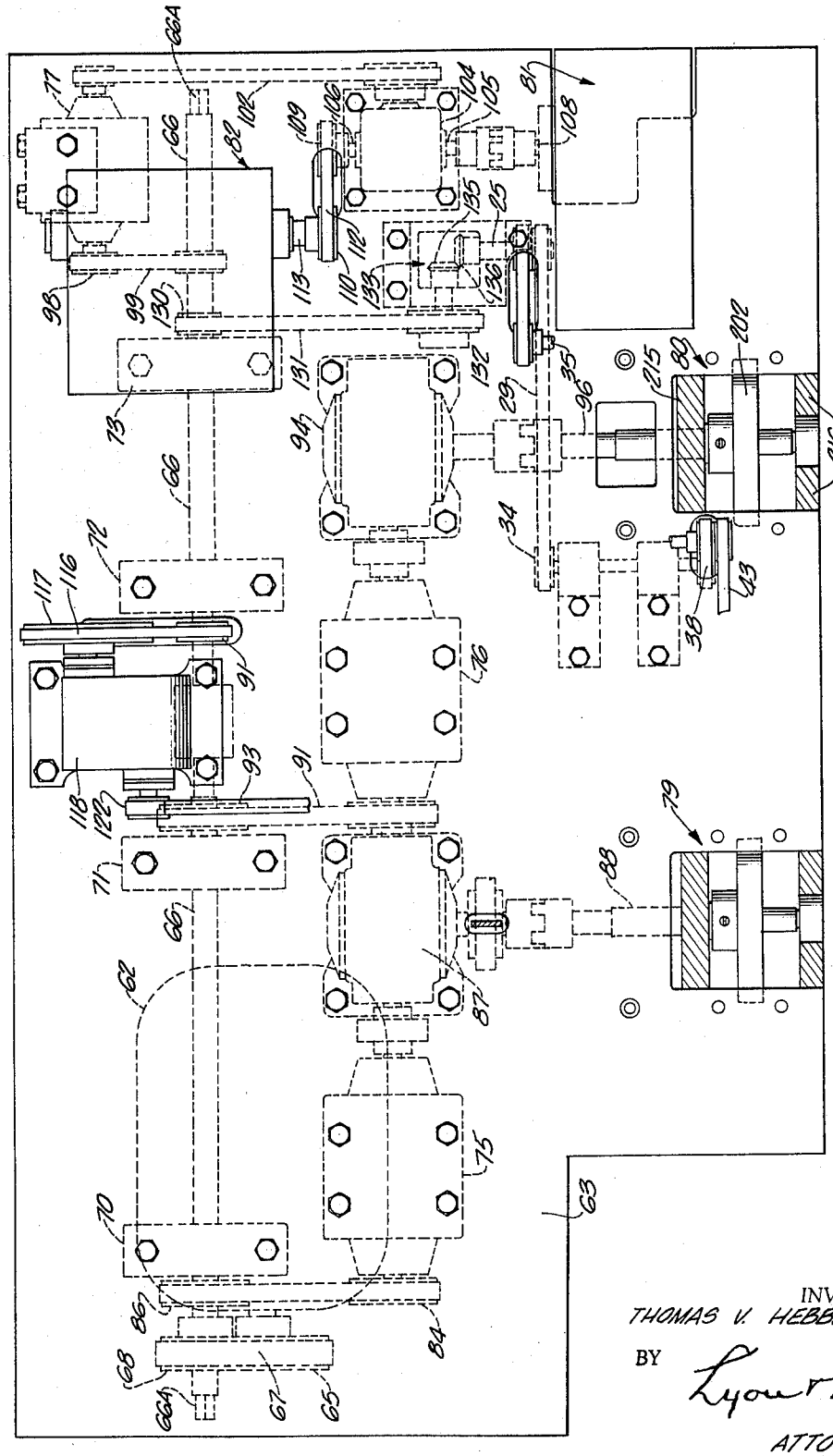


FIG. 9.

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Oct. 28, 1969 T. V. HEBBLETHWAITE 3,475,253

CARD-PREPARING MACHINE

Filed April 12, 1963 8 Sheets-Sheet 6

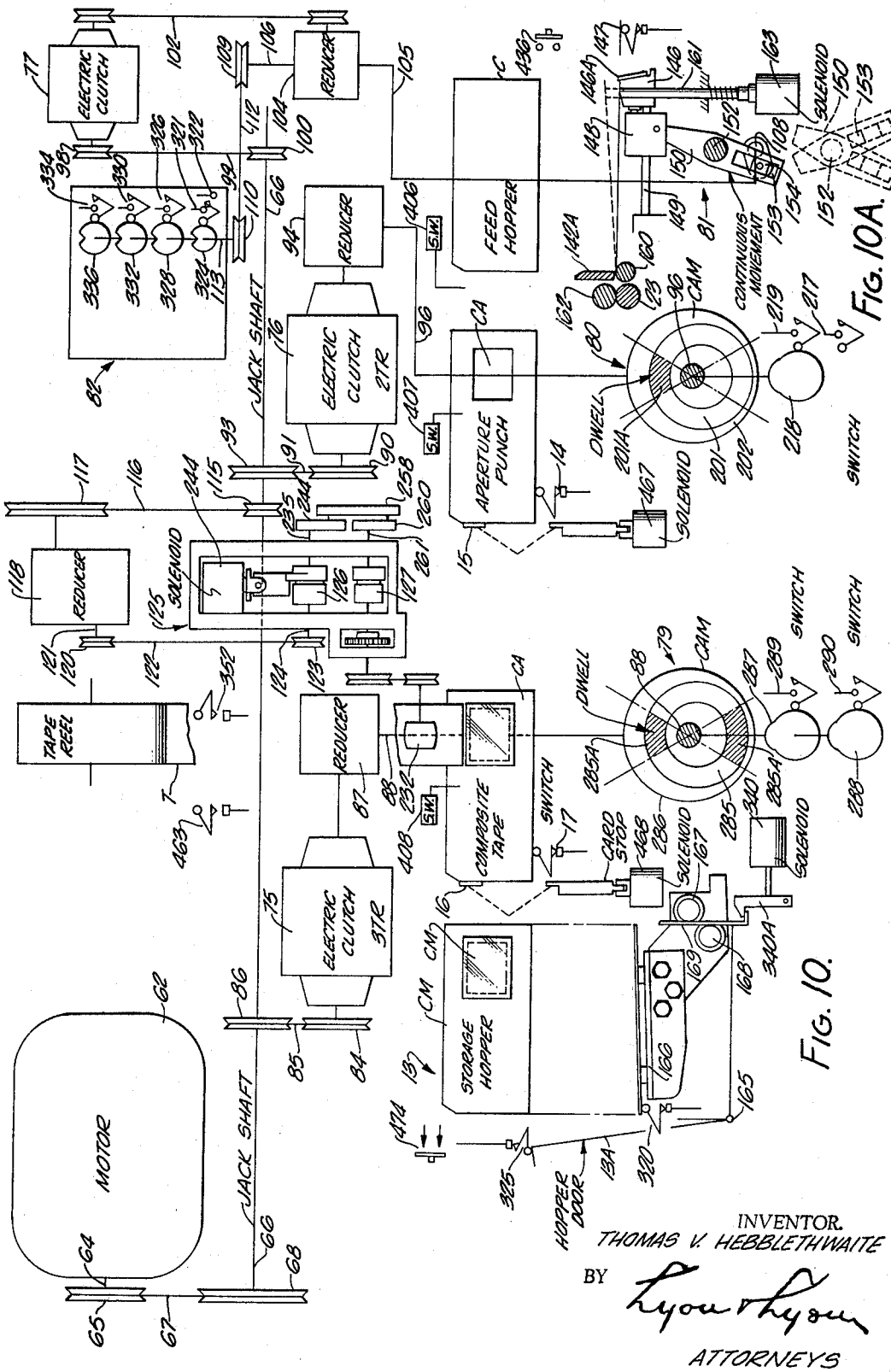


FIG. 10A.

FIG. 10.

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CARD-PREPARING MACHINE

Filed April 12, 1963 8 Sheets-Sheet 7

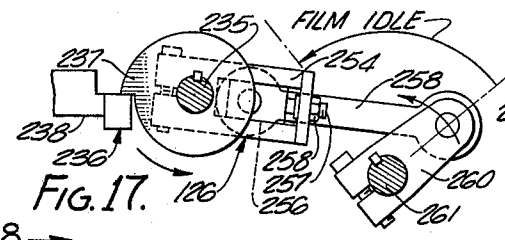


FIG. 17.

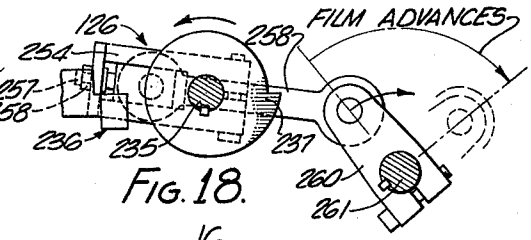


FIG. 18.

