May 29, 1962 D. D. SLOAN ETAL 3,036,519

INDICIA APPLYING MACHINE

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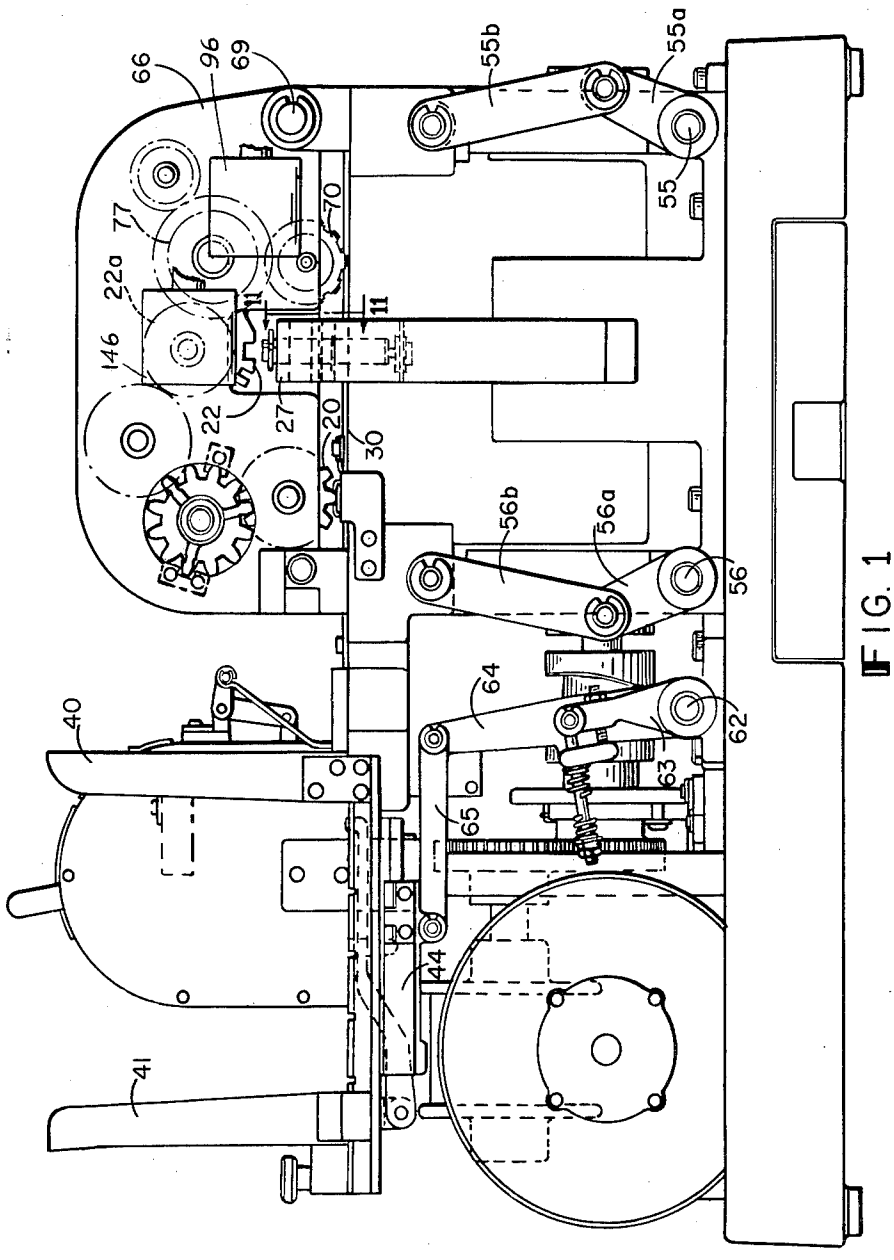


FIG. 1

INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Grover
ATT'YS.

May 29, 1962 D. D. SLOAN ETAL 3,036,519

INDICIA APPLYING MACHINE

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12 Sheets-Sheet 2

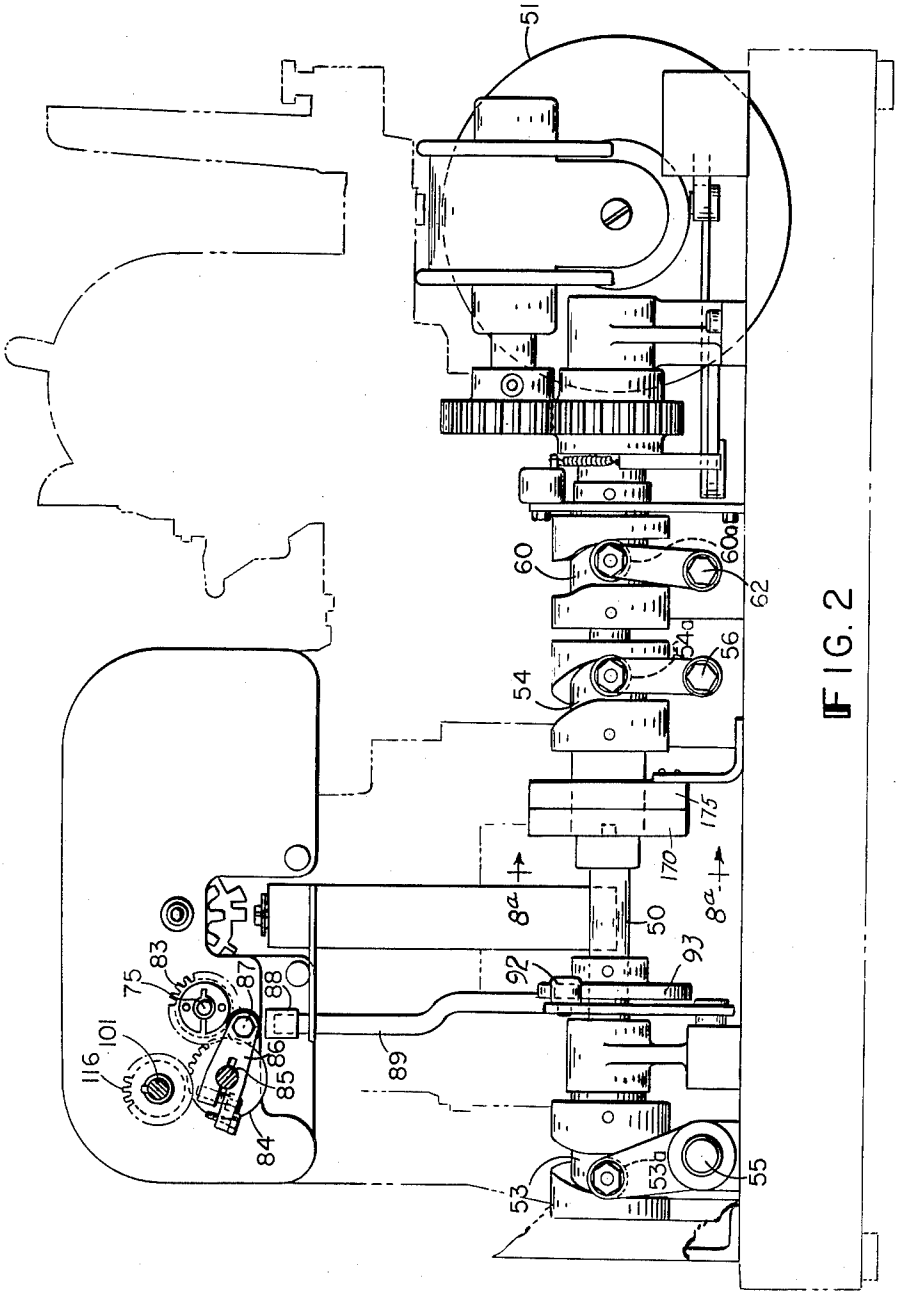


FIG. 2

INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Grover
ATT'YS.

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INDICIA APPLYING MACHINE

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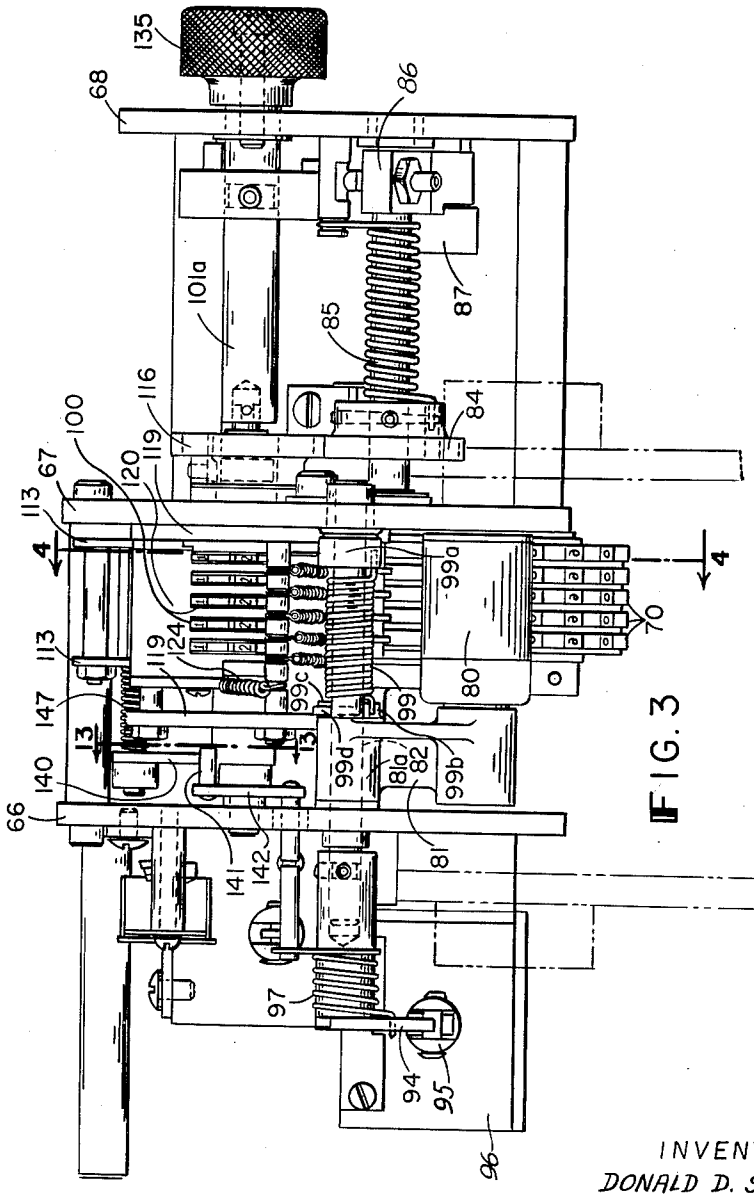


FIG. 3

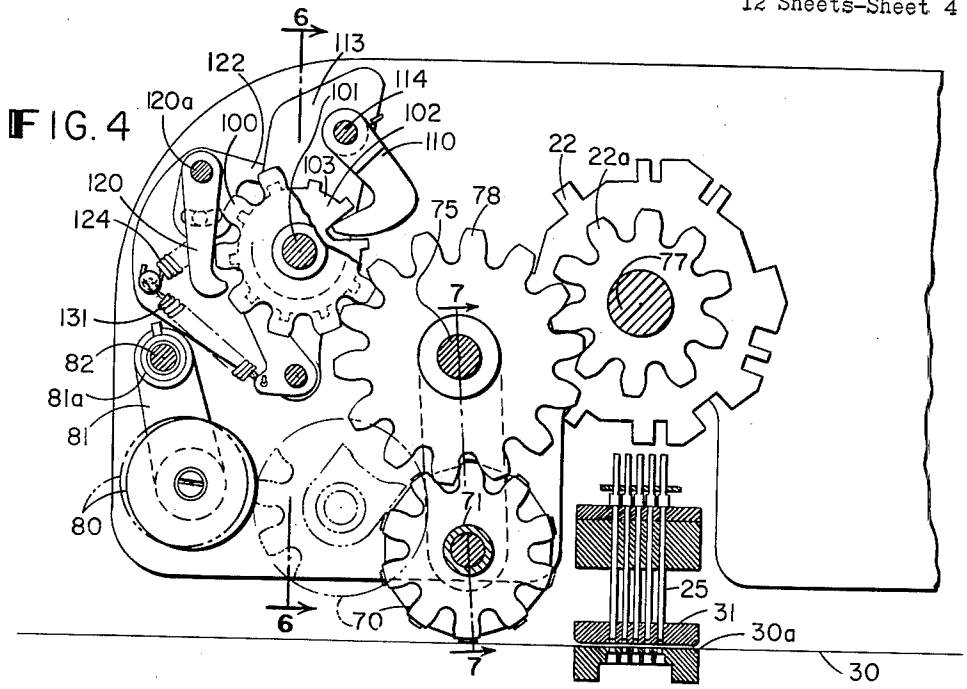
INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Glover
ATT'YS.

May 29, 1962 D. D. SLOAN ETAL 3,036,519

INDICIA APPLYING MACHINE

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FIG. 4



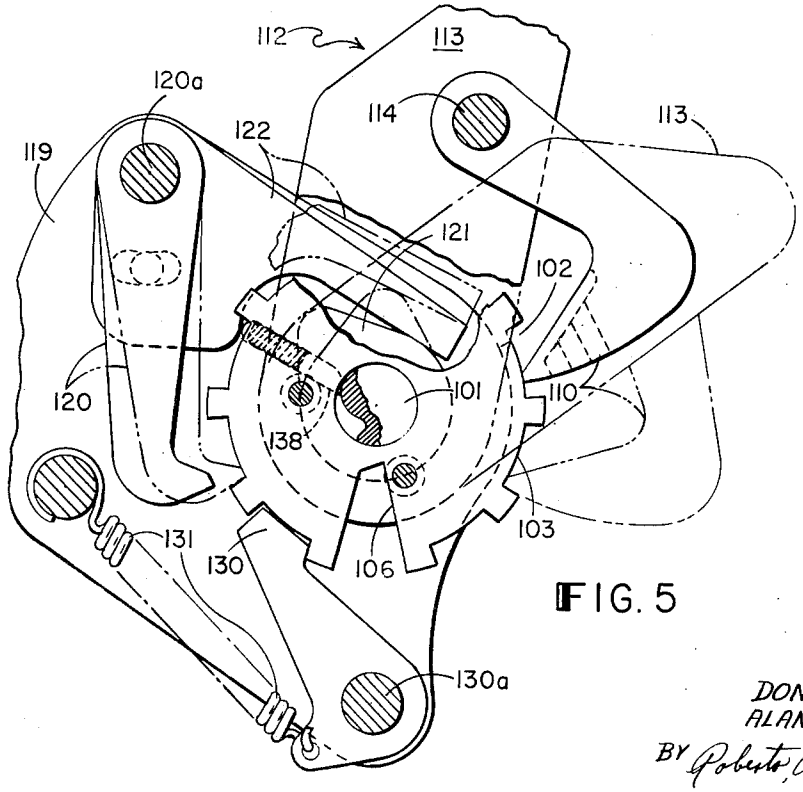


FIG. 5

INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Grover
ATT'YS.

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INDICIA APPLYING MACHINE

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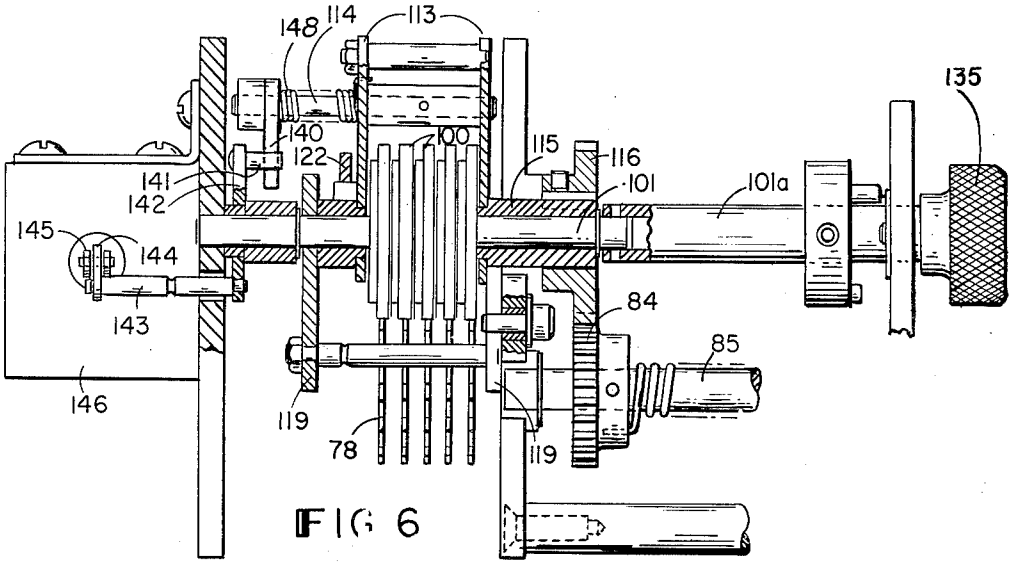