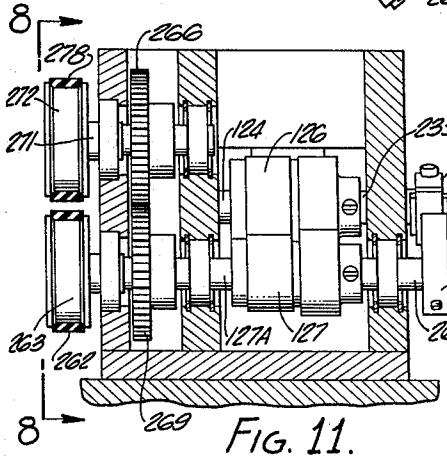


FIG. 11.

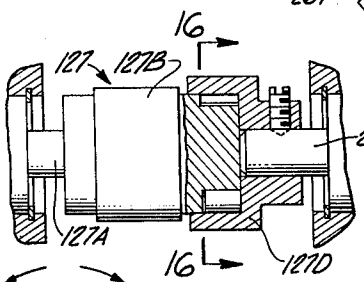


FIG. 15.

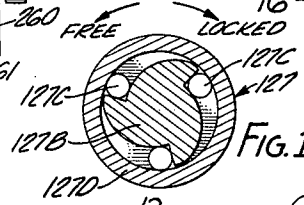


FIG. 16.

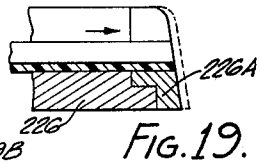


FIG. 19.

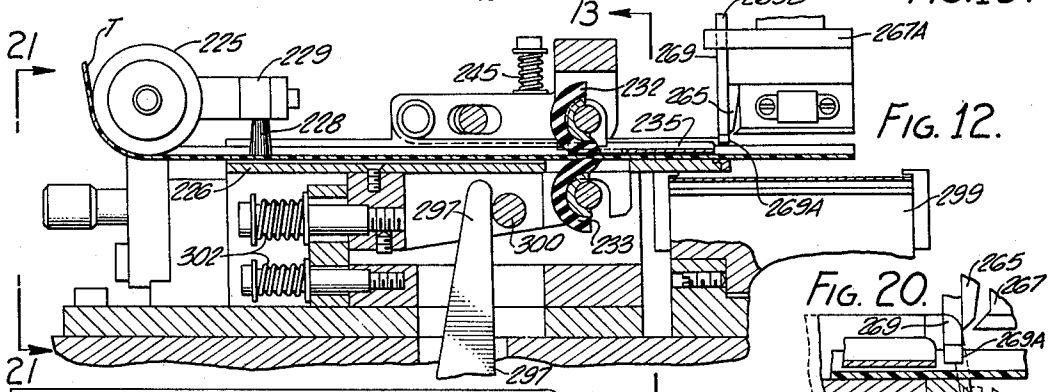


FIG. 12.

FIG. 20.

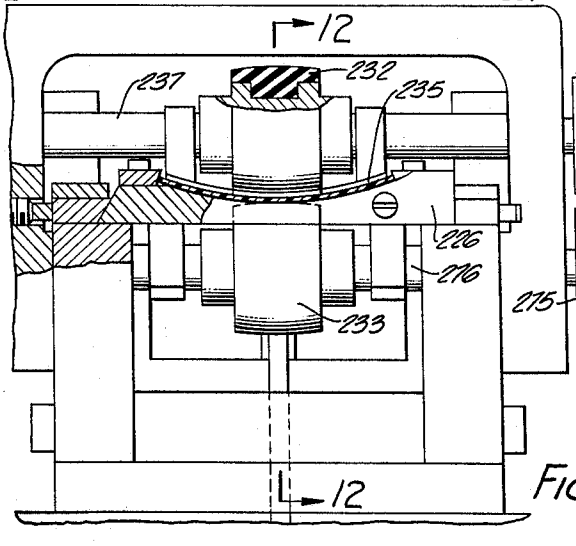


FIG. 13.

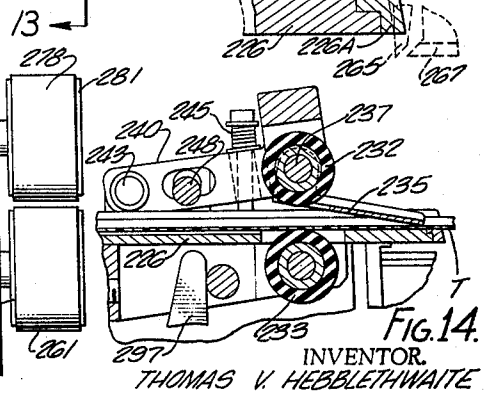


FIG. 14.

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Oct. 28, 1969 T. V. HEBBLETHWAITE 3,475,253

CARD-PREPARING MACHINE

Filed April 12, 1963 8 Sheets-Sheet 8

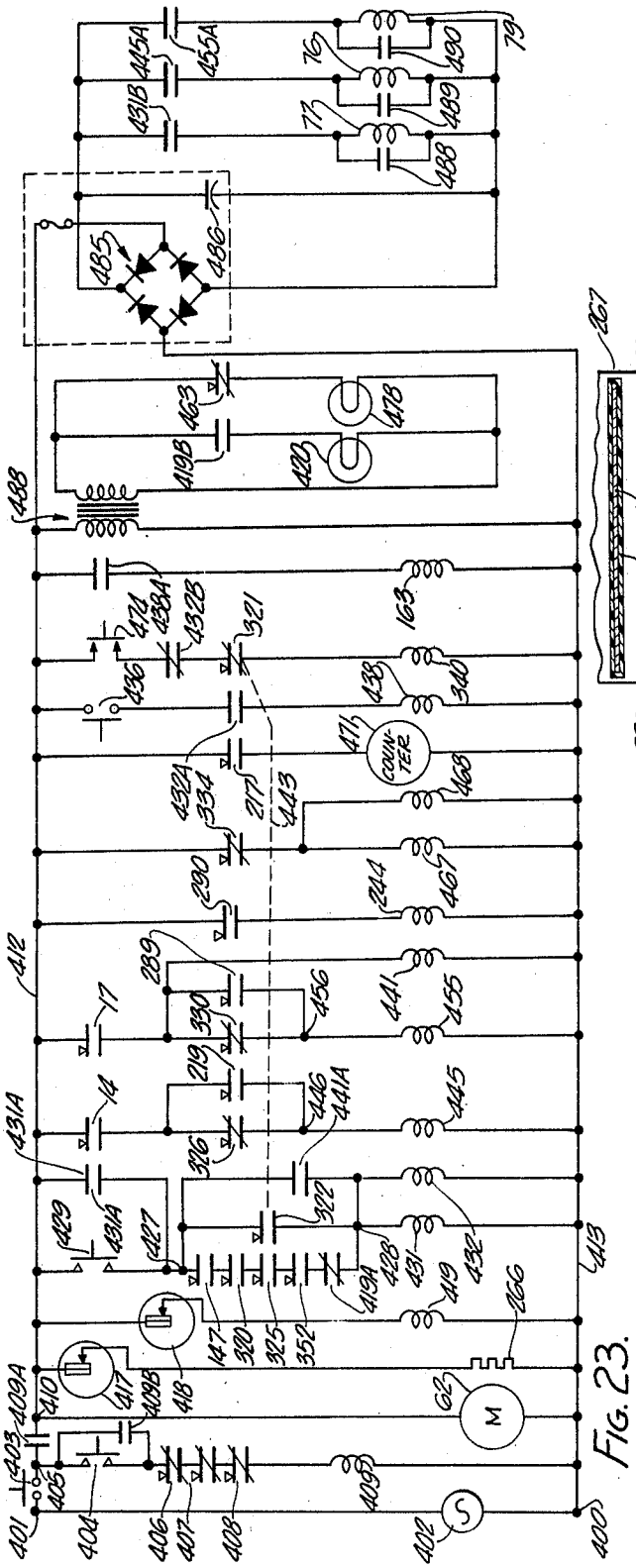


FIG. 23.

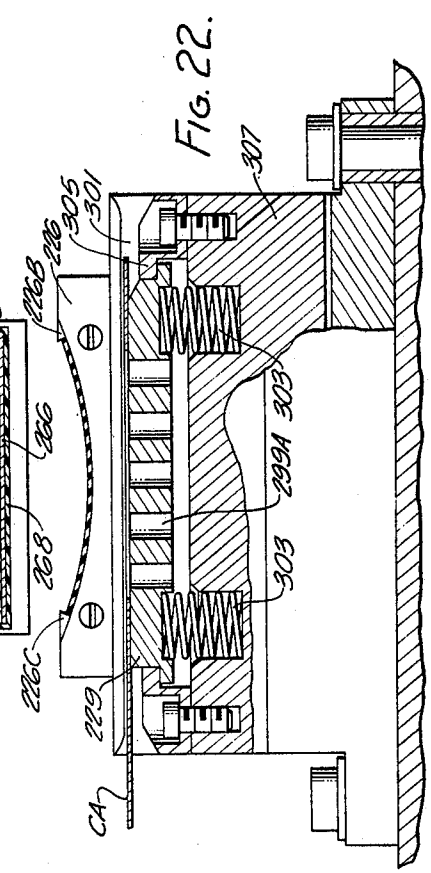


FIG. 22.