FIG. 6

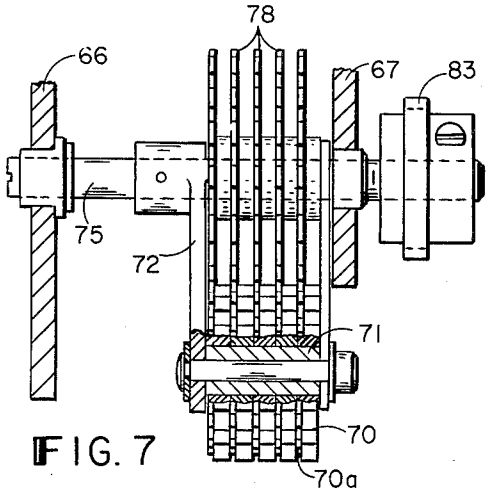


FIG. 7

INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Grover
ATT'YS.

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INDICIA APPLYING MACHINE

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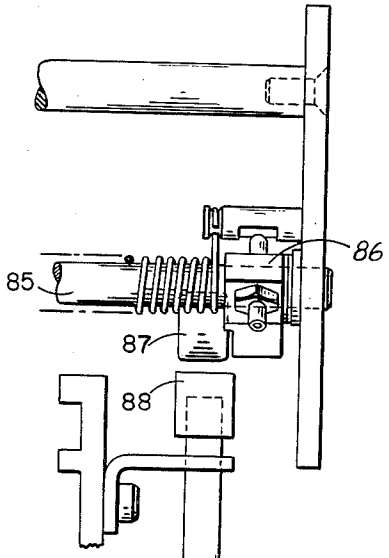


FIG. 8

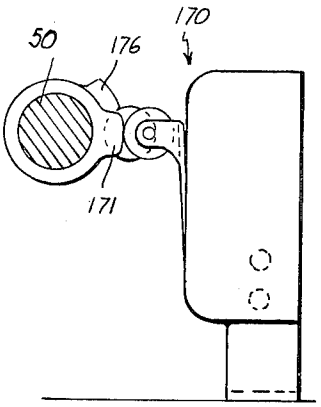
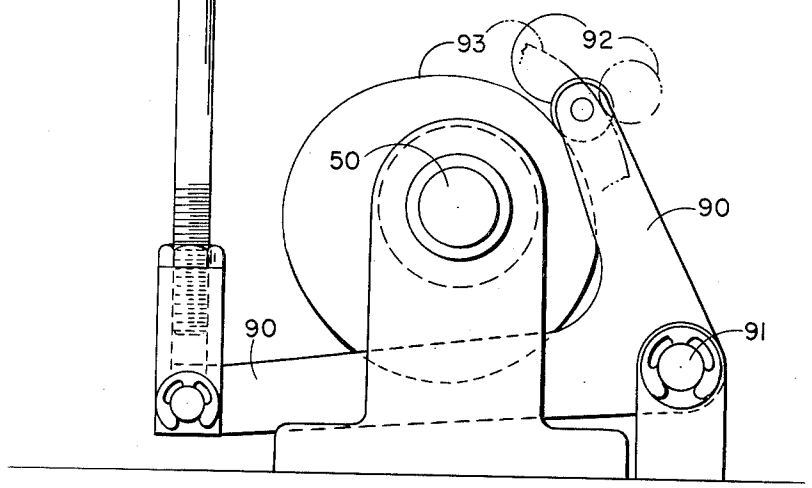


FIG. 8a



INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Groves
ATT'YS

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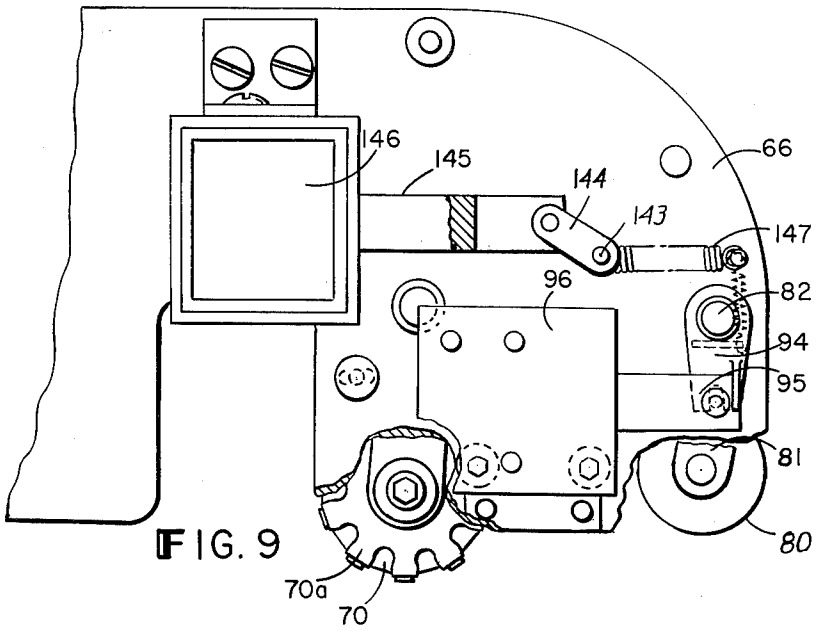


FIG. 9

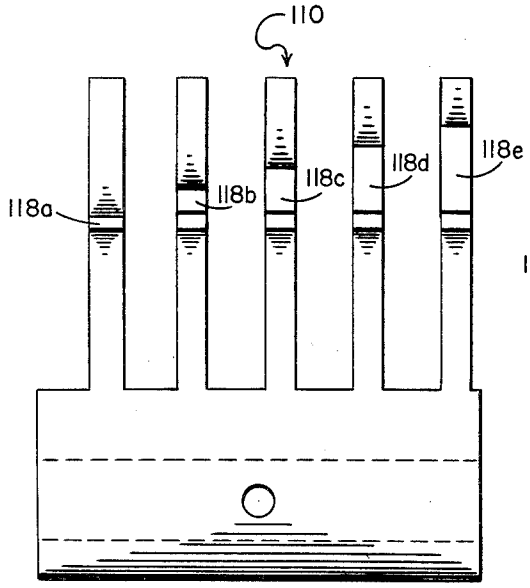


FIG. 10B

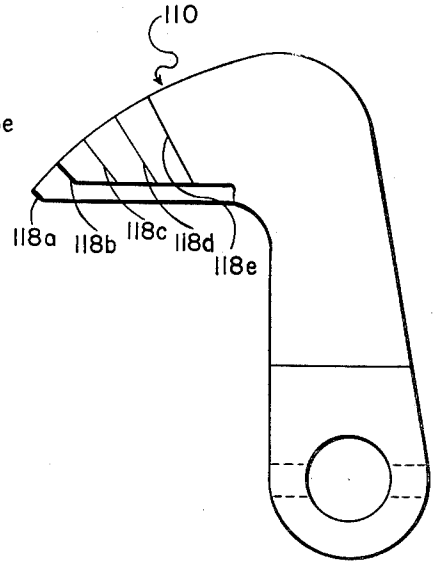


FIG. 10A

INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Woodward
ATT'YS.

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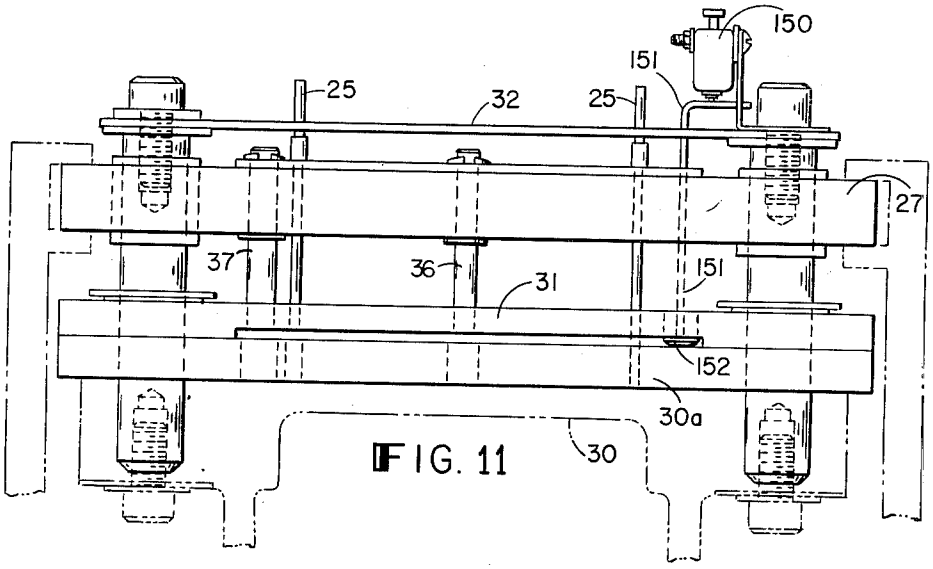


FIG. 11

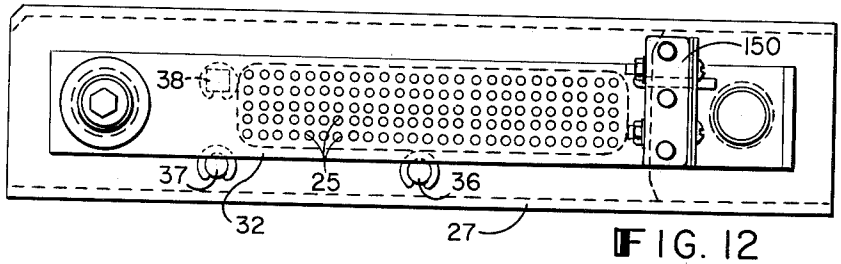


FIG. 12

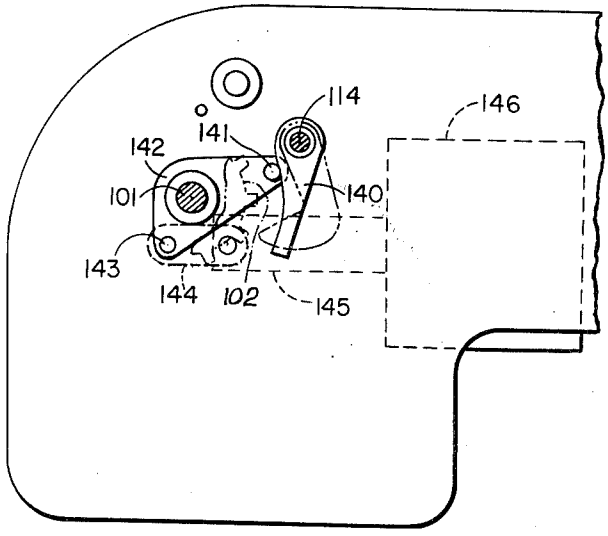


FIG. 13

INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Groves
ATT'YS.

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FIG. 14

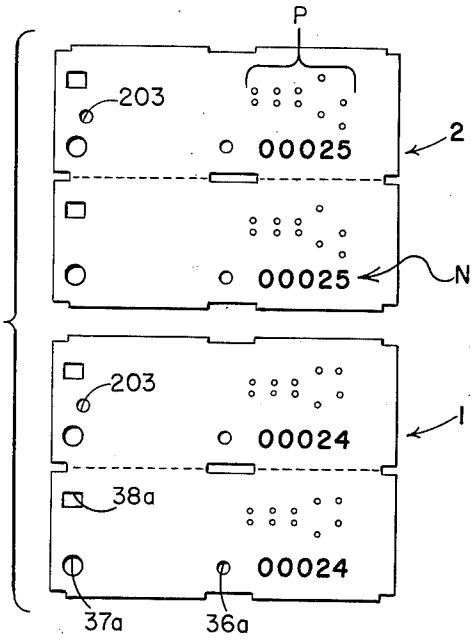
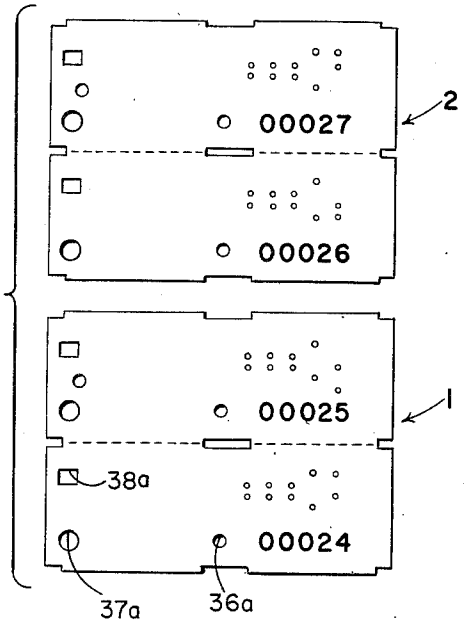


FIG. 15



INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Grover
ATT'YS.

May 29, 1962 D. D. SLOAN ETAL 3,036,519

INDICIA APPLYING MACHINE

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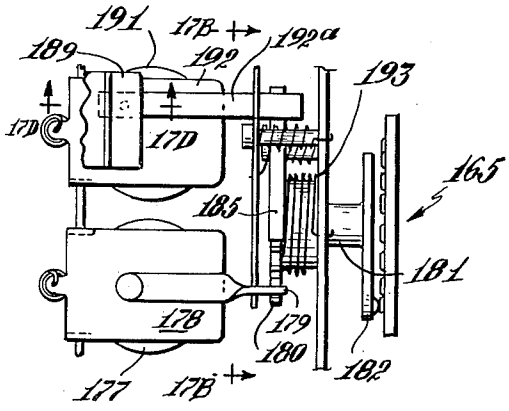