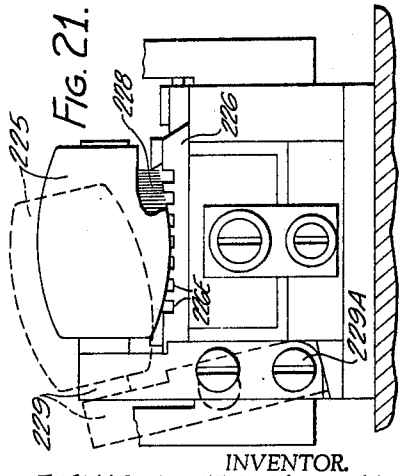


FIG. 21.

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United States Patent Office 3,475,253
Patented Oct. 28, 1969

3,475,253

CARD-PREPARING MACHINE

Thomas V. Hebblethwaite, Woodland Hills, Calif., assignor to The Scionics Corporation, Canoga Park, Calif., a corporation of California

Filed Apr. 12, 1963, Ser. No. 272,767
Int. Cl. B26d 5/00; B32b 31/18
U.S. Cl. 156—355 20 Claims

ABSTRACT OF THE DISCLOSURE

Individual cards from a stack of cards travel in succession to a first station where a first operation is performed thereon and thereafter to a second station where a second operation is performed and then into a storage bin. At the first station the card is apertured. At the second station an adhesive cover sheet is applied to the card to extend within the previously apertured portion. Such cover sheet includes an adhesive which may be used later to mount a film transparency. At each of the two stations there is a switch which senses the presence of a card at that station such that the corresponding operation at the corresponding station can not be performed unless there is a card at that particular station. The cards rest on continuously moving endless belts. To arrest movement of the card at the particular station, the card engages a stop member such that the stop member engages the card and causes it to remain stationary with the conveyor belt sliding underneath the card. The stops at the plurality of stations are simultaneously released to thereby allow all cards to be moved at the same time in timed relationship with a card fed from said stack.

The present invention relates to a card-preparing machine and is especially useful in modifying business-type cards used in electric accounting machines such that an individual card after processing by the machine is apertured and has a cover sheet mounted thereon extending into the apertured portion of the card for later mounting of film or other information containing media.

Briefly, the machine disclosed herein serves to punch a card at a first station to form an apertured portion therein and then at a second station to cover such apertured portion with a cover sheet that overlies a peripheral portion of the apertured portion, these operations being performed automatically on individual cards supplied, one at a time, and at a substantially constant rate from a card-supply hopper to a card-punching station where the movement of the card is arrested by a first stop at the first station which is automatically released after the punching operation to allow the apertured card to travel to the second station; i.e., the cover sheet applying station, where the movement of the card is again arrested by a second stop at such second station, which second stop is automatically released after the cover sheet is applied to allow the finished card to move into a discharge or collection hopper. At each of such first and second stations the card operates a corresponding switch to initiate the corresponding punching and cover sheet applying operations. The operation of the machine at these two stations, as disclosed, is thus responsive to the presence and proper positioning of a card with many advantages being derived therefrom.

The cover sheet, which is applied to the card, is cut from a supply of material furnished as a web in roll form, with the operations at such second station including more specifically the feeding of a web of such material coated with a temperature-sensitive adhesive, the cutting off of an end piece of such web, and the bonding of the same, as the cover sheet, over the apertured card portion in the presence of a heated platen which serves to apply

or bond the cover sheet against the card. All of these operations at the second station occur in substantially the same time interval required for the card-punching operation so that the above mentioned first and second stop members may be automatically retracted at substantially the same time. The operation of various mechanisms of the machine is interlocked both in the electrical and mechanical sense to assure proper sequencing of operations and uniformity in a good finished product.

It is, therefore, a general object of the present invention to provide an improved machine of the character indicated above.

A specific object of the present invention is to provide a machine of this character in which the timing of elements and their functions are controlled in addition to and apart from the speed of the drive motor for the machine.

Another specific object of the present invention is to provide a machine of this character involving controlled clutches for selectively applying operating power to various mechanisms of the machine to assure proper sequencing and uniformity of quality in the end product.

Another specific object of the present invention is to provide a machine of the character in which the card feed is directly related to timed operation of switches.

Another specific object of the present invention is to provide a machine of this character in which initiation of operation of a mechanism requires the presence of a card in proper position.

Another specific object of the present invention is to provide a machine of this character in which separate controlled clutches are used to effect operation of (a) a timer of the cam-switch type that relates the card feed directly to the operation of the timer; (b) the card-aperturing mechanism; and (c) the cover sheet mounting mechanism.

Another specific object of the present invention is to provide a machine of this character in which the cover sheet applying mechanism has a dwell period when pressure is being applied to the card.

Another specific object of the present invention is to provide a machine of this character especially suitable for handling material having a temperature-activated adhesive coating.

Another specific object of the present invention is to provide a machine of this character in which the card-punching mechanism incorporates a punch with an angled relief in its face to produce a shear angle for reducing shearing force.

Another specific object of the present invention is to provide a machine of this character in which various mechanisms of the machine are interlocked both in an electrical and mechanical sense to assure proper sequencing of operations and uniformity in a good finished product.

Another specific object of the present invention is to provide a machine of this character using one-revolution controlled shafts for effecting proper operation and sequencing.

Another object of the present invention is to provide an improved mechanism for cutting off ends of web material.

Another object of the present invention is to provide a machine of this character in which there is no waste of cover sheet material.

Another object of the present invention is to provide a machine of this character in which the amount of cover sheet material cut is adjustably controlled within precise limits.

Another specific object of the present invention is to provide an improved control circuit for a machine of this character.

Another specific object of the present invention is to provide an improved mechanism for moving, pushing or advancing thin film materials which have little structural strength under compressive loading in the direction of their planes, and does so in a precise, repeatable and controllable manner.

Another object of the present invention is to provide improved mechanism for transporting or pushing thin film materials which are subject to the collection of static electrical charges that otherwise make such mechanical handling, especially in automatic machinery, extremely difficult, and does so in such manner that overcomes the otherwise serious effects of such static charges.

Another specific object of the present invention is to provide a machine of this character incorporating a mechanism for pushing or advancing thin web material in precisely controlled dimensioned steps and does so without damage or marring surfaces of such web.

Another specific object of the present invention is to provide a machine of this character incorporating a mechanism whereby no waste or scrap thin web material is produced since the web of material when it is advanced the desired distance, is cantilevered outward over a cutting edge, thus requiring no gripping, pulling or mechanical guidance of such overhanging web material.

Another specific object of the present invention is to provide a machine of this character in which card feeding and transport means operates continuously without stopping while cards are stopped temporarily at functional stations, thus achieving mechanical simplicity and longer life than would be realized, for example, were it necessary to repeatedly start and stop such means during each and every functional cycle.

Another specific object of the present invention is to provide a machine of this character which requires no external adjustments, positioned controls or operator techniques and which can be operated to the fullest extent of its capability by an untrained, non-technically skilled operator in typical business office environment.

Another specific object of the present invention is to provide a machine of this character which will not operate or will stop itself automatically if (a) the supply of thin web material normally supplied thereto is exhausted or interrupted by a break in the web; or (b) the temperature of the heated platen falls below a required minimum temperature; or (c) the supply of cards in the feed hopper is exhausted; or (d) the full capacity of the discharge or collection hopper is reached.

Another specific object of the present invention is to provide a machine of this character which automatically processes electric accounting machine cards, in which card feeding from the feed hopper is immediately interrupted if and when malfunction or card jam occurs at any subsequent point in the card transport or processing system, thus avoiding damage to a large number of cards in the event of such a jam.

Another specific object of the present invention is to provide a machine of this character in which the power required by the several functions and mechanisms, oriented in several directions, is supplied by a single rotary source, on a time shared basis, thus minimizing both peak power and average power requirements, by virtue of the fact that all of the functional elements, except card feeding and transport mechanisms, are idle more than half the total running time and are operated only within the brief period of their action during each card cycle.

Another specific object of the present invention is to provide a machine of this character in which no mechanical damage can be suffered as a result of timing malfunction, line electrical power level drop or failure, mechanical overload in either or both power mechanisms, or card or web material misfeeding.

Another specific object of the present invention is to provide a machine of this character in which manual

operation of a switch, for servicing, and checking purposes, results in only one card being processed.

Another specific object of the present invention is to provide a machine of this character in which card travel, card tracking and apparatus controlling the feeding and transport of cards may be conveniently observed on a slow motion basis upon manual turning of a shaft whereby adjustments may be made accordingly.

Another specific object of the present invention is to provide a machine of this character which is not limited in its card handling ability precisely to exact dimensions of a standard card.

Another specific object of the present invention is to provide a machine of this character in which a card may be produced with more than one apertured portion having a cover sheet extending into the corresponding apertured portion.

Another specific object of the present invention is to provide improved card feeding means which assures dispensing of only one card at a time.

Another specific object of the present invention is to provide a machine of this character which may be modified to produce different sized apertures having a cover sheet extending into the apertured portion.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a top plan view, partially in section, of a machine embodying the present invention.

FIGURE 2 is a front view taken as indicated by arrows **2—2** in FIGURE 1.

FIGURE 3 is a schematic layout of the card transport system.

FIGURE 4 shows in enlarged form a part of the card transport system shown in FIGURE 2.

FIGURES 5 and 6 are sectional views taken generally as indicated by arrows **5—5** and **6—6** in FIGURE 2 through the card-aperturing station and cover sheet-applying station, respectively.

FIGURE 7 is a sectional view taken generally along the line **7—7** in FIGURE 5.

FIGURE 8 is a view taken generally along line **8—8** as indicated in both FIGURES 1 and 11.

FIGURE 9 is a top plan view of driving mechanisms taken generally as indicated by arrows **9—9** in FIGURE 2 with a portion of the card-receiving hopper omitted.

FIGURE 10 is largely a schematic illustration of the layout of electrical components and their relation to elements of the machine.

FIGURE 10A shows elements in FIGURE 10 in different operating positions.

FIGURE 11 is a sectional view taken generally along the line **11—11** of FIGURE 8.

FIGURE 12 is a sectional view taken generally as indicated by arrows **12—12** in FIGURE 13.

FIGURE 13 is a sectional view taken generally along line **13—13** of FIGURE 12.

FIGURE 14 is a view similar to that in FIGURE 12 showing the web-feeding rollers in a different position.

FIGURE 15 is a view illustrating details of the web advancing one-way clutch illustrated also in FIGURE 11.

FIGURE 16 is a sectional view taken generally as indicated by arrows **16—16** in FIGURE 15.

FIGURE 17 is largely a diagrammatic illustration of the web advancing lever.

FIGURE 18 shows the arrangement in FIGURE 17 in a different position.

FIGURE 19 is an enlarged view of the web support and indicates the movement imparted thereto after a cutting and bonding operation.

FIGURE 20 illustrates a relation of the cutter, web and its support.

FIGURE 21 is a sectional view taken generally as indicated by the arrows **21—21** in FIGURE 12.

FIGURE 22 is a view taken as indicated generally by arrows **22—22** in FIGURE 6.

FIGURE 23 is a schematic representation of electrical connections to electrical components.

FIGURE 24 is a perspective view showing some details of the card feed mechanism.

FIGURE 25 is a perspective view showing the card urger at the punch and cover sheet applying stations.

FIGURE 26 illustrates the slidable tape engaging plate and its support.

The machine functions to feed the undermost card from a stack of cards resting in the card-feed hopper **10** (FIGURE 1) to a card-aperturing station **11** where the movement of the card is arrested by stop **15** to allow the punch at station **11** to aperture the card C, the punch being operated as a result of the card engaging the actuating element of switch **14**. After the card is apertured, the stop **15** is withdrawn and the apertured card is transported to the cover sheet applying station **12** where the card movement is again arrested by stop **16** to allow cutting and bonding of cover sheet material over the apertured portion of the card as a result of the card engaging the actuating element of switch **17**, after which the card is allowed to move into the card discharge or collecting hopper **13** where cards collect in a stack. The card-punching and adhesive-bonding operations are accomplished independently of each other in that these operations are accomplished only after movement of a card to predetermined positions where, in a first position with the card-engaging stop **15**, the card C actuating switch **14** serves to initiate operation of the punch mechanism to form the card-apertured portion CA and, in a second position with the card-engaging stop **16**, the card by actuating switch **17** serves to initiate operation of the cover sheet cutting and bonding mechanism to bond the cover sheet CM over the apertured portion. These stops **15** and **16** are automatically withdrawn after the corresponding operation has been performed to allow the card to be moved by its frictional engagement with the continuously rotating pairs of drive wheels **18**, **19**, **20**, **21** and **22** (FIGURES 1 and 3). Initially a card is automatically fed from the hopper **10** to a position where it engages the continuously rotating card-engaging roller pair **23** which then serves to transport the card onto roller pair **18** and from there to stop **15** where the card movement is first arrested to form apertured portion CA.

The various card-engaging roller pairs are driven continuously through a pulley and belt system and, as illustrated in FIGURE 3, this system involves a continuously rotating shaft **25** mounting two pulleys **26**, **27**, engaging drive belts **28**, **29** for driving corresponding pulleys **32** and **34** on shaft **35** mounting the roller pair **23** and shaft **36** mounting pulley **37**, respectively. A drive belt **38** extends around pulley **37** and a pulley **40** on shaft **41** which also mounts the roller pair **18** and pulley **42**. A belt **43** extending around pulley **42** drives pulley **44** on shaft **45** which also mounts the roller pair **19** and pulley **47** having a drive belt **49** for driving the shaft **50** that mounts the roller pair **20** and pulleys **51** and **52**. A belt **54** couples pulley **52** to pulley **55** on shaft **56** which also mounts the roller pair **21** and a pulley **57** coupled by belt **58** to pulley **59** on shaft **60** upon which is also mounted the roller pair **22**. The main driving shaft **25** is driven by the means described under the section herein captioned "Drive System."

Drive system

The machine is driven by a single motor **62** (FIGURES 9 and 10) mounted underneath a stationary frame plate **63**, the output shaft **64** of the motor **62** mounting a pulley **65** for driving a jack shaft **66** through a belt **67** and pulley **68** on the jack shaft. The jack shaft **66** thus continuously rotates and is supported for such rotation in four spaced bearings, **70**, **71**, **72** and **73** on the underside of frame plate **63**. Three electric or magnetic clutches **75**, **76** and **77**, also mounted on the underside of frame plate **63**, serve to selectively couple the jack shaft **66** to the cover sheet cutting and bonding mechanism **79**, to the card-punching mechanism **80** and to the card-feeding mechanism **81**, respectively, and the latter clutch **77** also serves to selectively couple the jack shaft **66** to the timer mechanism **82**, and the manner in which such coupling is accomplished is now described.

The electrically operated clutch **75** has a pulley **84** on its input shaft coupled by belt **85** to the jack shaft pulley **86** and has its output shaft coupled to the input shaft of a speed-reducing unit **87** mounted on the underside of frame plate **63**. The output shaft of speed-reducing unit **87** is coupled to the rotatable shaft **88** of the adhesive material cutting mechanism **79** which is described under a separate caption herein.

The electrically operated clutch **76** has a pulley **90** on its input shaft coupled by belt **91** to the jack shaft pulley **93** and has its output shaft coupled to the input shaft of a speed-reducing unit **94** mounted on the underside of frame plate **63**. The output shaft of speed-reducing unit **94** is coupled to the rotatable shaft **96** of the card-punching mechanism **80** which is described under a separate caption herein.

The electrically operated clutch **77** has a pulley **98** on its input shaft coupled by belt **99** to the jack shaft pulley **100** and has its output shaft coupled by belt **102** to the input shaft of speed-reducer unit **104** mounted on the underside of frame plate **63**. The speed-reducer unit **104** has two output shafts **105** and **106**, the shaft **105** being coupled to the shaft **108** of the card-feeding mechanism **81** and the shaft **106** having a pulley **109** thereon for driving the timer-mechanism shaft **113** through the pulley **110** thereon and belt **112**. Both the card-feed mechanism and timer mechanism are described under a separate caption herein.

The jack shaft **66** mounts also the pulley **115** (FIGURE 10) which is coupled by belt **116** to the pulley **117** on the input shaft of speed-reducer unit **118** having a pulley **120** on its output shaft **121** for driving, through belt **122**, the pulley **123** on the input shaft **124** of the web feed mechanism **125** which incorporates a clutch **126** and a one-way clutch **127** as described under separate caption herein.

The jack shaft **66** also mounts a pulley **130** (FIGURE 9) for driving belt **131** and the pulley **132** on the input shaft of a right-angle speed reduction drive unit **133** which incorporates two meshing gears **135**, **136**, the gear **136** being on the previously mentioned shaft **25** (FIGURES 9 and 3) to drive the card-transporting roller pairs **23**, **18**, **19**, **20**, **21** and **22** in FIGURE 3.

It will be apparent from the description under this caption that while the jack shaft **66** may continuously rotate:

(1) The card-feed mechanism **81** and timer mechanism **82** is engaged only when the clutch **77** is engaged;

(2) The card-aperturing mechanism **80** is engaged only when the electric clutch **76** is engaged;

(3) The adhesive material cutting and bonding mechanism **79** is engaged only when the electric clutch **75** is engaged;

(4) While the shaft **124** of the adhesive material feed mechanism **125** continuously rotates, this mechanism is not rendered fully operative unless the clutch **126** is engaged as described under the caption Web Feed Mechanism; and

(5) The card-engaging transport roller pairs **23**, **18**, **19**, **20**, **21** and **22** rotate continuously to be always in a condition for transport of cards.

It is noted that the jack shaft **66** is formed with hexagonal ends **66A** to allow the manual application of a crank for turning the shaft without electrical power. This is a

desirable feature of the present invention since, in servicing and checking of the machine, manual turning of shaft **66** produces slow movement of the above mentioned roller pairs **23, 18, 19, 20, 21** and **22** whereby their operation may be conveniently observed in the absence of or in the presence of a card initially hand fed between the roller pair **23**.