Fig. 17A

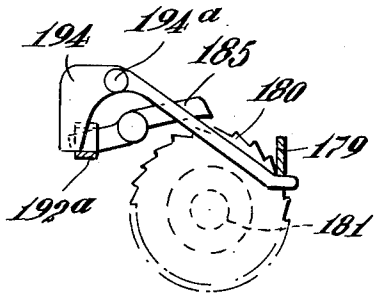


Fig. 17B

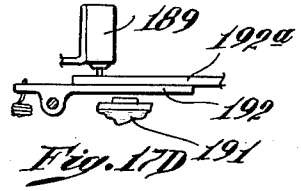


Fig. 17D

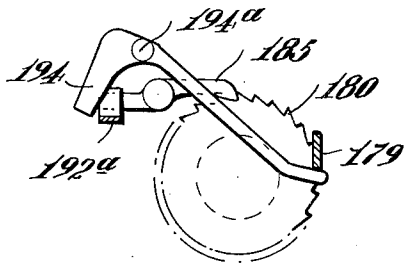


Fig. 17C

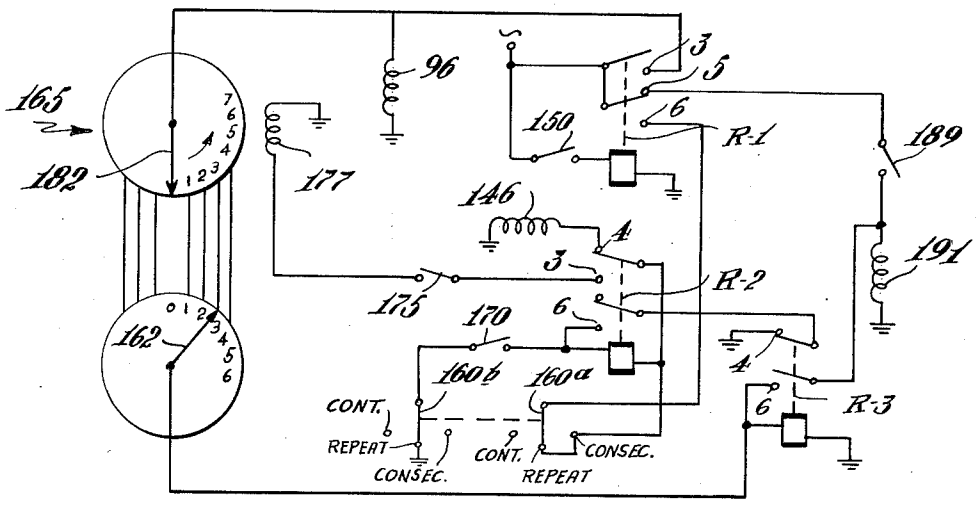


Fig. 16

INVENTORS
DONALD D. SLOAN
ALAN M. SWETT
BY Roberts, Cushman & Grover
ATT'YS

May 29, 1962 D. D. SLOAN ETAL 3,036,519

INDICIA APPLYING MACHINE

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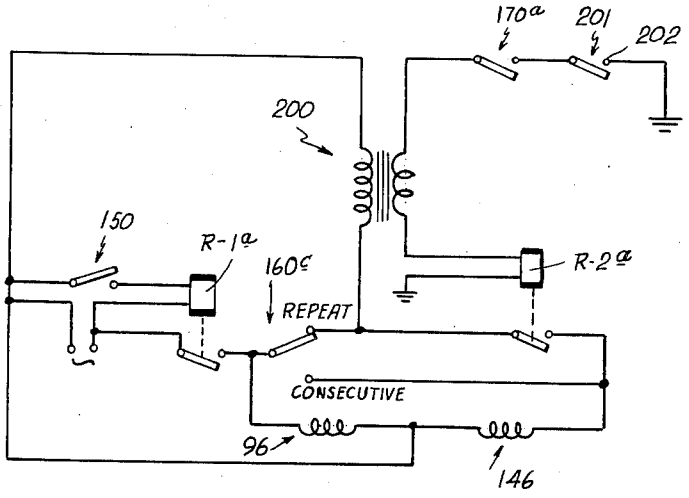


FIG. 18

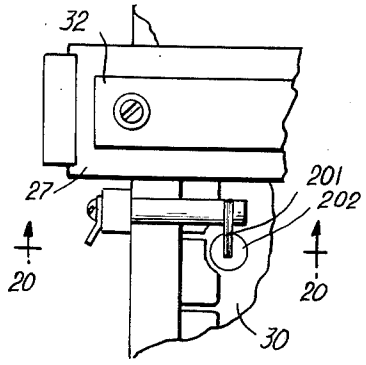


FIG. 19

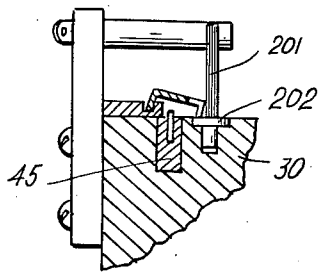


FIG. 20

INVENTORS

DONALD D. SLOAN
ALAN M. SWETT

BY Roberts, Cushman & Grover

ATT'YS

May 29, 1962 D. D. SLOAN ETAL 3,036,519

INDICIA APPLYING MACHINE

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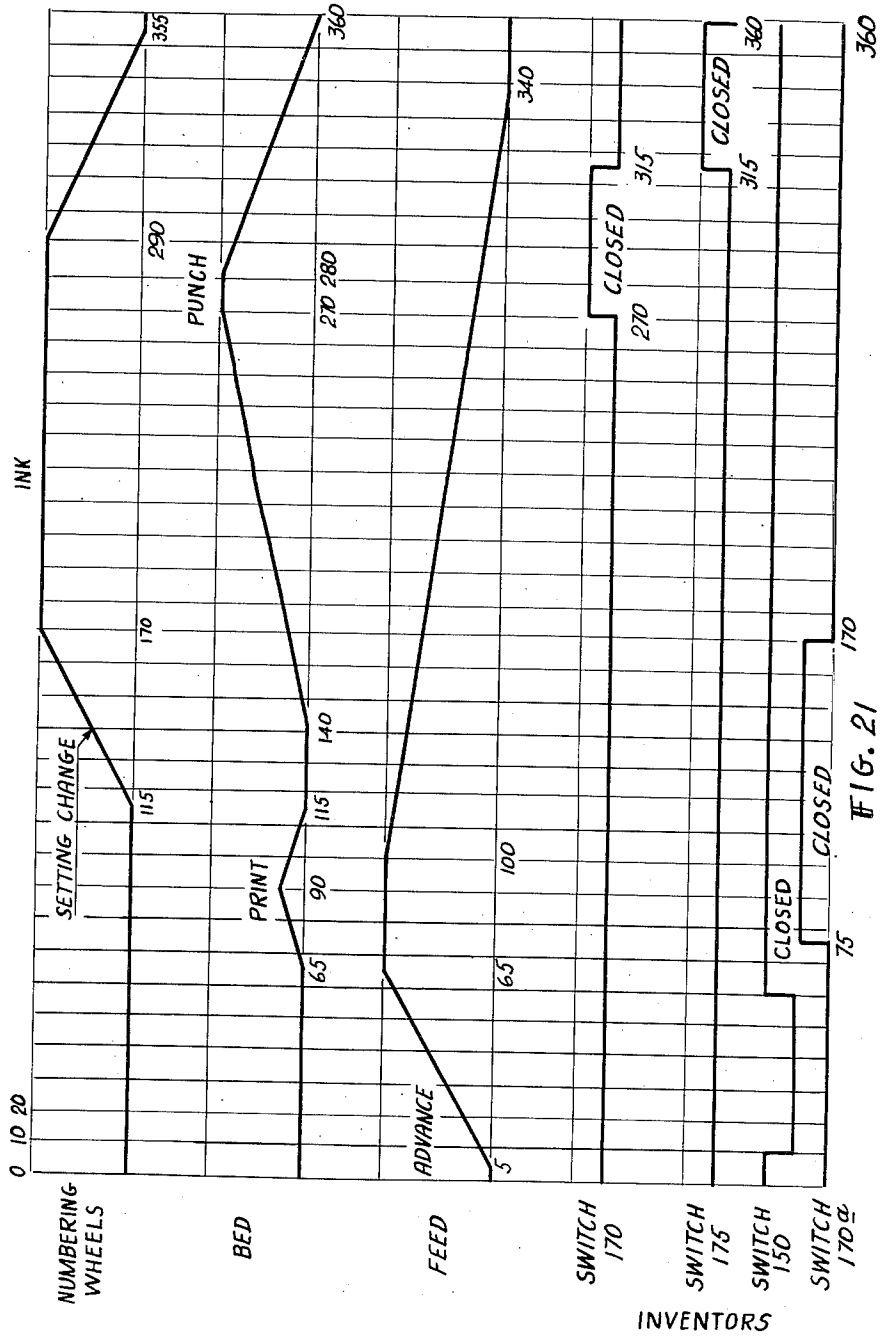


FIG. 21

INVENTORS

DONALD D. SLOAN

ALAN M. SWETT

BY Roberts, Cushman & Grover

ATT'YS

United States Patent Office

3,036,519

Patented May 29, 1962

3,036,519

INDICIA APPLYING MACHINE

Donald D. Sloan, Weston, and Alan M. Swett, Milton, Mass., assignors to Dennison Manufacturing Company, Framingham, Mass., a corporation of Massachusetts

Filed June 6, 1958, Ser. No. 740,342
20 Claims. (Cl. 101—19)

This invention relates to a machine for applying indicia to sectional ticket material, and more particularly to a machine having provision for an automatic change in setting such as to change, in a systematic manner, the indicia applied during a run. An example of such change would be to apply indicia, including numbers, to the successive ticket sections, and to increase the number once for each successive section, which operation may be referred to as a consecutive operation. Another example of such change would be to apply the same indicia to each section of a ticket, and only increase the number once for each ticket, which operation may be referred to as a repeat operation because the indicia is repeated on the several sections of a given ticket.

A complication arises when it is sought to perform such operations and apply the indicia both in print and in a punched code, the print and the punched code to correspond. A practical requirement for sectional tickets is that the sections be small. It is impracticable to provide the printing and punching machine with a single station at which a ticket section can be both printed and punched while in the same position, because of the small size of the ticket section. This requires that the punching device and the printing device which are to apply corresponding indicia be located at different stations. This is no drawback in the conventional printing and punching machine where there is no change in setting during the run and where, accordingly, both printing and punching stations will each apply the same indicia at each cycle, the indicia at the two stations always corresponding.