Card-feed mechanism

Cards are initially placed in a card-feed hopper **10** (FIGURES 1 and 2) in the form of an open-top bin mounted on the horizontal frame plate **63**, the bin having two vertical side plates **140** and **141** and two end plates **142, 143** and a bottom plate **144**, the side plate **141** being formed with a large open-ended slot therein, as shown in FIGURE 2, to facilitate loading and unloading, if necessary, and the bottom plate **144** being apertured, as indicated at **145** in FIGURE 1, to provide clearance for movement of a card-engaging element **146** partially projecting through the floor of the bin. The element **146** having a shouldered portion **146A** projects up through such apertured portion **145** and such shoulder **146A** extends up beyond the body portion of element **146** a distance substantially equal to the thickness of one card or somewhat less so as to assure stripping of only the lowermost card when the element **146** is reciprocated. It will be seen that the card to be dispensed initially engages the body portion of element **146** prior to engagement with the shouldered portion so that such card is referenced with respect to such body portion and shouldered portion to assure single card feeding even though the angular position of element **146** may change somewhat in its guiding structure. The means whereby element **146** is reciprocated is now described.

The element **146** is secured to a guide block **148** which is mounted for sliding movement on a stationary pin **149** (FIGURES 2, 10 and 24) secured with respect to the bottom plate **144** (FIGURE 2) and which is guided by two adjustable screws **148C** (only one of which is shown in FIGURE 24) mounted on block **148** and engaging opposite sides of the end of lever **150**. This guide block **148**, as seen in FIGURE 24 is provided with a slotted portion and two spaced pins **148A** and **148B** to provide a connection with the upper end of this pivoted lever **150** which is pivoted on a bracket member **151** at a point intermediate its ends on pin **152**.

The lower end of lever **150** is provided with a closed slotted portion **153** within which a guide block **154** on a crank arm **155** on shaft **108** (FIGURES 2 and 10) is free to slide to provide a form of Scotch Yoke connection whereby when the shaft **108** is rotated as described above under the caption Drive System, the lever **150** is oscillated, as indicated in FIGURE 10A, to reciprocate the card-engaging element **146** and thereby cause one card at a time to be dispensed from the bin **10** for each oscillation of lever **150** through the small adjustable opening at the lower end of the adjustable plate **142A** where a roller **160** is mounted to facilitate card movement to a position between the spring-urged rollers **23** and **162**, this previously adjustable opening being defined by the space between roller **160** and the adjustable mounted plate **142A** on the end plate **142**. The roller **23** is continuously rotated as described above under the caption Drive System, and cooperating with roller **162** and geared thereto it causes the partially ejected card to be propelled, as described above in connection with FIGURE 3, to transfer it onto the continuously rotating roller pair **18** which, in turn, causes the card to move further until its movement is arrested by the stop **15**. When so arrested, the card is, of course, stationary with the roller pair **18** spinning continuously under the card awaiting release of the stop **15**. It is noted that the roller **162** is rotatably mounted on a slidable frame **164** which is urged by spring **165** to urge the rollers **162, 23** together for gripping and moving the card as described above.

To assure transport of the cards by roller pairs **18, 19, 20, 21** and **22**, means are provided to apply slight pressure on the cards above these rollers. Such means are indicated at **166**, details of which are more clearly shown in FIGURE 4 in relation to roller **20**. In FIGURE 4 a pressure roller **167** is rotatably supported on a frame member **168** with a leaf spring **169** anchored on pin **169A** pressing on the shaft **167A** of roller **167** with the pressure exerted by roller **167** being adjusted by the set screw **169B** contacting an intermediate portion of the leaf spring **169**.

The card hopper **10** also has a card-sensing switch **147** (FIGURE 1) mounted on the side wall **140** with its actuating element **147A** projecting within the hopper **10** so as to contact and sense the presence of cards. This switch **147** is closed only when one or more cards are in the hopper and in the absence of this condition, certain parts of the machine are prevented from operating as described under the caption Electrical System.

Also, the card hopper **10** has associated therewith, a pair of solenoid-operated rods **161** for raising the stack of cards above the shouldered portion **146A** as illustrated in FIGURE 10, when the solenoid means **163** is energized to thereby prevent dispensing of cards by the card-dispensing element **146**.

The card-receiving hopper **13**, as indicated in FIGURE 10, is pivotally mounted at **165** to allow convenient access to cards therein. To pivot the same outwardly, the solenoid **340** must first be energized to cause the latch member **340A** to be withdrawn. When this hopper **13** is pivoted to open position, the switch **325** is opened. Also, the hopper **13** has mounted therein a counterbalanced card-supporting plate **166** or bottom slidably mounted by means of rollers **167, 168** on the hopper frame member **169**, the plate **166** being moved downwardly by the weight of cards and when the hopper is full, the plate **166** is moved to a position where it causes the normally closed switch **320** to open. The plate **166** may be counterbalanced for example, by a differential pulley system with spring means, details of which need not be described since counterbalancing means are well known. These switches **320** and **325** and latching solenoid **340** are electrically connected as described under the caption Electrical System.

Preferably switches such as switches **406, 407** and **408** (FIGURE 1) so called anti-jam switches are adjustably mounted at the outlet of the card feed hopper **10**, the punch station **11** and cover sheet applying station **12** respectively with its corresponding switch actuating member positioned to contact and sense thickness of a card such that, for example, when more than one card is present or a card is buckled, the switch is actuated. For this purpose the switch actuating element contacts the upper surface of a card and causes actuation of the corresponding switch when an abnormal condition exists to stop operation of the machine as described later under the caption Electrical System.

Card-punching mechanism

During the time that card movement is being arrested by stop **15** the card is indexed not only by the stop **15** but also by one of its side edges being pressed against the stationary guide groove **173** in supporting frame **174** by the weighted and pivoted guide member **181** engaging the opposite side edge of the card. This card urging guide member **181** is in the form of an arcuate card engaging plate **181A** on the end of lever **181B** having an intermediate portion supported on support block **181C** and having an adjustably positioned weight **181D** on its lower end. The card is thus indexed and rests over the rectangular opening **170** in die plate **171** for the card-aperturing operation, such aperturing being accomplished by movement of the punch member **172**, having its lower face hollowed and with angled relief defines four cutting edges which cooperate with the four side edges of the opening to cut out a portion of the card.

The die plate 171 is secured within a recessed portion of the die-plate supporting frame 174 which is mounted on the support block 175 secured to the frame plate 63. The supporting frame 174 is provided with an upper slotted portion 176 serving as a guide for the card and has an apertured stripping plate 177 mounted thereon for stripping the apertured card from the punch 172 when and as the punch is being raised or retracted.

The punch 172 is mounted on its holder 178 which is mounted for rectilinear guided movement on the two stationary posts 179, which extend into and are stationarily mounted with base block 175 to frame member 63. The base block 175 and frame member 63 are apertured to allow the cutout card portion to drop out and away from the punching area. The punch holder 178 is connected to the lower end of a reciprocable rod 180 by the connection 182 shown that allows some self-alignment between the reciprocable holder 178 on its guides 179, and the reciprocable rod 180 in its stationary cylindrical bearing 184, the bearing 184 being stationarily supported by a frame which is partially shown in FIGURE 5 at 186.

The upper end of rod 180 is provided with a slotted portion to receive an end of an actuating lever 187 between two spaced rods 189 extending radially through such slotted portion, the lever 187 being pivoted at a point intermediate its ends on a stationary bearing bracket 191 for the lever shaft 192 and having its other end connected in similar manner to the upper end of a reciprocable rod 194 slidably mounted in two spaced bearings 198A, 198B in its stationary bearing support 198. The lower end of rod 194 has adjustably secured thereto a guide block 195 (FIGURES 5 and 7) which is slidably mounted in a pair of vertically extending guide plates 196, 197 and which has mounted thereon a cam roller 199 for cooperation with a cam slot 201 within and eccentrically located with respect to the rotational axis of the circular plate or cam hub 202 mounted on shaft 96. The guide plates 196, 197 are adjustably mounted on two vertical stationary supporting members 204 and 205 by fastening bolts 206 and 207. It will be observed that these plates 196, 197 may be adjusted by loosening bolts 206 and 207, loosening the lock nuts 210, 211, turning screws 212, 213 and then tightening the nuts 210, 211 and fastening screws 206, 207.

The shaft 96 is supported in two spaced bearing brackets 215, 216, mounts a cam 218 for operation of a pair of switches 219 and 217 once per revolution of shaft 96 corresponding to one card-punching operation and is driven as described under the caption Drive System.

Web Feed Mechanism

The cover sheet ultimately applied to the card is supplied in the form of a tape or web on a reel and such tape or web is a composite tape or web in that it has a coating of temperature-activated adhesive thereon which is non-adhesive at room temperature and while in the feed mechanism. The machine cuts off an end of the tape or web and applies such cut-off portion over the apertured portion of the card in the presence of heat to activate the adhesive and cause the cut-off portion to be bonded to the card over its apertured portion as the cover sheet.

The composite tap or web T is supplied from a supply spool or reel 220 rotatably supported on the upper ends of a pair of stationary arms 221 so that the composite tape or web as shown in FIGURE 6, passes over and around two idler rollers 224 and 225 and onto the upper surface of a supporting plate 226, which surface is generally arcuate as seen in FIGURES 13 and 22. The roller 225 is crowned or contoured such as to cause the web to have a transverse bow matching generally the surface of the supporting plate 226 before the web contacts such surface. To cause the tape to conform to such arcuate surface there is provided a fine soft bristle brush 228, such as used, for example, to dust optical equipment; i.e., lens and reflectors, the brush being mounted on a bracket member 229 to press the tape or web gently against such surface. The tape or web after passing under the brush 228 and conforming to such arcuate surface, slides along such surface and passes between two feed rollers 232, 233 which are adapted to engage the tape at a point intermediate the ends of such supporting plate 226. After the tape or web leaves the rollers 232, 233, it continues to conform to the arcuate surface of the supporting plate 226, and to assure such conformity there is provided an upper plate 235 freely hinged as a cantilever about the shaft 237 of roller 232 and having a surface complementary with such arcuate surface of supporting plate 226 to form a constraining web channel This plate 235 separated from the upper surface of the web by a distance of approximately a few thousandths of an inch thus provides an element of a constraining channel and assures conformity of the tape with the arcuate support surface and, of course, assures the tape being bowed in cross section; i.e., a transverse bow is in the tape or web so that when it overhangs the support 226 as a cantilever in a position ready for cutting as shown in FIGURE 12, its transverse bow results not only in a more rigid overhang but also presents a cross section for progressive cutting of the tape by a straight cutting element moving in a direction generally perpendicular to the longitudinal axis of the tape.

The previously mentioned pressure rollers 232, 233, are normally spring-urged together to assure gripping of the tape therebetween. In order to allow initial manual feeding of the tape between such rollers, means are provided for retracting the upper roller 232 and such means are now described.

The roller 232 has its shaft journalled for rotation in a frame 240 which is pivoted about the axis of a horizontal pin 243 and which is normally spring-urged downwardly by spring 245. To overcome the biasing action of spring 245 and to lift the frame 240 to its position shown in FIGURE 14, there is provided a pivoted shaft 248 having an offset or cam portion thereon cooperating with a slotted portion of frame 240 and such shaft 248 is manually pivoted by the lever 250 attached thereto. Also, to facilitate initial manual feeding of the tape, the frame 229 carrying the brush 228 and roller 225 may be pivoted to its position indicated by dotted lines in FIGURE 21. After the initial manual feeding of the tape between the rollers 232, 233, the frame 229 and lever 250 are returned to their normal positions shown in FIGURE 6.

Automatic feeding of the tape is accomplished by driving each of the rollers 232, 233. These rollers 232, 233 are driven intermittently by a mechanism operated by the continuously rotating shaft 124 which is coupled to the motor jack shaft as described under the caption Drive System.

The shaft 124 is the input shaft of a solenoid-controlled clutch 126 having the output shaft 235 which is normally prevented from rotating, as shown in FIGURE 8, by the latch 236 comprising a rotatable portion 237 of the clutch and the retractable stop member 238 which is connected to the solenoid plunger 240, this plunger 240 being spring-urged by spring 242 to normally position the stop 238, as shown in FIGURE 8, and may be withdrawn by energizing solenoid 244 to allow the output shaft 235 to rotate. The shaft 235 (FIGURE 17) has a crank arm 254 mounted thereon and such crank arm 254 mounts an adjustably positioned bearing 256 thereon for one end of a lever 258, the other end of the lever 258 being pivotally mounted on an end of an arm 260 on shaft 261 to impart an oscillatory movement of the arm 260 and shaft 261 between adjustable limits indicated by the designated arc in FIGURES 17 and 18. The tape is advanced in only one direction of movement of arm 260 and shaft 261 and, for that purpose, the shaft (261) is the input shaft of the one-way clutch 127 which may

take many different forms such as a spring-grip type clutch. As indicated in FIGURES 15 and 16, the output shaft **127A** may be connected to a driven member **127B** having cam surfaces cooperating with balls **127C** for coupling to the casing **127D** connected to the input shaft **261** whereby the output shaft **127A** may be rotated intermittently and in one direction only. The output shaft **127A** mounts a gear **269** and a pulley **263**, the gear **269** meshing with gear **266** mounted on a shaft **271** with pulley **272**. The pulley **263** is connected by belt **262** to the pulley **275** on the same shaft **276** with tape-engaging roller **233**. Likewise, the pulley **272** is connected by belt **278** to the pulley **281** (FIGURE 13) on the same shaft **237** with tape-engaging roller **232**. Thus, the tape or web T is advanced by rollers **232, 233** for each rotation of the output clutch shaft **235** and the amount of tape or web so advanced may be adjusted by adjustment of the lever bearing **256** on crank arm **254**, it being noted that the bearing **256** is slidably mounted on the arm **254** and has a threaded shank **257** which is releasably secured to the arm **254** by nut **258** to secure a precise adjustment of the effective length of the crank arm **254** and hence the amount of tape dispensed each operation of the web feed mechanism.

Web or tape cutting mechanism

The means for moving the tape or web cutter is similar to the means used for punching the aperture in the card, as will be seen from comparing FIGURES 5 and 6, and is operated when a card is arrested by top **16** (FIGURE 10) and engages and operates switch **17**. The card when it is arrested by the stop **16** is indexed not only by the stop **16** but also by a pivoted and weighted card guide **181** which constructed like the guide **181** at the punch station serves to engage one side edge of the card to urge the opposite side edge of the card in a stationary guide.

The tape or web cutter is a flexible straight knife **265** cooperating with the sloped end of the movable tape or web support **226** for cutting or shearing the transverse bowed tape or web at that location; and such knife **265** is mounted adjacent to a heated platen **267** for movement therewith, the heated platen serving to move the cut-off tape or web against the card and to apply heat to the marginal edges of the cut-off tape or web, which is now the cover sheet, to bond it to the card in a position overlying the card apertured portion. An electric heating element **266** insulated thermally and electrically by insulation **268** from its supporting structure is incorporated in the platen **267** as well as two thermostatically operated switches and these are connected as described under the caption Electrical System.

The platen and knife asembly **265, 267** is mounted on the lower end of rod **270** which is slidably mounted in the bearing support and which is slotted near its upper end to receive one end of lever **274** between a pair of pins or rods **275** on such rod **270**. The lever **274** is affixed to a shaft **276** which is journalled for rotation with the other end of the lever **274** being received between a pair of pins or rods **278** extending through a slotted portion of the upper end of rod **279** which is slidably mounted in spaced bearings in the bearing support **280**. The lower end of rod **279** has adjustably mounted thereon a bearing block **282** slidably mounted in guide plates as in FIGURE 5, and such bearing block **282** mounts a cam roller **284** cooperating with an eccentric cam slot **285** in the face of the cam hub or plate **286** mounted on shaft **88**. The shaft **88** also mounts a pair of cams **287, 288** cooperating respectively with switches **289** and **290** for operating the same once per revolution of shaft **88**; i.e., once per card-cutting and cover sheet applying operation. The shaft **88** is driven as described under the caption Drive System.

Rotatable with shaft **88** is a disc **293** mounting an adjustable dog **294** which, once per shaft revolution, engages a roller **296** on the lower end of lever **297**, pivoted on shaft **298**, to cause the upper end of lever **297** to engage a pin **300** on the tape support **226** to cause the tape support **226** to slide to the right in FIGURE 6 against the action of coil-compression springs **302** which normally urge such support **226** against the stationary abutment **304**. These springs **302** are on rods **306** which extend through the abutment **304** and each have one of their ends engaging the abutment and the other one of their ends seated against an enlarged head on rods **306** as, for example, an adjusting nut.

This slight movement imparted by lever **297** to the tape support **226** after each cutting and bonding operation, as indicated in FIGURE 19, results in relative movement between the tape which, on the one hand, is clamped between rollers **232** and **233** and the tape support **226** on the other hand. This feature assures the breaking of any bond, however slight, between the tape and the downstream end of the tape support which may have resulted from the heat developed during cutting by the cutter **265** or the heat transferred thereto from the heated platen **267**, or the pressure applied by plate **269**.

The tape support **226** is slidably mounted for an additional reason since, as seen in FIGURE 20, it has a sloped outer end which is progressively moved to the left by the cutter **265** against the action of the previously mentioned springs **302** during the cutting operation.

To assure that the tape or web does not creep or buckle during the cutting action, a plate **269** is slidably mounted on one side surface of platen **267** such that when the platen-knife assembly is lowered the lower arcuate edge **269A** of plate **269** normally spaced from the tape support **226**, engages the tape or web and holds it on the support **226** just prior to and during the cutting and heating operations and also when such platen-knife assembly is being raised. For this purpose, the plate **269**, a weighted member, is provided with a pair of ear portions **269B** at its upper corners for engagement with a corresponding one of a pair of L-shaped guide and stop bracket members **267A** mounted on platen **267**. This plate **269** thus serves not only as a clamping member which holds the tape or web on the support during web cutting but also as a stripper element in that during withdrawal of the platen-knife assembly the web is still being clamped to prevent the uncut portion of the web following upward movement of this platen-knife assembly. Near the upper limit of travel of this assembly the bracket members engage the plate ears **269B** to raise the plate **269** and space its lower arcuate edge **269A** above the path of web feed to allow a subsequent web feeding operation.

After the tape or web is cut, the cut-off portion is pressed by the heated platen **267** (FIGURE 22) against the spring-urged plate **299** which has guide slots **301** for the apertured card CA and which is urged upwardly by compression springs **303** against the frame **305** bolted to the stationary support **307**. This construction augments the dwell of cam **286** and provides controlled pressure in the bonding operation during which the springs **303** are compressed further as the heated platen **267** presses the cut-off tape portion, now the cover sheet, over the card apertured portion.