However, in the machine with which this invention is concerned, where changes are to be made in the setting at each cycle or at longer intervals, successive stations must be able to print and punch different non-corresponding indicia in some or all of the cycles.

It will readily be understood that indicia applied at the printing and punching stations in a given cycle must always be different in the case of consecutive operation, and must be different at certain times in repeat operation, that is, at the times when the two stations are acting on different tickets.

In theory the settings of simultaneously acting print wheels and punch interposers could be caused to be different in the manners in which they would need to be different, for consective and for repeat operations. For consecutive operation they would need to differ according to the spacing of the stations, i.e., if the forward station were two units of feed in front of the other station as in the machine of the United States patent application of Arnold R. Bone and Donald D. Sloan Serial No. 493,754, filed March 11, 1955, now U.S. Patent No. 2,890,650, the setting at the forward station would logically be constantly two units lower than that of the station which is two ticket section lengths in rear of the forward section.

For repeat operation the basic setting of the forward station might logically be the same as that of the other station provided the setting of the rear station were advanced one unit at two cycles before a corresponding one-unit advance of the setting of the forward station, the setting of the rear station thus being one unit higher than the setting of the forward station during parts of the sequence.

In either such case, however, the time of carrying over from a unit wheel (print wheel or interposer wheel) to

an associated ten's wheel, and the time of carrying over from a ten's to a hundred's wheel, etc., would need to occur two cycles sooner at the rear station than at the forward station. This in effect would require separate carry-over mechanisms for the bank of the print wheels and for the bank of the interposer wheels.

The variation in the relations between the setting of the corresponding individual print wheels and interposers in the case of repeat operation would further complicate the mechanism required to change their positions automatically. Some special way would need to be devised in order to convert the relative settings used for consecuitve operation (a difference in setting of two) to the basic, relative setting for repeat operation (a basic difference of zero, but with the rear station sometimes set one unit higher than the forward station).

An important practical requirement in a machine of the present type is that no matter how the settings of the stations are changed in order to secure consecutive or repeat operation, correspondence between the printing and punching on any ticket section shall not be lost and the correct count shall not be lost when there is either an accidental failure of feed or there is a gap in the procession of ticket sections such as occurs when one lot of tickets is run out and another lot started.

The invention in one aspect involves locating printing and punching units adjacent to each other so that one step of advance of the ticket material carries one ticket section from one of these units to the other, and operating these units sequentially, the rear one after the forward one, with provision for a change in setting of both units between these operations, with the effect of permitting the use of simple control mechanism which includes carry-over mechanism to be used to change the setting of both units.

The invention further renders it possible to have the settings of the two units always correspond, notwithstanding the device will sometimes be used for consecutive operation and sometimes be used for repeat operation.

Given the requirement that the settings of the printing and punching devices are to be increased periodically by one, and assuming for example that the printing station is to be foremost and the punching station is to be to the rear of the printing station, the above plan of having the two stations located to act upon immediately adjacent or abutting ticket sections, having the settings of the two devices correspond and changing the setting in between operations of the two devices permits conditioning this change upon the presence of a ticket section at the rear station. In other words, no automatic change in setting is made unless there is a ticket section at the rear or punching station. Thus when the machine is cleared the setting can be allowed to remain at the number of the ticket section last punched until the leading section of a ticket is again presented at the punching station in the next run, whereupon numbering is correctly resumed.

Printing and punching machines such as those disclosed in United States Patent to Braun No. 2,708,873 and in the United States patent application of Bone and Sloan Serial No. 493,752, filed March 11, 1955, now U.S. Patent No. 2,832,205, in which the sectional ticket material is fed section by section, have at least one idle position in between any printing station and any punching station which are interconnected to apply corresponding indicia.

It will be seen that if there were an idle position between the printing and punching stations and if there were a corresponding difference in setting of the stations during the run (e.g., the setting of the rear station being a constant number higher than that of the forward station) then the change in setting could not, for consecutive numbering, be conditioned on the presence of a ticket

section at the rear or punching station because after punching the last ticket section and when the punching station was clear a further change would be required in the setting of the forward or printing station.

Even if some other control were provided for permitting the change in setting of the forward or printing station in this event, the corresponding change at the punching station, for the cycle in which no section was punched, would throw off the count in the next run i.e., there would be a gap in the sequence of numbers.

Thus an important feature of the machine of this invention is the avoidance of a change of setting when no ticket section is at the rear one of the two interconnected stations which apply corresponding indicia.

A related feature is the permitting of change of setting when no ticket section is at the forward one of the two stations. This condition exists at the beginning of a run when the first ticket section reaches the rear or punching station. In the illustrated machine the following operations follow the step of feed that places this first ticket section at the rear or punching station: an idle printing operation with no ticket section at the printing station, an auomatic change in setting of both stations, an effective operation of the punches. If the original setting is zero, zero is neither printed nor punched, and the first ticket section is both punched and printed with the numeral one as it should be. Whether the numeral is thereafter increased for every ticket section or for every complete ticket depends on whether the machine is set for consecutive or repeat operation. In either case, however, the arrival of the first ticket section at the rear or punching station brings about a change of setting, so that the zero in the units column is neither punched nor printed on a ticket section until the numeral ten is reached.

Then, in the illustrated preferred form of the machine, after the initial change, when the printing device assumes the setting with which it will print in the next cycle, changes are made only in cycles in which actual printing and actual punching both occur. There is therefore no gap in the sequence of numbers when the next run is begun.

Other objects and advantages of the invention will be apparent from this specification and its accompanying drawings wherein the invention is explained by way of example.

In the accompanying drawings, a cover which normally covers the printing and punching head of the machine, but which is removable for inspection of the machine and which forms no part of the present invention, is assumed to be removed and, accordingly, does not appear.

In the accompanying drawings,

FIG. 1 is a side elevation of a printing and punching machine having the present invention applied thereto, this side being herein designated the left side;

FIG. 2 is a diagram in the nature of a right side elevation omitting much of the structure of the machine, but showing certain parts on the side of the machine opposite to that shown in FIG. 1;

FIG. 3 is a front elevation, as viewed from the right of FIG. 1, of the upper portion of the machine;

FIG. 4 is a partial section taken mainly on line **4—4** of FIG. 3 with some parts broken away and removed;

FIG. 5 is a diagram on a larger scale than FIG. 4 showing portions of the drive mechanism for the counter, and in particular the counter drive pawl, one of the drive rings driven by this pawl, a stop pawl for the drive rings, a cam for operating the stop pawl, and a detent pawl;

FIG. 6 is a vertical partial section taken mainly on line **6—6** of FIG. 4 through the axis of the counter gears;

FIG. 7 is a partial section taken mainly on the line **7—7** of FIG. 4, through the axis of the idler gears and the print wheels with the latter in their printing position;

FIG. 8 is a fragmentary diagram taken from the front and the same point of view as FIG. 3;

FIG. 8A is a fragmentary view taken on the line **8A—8A** of FIG. 2;

FIG. 9 is a fragmentary left side elevation to a larger scale than FIG. 1, and with parts broken away;

FIGS. 10A and 10B are respectively a side and an end elevation of the counter wheel drive pawl;

FIG. 11 is a vertical partial section on the line **11—11** of FIG. 1, showing the punching station and a ticket sensing means;

FIG. 12 is a plan of the mechanism of FIG. 11;

FIG. 13 is a diagram in the nature of a vertical partial section taken on line **13—13** of FIG. 3;

FIG. 14 is a plan showing tickets printed and punched by repeat operation;

FIG. 15 is a plan showing tickets printed and punched by consecutive operation;

FIG. 16 is a wiring diagram of a control circuit for the machine;

FIG. 17A is a plan view showing the main element of the stepping switch of FIG. 16;

FIG. 17B is a vertical sectional view taken on the line **17B—17B** of FIG. 17A, with the switch in its reset or zero position;

FIG. 17C is a view similar to FIG. 17B but with the switch one or more steps away from its zero position;

FIG. 17D is a vertical sectional view taken on the line **17D—17D** of FIG. 17A;

FIG. 18 is a wiring diagram of an alternate form of control circuit for the machine;

FIG. 19 is a fragmentary plan view showing a portion of the punching station, a portion of the bed at the adjacent numbering printing station, and additional sensing means employed at this printing station in connection with the control circuit of FIG. 18;

FIG. 20 is a fragmentary vertical sectional view on the line **20—20** of FIG. 19; and

FIG. 21 is a timing diagram of the machine.