This plate **299** may be provided with apertured portions **299A** to allow the escape of air therethrough to prevent the possibility of entrapped air causing the cover sheet to shift before bonding.

It will also be seen in FIGURE 22 that the tape support **266** is provided with longitudinally extending spaced guides **226B** and **226C** for assuring guided movement of the tape and, as seen in FIGURE 21, preferably such support **226** is provided with longitudinally extending grooved portions for lessening contact area and thus friction between the tape and its support **226**.

As indicated in FIGURE 10, the cam slot **285** at the cover sheet applying station is provided with two diametrically opposed circular sections **285A**, and the cam slot

201 is provided with a single circular section 201A, each extending along the circumference of a circle having the center of rotation as its center to provide dwell at each extreme end of travel in the case of the knife-platen assembly and only dwell at the top of the stroke of the punch assembly such that while the cam plates 286 and 202 may rotate through the indicated 60° sectors, there is no corresponding vertical movement of the corresponding assembly in those sectors.

Timer mechanism

The timer mechanism 82 is driven by the shaft 113 and, as described previously, the timer shaft 113 is rotated simultaneously with that shaft 35 which is effective to dispense cards one at a time from the supply hopper 10. In other words, both the timer 82 and the card-dispensing mechanism are controlled by a single clutch; namely, the clutch 77. Mounted on the timer shaft 113 are four cams 324, 328, 332 and 336. The cam 324 is a dwell-type cam having its lobe operating the switches 321 and 322 such that when the lobe closes the switch 322, the switch 321 is opened. The cam 328 is a dwell-type cam with the dwell portion allowing the switch 326 to close. The cam 332 is a dwell-type cam with the dwell portion allowing the switch 330 to close. The cam 336 is a dwell-type cam with its dwell portion allowing the switch 334 to close. The function of these switches and their connections is described under the next caption Electrical System.

Electrical system

The overall operation of the machine may be explained with reference to the electrical circuit diagram of FIGURE 23 which includes input terminals 400, 401 for a 115-volt A.C. source 402. Connected across terminals 400, 401 in a series circuit are a self-latching manually operable open-or-off switch 403 for connecting terminal 401 to terminal 405, a manually operated momentary type push button switch 404 which is closed only when a manual force is applied thereto; three anti-jam card-operated switches 406, 407, and 408, each of which are normally closed and operated to an open position by a card when there is a deformed, i.e., non-flat card or more than one card adjacent such switches, and a relay coil 409. The relay coil 409 when energized by closing switch 404 closes its associated normally open relay switches 409A and 409B to connect, respectively, terminal 405 to terminal 410 to thereby apply the voltage from source 402 between the two lines 412, 413, and to hold the circuit of the start switch 404 to thereby continue to maintain coil 409 energized.

The switches 403 and 404 are mechanically interlocked such that when the momentary switch 404 is pushed, switch 403 is unlatched and is allowed to assume its closed position; and when the switch 403 is manually operated it latches in its open position.

For convenience in referencing, the following nomenclature is used to designate a relay coil and the associated switch or switches operated thereby. A coil has a numerical reference numeral such as, for example, the coil 409 and the switches operated thereby have the same reference number with a letter appended thereto; namely, the switches operated by coil 409 are designated as 409A, 409B.

The driving motor 62 is thus energized when relay switch 409A is closed and its driven jack shaft rotates to establish the five conditions set forth under the caption Drive System, among which is that the card transport rollers 23, 18, 19, 20, 21, and 22 now rotate.

The heater 266 in the platen punch for the web material is connected in series with the normally closed thermostat switch 417 in such platen across lines 412, 413 so as to maintain a substantially constant temperature of the platen for cover sheet bonding purposes.

A second thermostat switch 418, also mounted in such platen, is connected in series with a relay coil 419 across lines 412, 413 and this switch 418 is closed only for temperatures below a predetermined threshold temperature, this threshold temperature being lower than the adhesive material platen operating temperature with this switch 418 serving to prevent certain operations until such threshold temperature is reached as a result of heating by heater 266.

It is noted that the relay coil 419 when energized, opens its associated normally closed relay switch 419A and closes its normally open switch 419B, the former being used to condition a timing circuit and the latter being used to energize an indicating light 420. Thus lamp 420 is energized only when the machine is warming up and serves as an indication when energized that the machine requires further heating.

This relay switch 419A is in a series circuit with four other circuit-conditioning switches 147, 320, 325 and 352 between terminals 427, 428, each of these four switches being responsive to various desired conditions so as to be closed only when certain desired conditions prevail but are otherwise opened. Such desired conditions may, for example, be the presence of a card in the card-supply hopper 10, the over-abundance of cards in the discharge hopper 13 or other conditions involving the disposition of cards in the machine. The switch 147 is at the card-feed hopper 10, the switch 320 is at the collection hopper 13, and the switch 325 is opened when the card collection hopper 13 is pivoted to open position. The switch 352 is opened when no web material is present for feeding.

Between terminal 427 and line 412 is a momentary type push button switch 429 which is closed only when manual force is applied thereto and which is referred to as the card-feed switch; and between terminal 428 and the other line 413 are two parallel connected relay coils 431 and 432. Relay coil 431 when energized, closes its associated normally open switch 431A, a circuit holding switch connected in parallel with push button switch 429, and also closes the normally open relay switch 431B to energize the timer clutch 77 to thereby (a) initiate operation of the card-feed mechanism and (b) start rotation of the four timing cams in the timer 82 and thus a card is dispensed from the hopper 10 and is moved by the continuously rotating rollers 23 and 18 into engagement with stop 15 where the card awaits a card-punching operation. The other relay coil 432 operable to actuate its relay switches 432A, 432B when energized, closes its associated relay switch 432A which is connected in a series circuit with a manually operated push button switch 436 and a relay coil 438 between lines 412, 413 to condition this circuit. Coil 432 when energized opens a relay switch 432B to prevent opening of the discharge hopper as described later. Connected between terminals 427 and 428 are two switches 322 and 441A, the switch 322 being a cam-operated switch in the timer 82 ganged with switch 321, as indicated by the dotted line 443. The switches 321 and 322 are operated by the dwell of cam 324 such that the dwell opens switch 322 and closes switch 321. The closing of switch 322 allows the last card to be dispensed from the hopper 10 but when switch 322 subsequently opens, the condition of the series circuit between terminals 427, 428 is effectively checked and should it not be in conducting condition, and if relay switch 441A is open, the relay coils 431 and 432 are de-energized. The switch 441, in parallel with switch 322, is a relay switch operated by the relay coil 441 for purposes described later.

The blanking press control relay having coil 445 has one of its terminals connected to line 413 and the other one of its terminals connected to terminal 446, the terminal 446 being connectable to line 412 through a series circuit comprising the timer cam-operated switch 326 and card-actuated switch 14 associated with the card-traversing mechanism. The switch 326 is closed when its actuating element is within the dwell of a cam 328 at which time, with switch 14 closed, the relay coil 445 is

energized. The switch **326** is connected in shunt with press-actuated switch **219** which is allowed to close during the punching operation to assure continued energization of coil **445**, and after the punching operation, the switch **219** is opened by the lobe on cam **218**. The punching operation is accomplished since energization of relay coil **445** results in closing of its relay switch **445A** to energize the clutch **76** to operate the punch mechanism and cause operation of the above mentioned switch **219** after one revolution of the shaft driving the punch mechanism.

The control relay for operating the adhesive material cutter and having coil **455** has one of its terminals connected to line **413** and the other one of its terminals connected to terminals **456**, such terminal **456** being connectable to the other line **412** through a series circuit comprising the timer-controlled switch **330** and card-actuating switch **17** associated with the card-traversing mechanism. The switch **330** is closed when its actuating element is within the dwell of cam **332**, at which time with switch **17** closed, the relay coil **455** is energized. Switch **289** operated by the cover sheet mounting press, is in shunt with the timer-operated switch **330** and is allowed to close during the cutting and adhesive material applying operation to assure continued energization of coil **455**, and after this operation, the switch **289** is opened by the lobe on cam **287**. The material applying operation is accomplished since energization of relay coil **455** results in closing of its relay switch **455A** to energize clutch **79** to operate the cutter mechanism and cause operation of the above mentioned switch **289** after one revolution of the shaft driving the cutter mechanism. The previously mentioned relay coil **441** that operates previously mentioned switch **441A** has one of its terminals connected to line **413** and the other one of its terminals connectable to the other line **412** through card-actuating switch **17** at the adhesive material cutting station which means that the relay coils **431** and **432** are assured of being energized as long as a card is at that station.

It is noted that during operation of the cover sheet cutter and bonder, the other cam-operated switch **290** is allowed to close and its closure results in energizing solenoid **244** to cause the clutch **126** to engage and effect a feeding of tape or web preparatory to such cutting and bonding. The material is fed prior to advancement of the cutter to cutting position.

Card-stop solenoids **467**, **468** for retracting stops **15** and **16** respectively, are each connected in series with the timer-operated switch **334** between lines **412**, **413** so that when this switch **334** has its actuating element in the dwell of cam **336**, the switch is closed and the stops are released whereby the card may travel further.

An electric counter **471** visible to and resettable by the operator, is connected in series with the punch press-operated switch **217** between lines **412**, **413**.

Hopper-release solenoid **340** is connectable between lines **412**, **413** through a series circuit comprising a manually operated normally open momentary-type push button switch **474** at the card-discharge hopper, the relay switch **432B**, and the previously mentioned timer-operated switch **321** so that this hopper may be opened only under certain conditions that assures a card from being ejected elsewhere when the hopper is opened. When the hopper is open, the hopper switch **325** (corresponding to switch **424**), is opened to prevent subsequent card feed when also the switches **322** and **441A** are open. The timer switches **322** and **321** are ganged as indicated such that the timer switch **322** is open when switch **321** is closed. The switch **441A** is open only when there is no card at the web-cutting station and this latter condition may be obtained by preventing the transfer of cards; i.e., by energizing the card-raising solenoid **163**.

For this latter purpose, the previously mentioned relay coil **438**, when energized by manually closing switch **436**, actuates its relay switch **438A** to connect the feed-hopper solenoid **163** between lines **112**, **113**, the solenoid **163** being for the purpose of preventing the dispensing of cards as illustrated in FIGURE 10.

When it is desired to open the discharge hopper during those times when the machine is conditioned to feed cards, the switch **436** is operated to energize relay coil **438** and close switch **438A** to thereby energize the solenoid **163** to raise the cards in the supply hopper and open the switch **147** at the card-feed hopper. The lack of card feeding results in non-operation of switch **17**, and hence the relay coil **441** is de-energized and its relay switch **441A** is open; and when the timer is rotated to open switch **322** and correspondingly closes switch **321**, the relay **432** is de-energized to stop the card-feeding mechanism and to allow switch **432B** to be closed, after which, with switches **432B** and **321** closed, manual operation of the switch **474** results in energization of the hopper-door solenoid **340** and the cards may then be removed from such hopper.

In order to again feed cards, the discharge hopper must be closed to close switch **325**, the switch **436** released to allow switch **147** to close, and the switch **429** must be operated.

Preferably, the card-feed mechanism is disabled when there is lack of or breakage of adhesive tape, and for that purpose, as seen in FIGURE 6, when this condition exists, the spring-urged roller **352A** is allowed to enter the grooved portion **224A** of roller **224** to open switch **352**.

The two indicating lamps **420** and **478** are 24-volt lamps connectable, respectively, through switches **419B** and **463** to the secondary winding of transformer **480** having its primary winding connected between lines **412**, **413**, the switch **419B** being a relay switch and the switch **463** being operated at the same time as the previously mentioned switch **352** to open position when the web material is not present for bonding operations.

The three magnetic clutches **77**, **76** and **79** are operated with approximately 90 volts D.C. and are connectable through corresponding relay switches **431B**, **445A** and **455A** to the D.C. output terminals of a full-wave rectifier **485** having its A.C. input terminals connected to lines **412**, **413**. A filter capacitor **486** is connected across such output terminals and capacitors **488**, **489**, **490** to shunt clutch windings **77**, **76** and **79**, respectively, for spark suppression at the corresponding relay switches **431B**, **445A** and **455A**.

It will be seen that this machine produces an electric accounting machine type business card having a rectangular apertured portion covered by a cover sheet, with the cover sheet being a thin film of dimensionally stable material having a temperature activated adhesive coated on one side thereof; i.e., that side which is immediately adjacent the card. Such adhesive secures the cover sheet to the card and may be used to adhesively secure a section of film or other information media within the apertured portion of the card.

It will be seen that the machine is capable of preparing only one card; i.e., the presence of more than one card is not necessary to complete one card. Also, the machine is not restricted to use with a card of a particular thickness, width or length since adjustments are incorporated for accommodating different size cards. These adjustments involve adjustment of the card exit opening at the feed hopper by adjusting plate **142A**, the adjustment of the tension on leaf springs **169**, and adjustment of anti-jam switches **406**, **407** and **408**.

It will also be apparent that a card may be prepared with two covered apertured portions by running the same card through the machine two times, reverse direction.

Also, the machine may be modified relatively simply to provide different sized card apertures covered with a cover sheet, this involving changing the punch die set, the bonding platen and the tape or web feed trough.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects.

I claim:

1. In a machine of the character described wherein it is desired to process cards, the combination including: first card processing means at a first station; second card processing means at a second station; means at said first station and responsive to the presence of a card for operating said first means; and means at said second station and responsive to the presence of a card for operating said second means; continuously operating card conveying means continuously effective to convey a card resting thereon to said first and second stations; individual card stop means at each of said stations for engagng and arresting the movement of a card on said conveying means at a corresponding station such that when a card is so arrested said continuously operating conveying means continues to move under the card resting thereon; means for feeding cards to said conveying means; and means operated in time relationship with said card conveying means for operating each of said stop means simultaneously.

2. The combination as set forth in claim 1 in which said first card processing means includes means for aperturing the card; and said second card processing means includes means for applying a cover sheet on and over that portion of the card apertured by said aperturing means.

3. The combination set forth in claim 1 in which each of said operating means includes an electric switch engaged and actuated by a card.

4. The combination set forth in claim 1 in which said applying means includes web feeding and cutting means for feeding and cutting web material from which said cover sheet is derived.

5. The combination set forth in claim 1, including movable card receiving means in a first position thereof receiving cards from said conveying means after passage through said stations, said card receiving means being movable to a second position, means preventing said receiving means from moving to said second position, disabling means rendering said preventing means ineffective, and means responsive to the presence of a card at said applying station for preventing operation of said disabling means.

6. The combination as set forth in claim 5, including second disabling means rendering said card feeding means ineffective to feed cards, and means operated when said card receiving means is moved from said first position to said second position for operating said second disabling means.

7. The combination set forth in claim 2, including card feeding means, means for operating said aperturing means in timed relationship with said card feeding means, and means for operating said applying means in timed relationship with said card feeding means.

8. In a machine of the character described wherein it is desired to aperture a card to provide an apertured portion therein and to apply a cover sheet to said card extending within said apertured portion, the combination including: a driving motor, a jack shaft coupled to and rotated by said motor, card aperturing means at an aperturing station, a first one-revolution shaft for operating said aperturing means, first clutch means for coupling said jack shaft to said first shaft, web cutting and applying means at an applying station, a second one-revolution shaft for operating said cutting and applying means, second clutch means for coupling said jack shaft to said second shaft, card feeding means, timing means, third clutch means for coupling jointly said feeding means and said timing means to said jack shaft, card conveying means for conveying cards from said feeding means to, in turn, said aperturing station and said cutting and applying station, said conveying means being coupled to said jack shaft, first control means controlled by said timing means for selectively operating said first clutch means and effective when operated to produce one revolution of said first shaft, second control means controlled by said timing means for selectively operating said second clutch means and effective when operated to produce one revolution of said second shaft, condition sensing means, and third control means controlled by said condition sensing means for operating said third clutch means.

9. The combination set forth in claim 8 in which said condition sensing means includes a switch operated in response to the presence of cards available for feeding by said feeding means.

10. The combination set forth in claim 8 in which said condition sensing means includes a switch operated in response to the total weight of cards conveyed by said conveying means.

11. The combination as set forth in claim 8 in which said condition sensing means includes a switch operated in response to a temperature condition at said applying station.

12. The combination set forth in claim 8 wherein said timing means includes a first switch, said condition sensing means includes a second switch connected in shunt with said first switch.

13. The combination set forth in claim 12 wherein a third switch is connected in shunt with said first and second switches, and means responsive to the presence of a card at said applying station for operating said third switch.

14. The combination set forth in claim 8 in which said first control means includes a switch operated in response to the presence of a card at said aperturing station, and said second control means includes a switch operated in response to the presence of a card at said applying station, first stop means at said aperturing station for arresting the movement of a card, second stop means at said applying station for arresting the movement of a card and means controlled by said timing means for disabling said first and second stop means substantially simultaneously to allow cards to travel past said stations.

15. The combination set forth in claim 8, including an anti-jam switch responsive to a condition of a card and controlling rotation of said jack shaft.

16. The combination set forth in claim 8 in which said jack shaft is adapted for manual turning whereby slow manual turning of the jack shaft results in slow movement of the card conveying means.

17. The combination set forth in claim 8, including web feeding means for feeding a web to said cutting and applying means, fourth clutch means for coupling said web feeding means to said jack shaft, and said timing means controlling said fourth clutch means.

18. The combination set forth in claim 12, including movable card receiving means for receiving cards from said conveying means after passage from said applying station in a first position of said receiving means, said receiving means being movable to a second position, means preventing movement of said receiving means from said first to said second position, disabling means for rendering said preventing means ineffective, and said timing means including a switch mechanically interlocked with said first switch and controlling said disabling means.

19. The combination set forth in claim 8 wherein cam means interconnect said first shaft and said aperturing means, and said cam means incorporates a dwell that results in said aperturing means being stationary during a portion of one revolution of said first shaft.

20. The combination set forth in claim 8 wherein cam means interconnect said second shaft and said applying means, and said cam means incorporates dwells that

result in said applying means being stationary during portions of one revolution of said second shaft.

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