The general organization of the illustrated machine, so far as concerns feeding the ticket material through the machine, printing the upper line of printed indicia on each ticket section and punching the corresponding indicia in code, as well as stopping the machine when a predetermined number of tickets have been printed and punched and stopping the machine when the tickets exhaust, is similar to that of the said Bone and Sloan application, and the Bone and Sloan application may be referred to for details of construction, which however are not essential to an understanding of the principles of the present invention.

As in the Bone and Sloan application the machine includes a manually settable bank of print wheels **20** some ones of which are interconnected by gearing to individual ones of a bank of interposer wheels **22**, in order to print and punch corresponding indicia in a top line of printing and in a central punching field of each ticket section.

The machine of the Bone and Sloan application also includes a second bank of manually settable print wheels for printing a bottom line of indicia on each ticket section. The present machine, instead of this second bank of manually settable wheels, provides an automatically changeable bank of numbering print wheels. These are interconnected to certain ones of the interposers **22** so that corresponding numerical indicia is printed and punched and this indicia can be automatically changed during the course of a run, either according to consecutive operation or repeat operation as above referred to.

Punches **25** for punching coded indicia are carried by a stationary cross member **27**, FIGS. 11 and 12, only two of the considerable number of these punches being shown in FIG. 11. As shown in FIG. 12 the numerous code punches **25** are arranged in columns of five. Each column is controlled by a single one of the interposer wheels **22**

which occupies a position above the column of punches. By way of example there may be twenty-five interposer wheels **22**, and, counting from the side visible in FIG. 1 or from the left in FIG. 12 the alternate interposer wheels commencing with the fifteenth and ending with the twenty-third, i.e., five in all, are connected to and controlled by the counter mechanism subsequently described and punch in code the numbers printed by automatically changed numbering print wheels. These five numbering interposers each have ten positions representing zero and the digits one to nine, in each of which ten positions two punches **25** of each column are rendered operative to punch. The particular code employed is basically a one, two, four, seven code, with zero represented by four in conjunction with seven, and with a numerally-valueless top punching position in which a punch is made in those cases where the particular digit requires only one punched hole. In the illustrations of tickets in FIGS. 14 and 15 the code perforations made by the code punches other than the automatic numbering punches are omitted and five columns of perforations P are shown, corresponding in each case to the numerals N applied by the numbering mechanism. The printed indicia which would normally be applied along the top of each ticket section by the print wheels **20** is also omitted.

As in the Bone and Sloan application the bed **30** of the machine rises vertically and at the punches is formed as a lower die **30***a*, FIG. 11, and an upper die or ticket stripper **31** with a gap therebetween for the ticket material. The code punches **25** are vertically movable in the stationary member **27** but selected punches can be held down by the interposer wheels **22** and caused to punch. A vertically movable stripper plate **32** insures that all punches are clear of the interposer wheels when the bed is in its lower positions.

Larger stationary punches **36**, **37** and **38** are carried by the stationary member **27** and punch locating holes in each ticket section, these holes being indicated by the corresponding characters **36***a*, **37***a* and **38***a* in the tickets of FIGS. 14 and 15.

A ticket magazine is carried by the left end of the bed, FIG. 1, and is shown as including a front end section **40** and an adjustable rear end section **41** which can be shifted to various distances from the front end section **40** to accommodate stacks of tickets of different lengths. A ticket section is customarily one inch in length.

If continuous strips of sectional ticket material are to be employed the machine may be modified, for instance as disclosed in the Bone and Sloan application, by inclusion of mechanism for severing the tickets from the strip, and the rear end section **41** of the magazine will be removed.

The invention is applicable to machines which may feed the ticket material through the machine in a continuous length and sever it into tickets of the desired number of sections after printing and punching rather than before. When reference is made to the position of the ticket with reference to either of the indicia-applying stations, it will be understood that such ticket may not yet have been severed from a strip, but simply consist of the sections which will constitute the ticket when severed from the strip.

Reciprocating feed means including feed bars and ticket pawls as described in the Bone and Sloan application, are operated from a slide **44** beneath the magazine and extend approximately to the right end of the machine and feed the ticket material from let to right, step by step by engagement with the feed slots and rear ends of the tickets. One such feed bar appears at **45** in the fragmentary sectional view of FIG. **20**. Each step of feed is equal to the length of a ticket section, e.g., one inch. The location of the first bank of print wheels **20** and the bank of punches **25** controlled by interposer wheels **22** is such that two steps of feed are required to remove a ticket section from its position where it is printed by print wheels **20** and move this ticket section into the punching station, likewise as in the machine of the Bone and Sloan application.

As the bed rises to punch a given ticket section at the punching station, the second ticket section to the rear thereof is brought into contact with an ink ribbon (omitted from the drawings for clarity of illustration) and printed by the bank of print wheels **20**. The intervening ticket section receives neither printing nor punching in this cycle.

The up and down movement of the bed and the reciprocation of the feeding mechanism are derived from a camshaft **50**, FIG. 2, driven through a suitable clutch and reduction gearing from a motor **51**. The timing of these motions will be understood by referring to the timing diagram of FIG. 21.

Cams **53** and **54**, FIG. 2, operate through followers **53***a* and **54***a* to rock a pair of shafts **55** and **56**, which shafts are connected by toggles **55***a*, **55***b* and **56***a*, **56***b*, FIG. 1, to lift and lower the bed **30**.

Cam **60** on shaft **50** operates through follower **60***a* to rock a shaft **62**, and as shown in FIG. 1 shaft **62** is connected by interconnected levers **63**, **64** and a link **65** to the slide **44** which reciprocates the feed bars of the ticket feeding means.

The frame of the printing and punching head of the machine consists mainly of vertical plates **66**, **67** and **68** extending longitudinally of the bed, interconnected by various cross members and all pivotally mounted upon the axis **69**, FIG. 1, so that the head as a whole can be swung upwardly to expose the bed and inspect the mechanism of the head.

A bank of five numbering print wheels **70** carrying zero and the digits one to nine on their peripheries are freely rotatable upon a sleeve **71**, FIG. 7, carried by an arm **72** which is fast upon a rock shaft **75**. Rock shaft **75** carries fast thereon a gear **83** by which it is rocked as later described. Each numbering wheel **70**, in addition to carrying the printing characters zero to nine, is provided with a ten tooth gear **70***a* fast therewith.

In FIG. 4 the bank of numbering wheels **70** is shown in full lines in its lower or printing position, in which position it is located at one feed step to the left of, that is, beyond, the punching station formed by the lower and upper punching dies **30***a* and **31**.

In this same FIG. 4 the bank of numbering wheels is shown in broken lines as swung upwardly and to the left, by rocking of shaft **75**, to its inking position.

The five interposers **22** with which the numbering mechanism cooperates each carry a ten tooth gear **22***a* and are freely rotatable upon a stationary spindle **77**. The respective gears **70***a* of the print wheels are interconnected with the interposer gears **22***a* by idler gears **78** which are freely rotatable on rock shaft **75**. Thus, with the print wheels in their printing position of FIG. 4 the setting of each print wheel and its interconnected interposer corresponds. The notching of each interposer is such as to control the punches **25** according to the code mentioned above, so that when any print wheel **70** is in position to print a given numerical character the corresponding interposer **22** is in position to cause the associated punches to punch the corresponding character in code. Thus as indicated above, the setting of each numbering print wheel and its corresponding interposer always corresponds.

Any suitable ink roll **80** is provided for inking the bank of print wheels. As shown in FIG. 4 the ink roll is carried by an arm **81** which is yieldably mounted upon a rock shaft **82**, as later described.

As the bank of print wheels is rocked to and from inking position, the intermeshing of its set of gears **70***a* with the idler gears **78** rotates the bank of print wheels. The extent of this rotation and the location of the ink roll relative to the printing position of the print wheels are such that when a given printing character on the periphery of a printing wheel is inked by the ink roll, return of the

printing wheel to printing position will bring this same character to the bottommost or printing position of the ten printing characters of the wheel.

Rock shaft **75** which moves the print wheels to and from printing and inking positions is rocked by connections from the main camshaft of the machine so as to carry the print wheels to inking position and back to printing position in each cycle of operation of machine. These connections are best seen in FIGS. 2 and 8. Referring to FIG. 2, shaft **75** is connected by gears **83** and **84** to a rock shaft **85** to which is fastened a crank arm **86** carrying a follower roll **87**. A tappet **88** upon a lifter rod **89** is adapted to lift the follower roll **87**. As shown in FIG. 8 lifter rod **89** is given its up and down motion by a bell crank **90**, pivoted at **91** and carrying a follower roll **92** which is engaged by a cam **93** on the main camshaft **50**.

The ink roll rock shaft **82** is adapted to move the ink roll into and out of its full line position of FIG. 4, in which full line position it will engage with the print wheels when these are swung to inking position. In its broken line inoperative position of FIG. 4 the ink roll clears the print wheels and no ink is applied. Ink roll rock shaft **82**, FIG. 3, is journaled in frame plates **6** and **67** and carries outside of the frame a crank arm **94**.

As shown in FIG. 9, arm **94** is connected by a pin and slot connection to the movable armature **95** of a solenoid **96**. Energization of solenoid **96** thus rocks shaft **82** to move the ink roll to operative position. A coil spring **97**, FIG. 3, rocks shaft **82** in the opposite direction when the solenoid **96** is deenergized.

The ink roll arm **81** is yieldingly mounted on shaft **82** to permit the ink roll to yield when engaged by the print wheels **70**. Referring to FIG. 3, the hub **81***a* of arm **81** is rotatable on shaft **82**. A coil spring **99** has one end fast in a collar **99***a* fast on shaft **82** and its opposite end bears against a shoulder **99***b* on hub **81***a*, tending to rotate the arm **81** relative to shaft **82**, away from the observer in FIG. 3. Another shoulder **99***c* on hub **81***a* is engaged by a stop pin **99***d* in shaft **82**. The ink roll and its arm can thus yield toward the observer in FIG. 3, against the force of the spring **99**.

The setting-changing mechanism includes five index gears **100** for units, ten's, hundred's, thousand's and ten-thousand's respectively, rotatable on a shaft **101** and each consisting of a ten toothed gear meshing with one of the idler gears and carrying the characters "0" through "9" which are visible to the operator. Each such toothed gear wheel **100** has fastened thereto a smaller diameter toothed drive ring **102** having nine shallow notches **103**, FIG. 5 and one deep notch **106**.

A pawl carrier indicated generally at **112**, FIG. 5, including two interconnected side plates **113**, FIG. 6, is rockable about shaft **101**. A stepped drive pawl **110**, FIGS. 4 and 5, is fast upon a shaft **114** which is journaled in the side plates **113** and is rocked with its carrier. Referring to FIG. 6, the right-hand side plate **113** of the pawl carrier is secured to a rotatable sleeve **115** having fast thereon a gear **116** which meshes with the gear **84** on the rock shaft **85**. These gears **116** and **84** may also be seen in FIG. 2. Thus at each cycle the pawl carrier is rocked from its full line position of FIG. 5 to its broken line position. By engagement of the stepped pawl **110** with one or more of the drive rings **102**, rocking of the pawl results in the setting of the index gears **100** being advanced one unit. Since the index gears **100** are in meshed relation with the idler gears **78** and these in turn are in meshed relation with the numbering print wheels **70** and also with the numbering interposer gears **22***a*, the setting of the numbering print wheels and interposers is also advanced one unit.

This change in the setting of the print wheels and interposers takes place as the numbering print wheels are rocked to inking position, and the type characters for printing the changed number receive ink.

The stepped drive pawl **110** shown in detail in FIGS. 10A and 10B has five prongs **118***a* to **118***e* inclusive for engagement with the respective drive rings **102** of the five index gears **100**, the longest prong **118***a* engaging the units' index gear drive ring.

The engagement of a prong of the stepped drive pawl with any given drive ring prevents engagement of the pawl with the drive rings of any higher order index gear excepting in the case when the driving engagement with the given drive ring is in the deep notch **106** thereof. In this latter case the pawl is able to engage the drive ring of the index gear of next higher order and drive that index gear also. This enables the pawl to perform the function of a carry-over device, whereby when one index gear goes from "9" to "0" setting the next higher order index wheel is advanced one position.

When "99999" is reached the pawl is adapted to engage all five drive rings, the deep notches of the first four coinciding and allowing the shortest prong **118***e* to engage the highest-order drive wheel, whereupon another operative stroke of the pawl would drive the five index wheels and bring the reading to "00000."

Other forms of counting means could be substituted.

The counter assembly is shown as including stationary side plates **119**, **119**, FIG. 3.

Referring to FIG. 5, a stop or locking pawl **120**, pivoted on a cross connection **120***a* between plates **119**, **119** is operated by a cam **121** which rocks with the pawl carrier **112** and a cam follower arm **122** which rides on the cam **121**, the stop or locking pawl being urged by a spring **124**, FIGS. 4 and 3, toward its unlocked position. This pawl prevents over-running of any of the index wheels as they are driven by drive pawl **110**. As shown in FIG. 3 stop pawl **120** is slotted so as not to interfere with the index gears **100** and to form prongs which reach in beside the gears and engage their respective drive rings **102**, as in the broken-line position of the pawl in FIG. 5.

Detent pawls **130** for the several drive rings are pivotally supported on cross connections **130***a* within the counter frame and are spring urged by springs **131** into the notches of the respective drive rings and releasably hold them in indexed position.

It will be noted that the shaft **101** about which the pawl carrier rocks and about which the index gears are rotated by the action of the pawl may be rotated within this assemblage, to set the index gears forward manually to zero position. An extension **101***a* of shaft **101**, FIG. 3, carries a knob **135** by which shaft **101** can be rotated.

As indicated in FIG. 5, each drive ring **102** carries in a recess therein a spring pressed plunger **138**, and shaft **101** is suitably recessed to receive these plungers. Thus one revolution of shaft **101** clockwise in FIG. 5 will carry any of the drive rings and their index gears which are not already in zero position forwardly into zero position, leaving the whole bank of wheels in their zero settings.

The stop pawl **120** does not interfere with the manual setting of the index gears, because this stop pawl is normally free of the drive rings **102** as shown in full lines in FIG. 5, only being brought to its broken line locking position when the pawl carrier is rocked clockwise.

The operator can also manually set the index gears for any number within their capacity by turning the appropriate index gear or gears forward to the appropriate setting by means of a stylus. Thus a run may be started at any desired number.

In both repeat and consecutive operations an automatic change in setting will take place when the first ticket section reaches the rear or punching station. Accordingly a manual setting of the index wheels should be to a setting one less than the first number to be printed and punched.

Means are provided for suppressing the action of setting-changing. The drive pawl **110** is rocked at each

cycle, but is ineffective when not allowed to engage with any of the drive rings **102**.

Referring to FIGS. 6 and 13, the shaft **114** on which the drive pawl **110** is fast carries a follower arm **140** adapted to be engaged by a stop pin **141** carried by a plate **142** which is rockable about the shaft **101**. The plate **142** is connected by a pin **143** and link **144** to the movable armature **145** of a solenoid **146**. A spring **147**, FIG. 9, yieldingly urges the parts to move the pin **141** away from the observer in FIG. 6 or clockwise in FIG. 13 to the position shown in FIG. 13 to engage the pin **141** with the undersurface of the follower arm **140**. In this position of FIG. 13 the drive pawl **110** clears all of the drive rings **102** and no change in setting is made. Energization of the solenoid **146** withdraws pin **141** from engagement with the follower arm **140** and allows the drive pawl **110** to engage one or more drive rings. A spring **148**, FIG. 6, acting on follower arm **140**, urges te drive pawl toward the drive rings.

The machine is arranged to effect printing and punching operations at different times such that an automatic change in setting can be made between these operations.

The cams **53** and **54** of FIG. 2 which control the raising and lowering of the bed **30** are given a form such that in each cycle they raise the bed through a short stroke of for example 3/64 inch, return it to bottom position, then raise it through a longer stroke, for example 3/16 inch.

The short stroke is sufficient to bring a ticket section into printing relation to the numbering print wheels when these latter are in printing position but this short stroke is not sufficient to operate the punches.

The long stroke of the bed is sufficient to operate the punches, and this long stroke takes place while the numbering print wheels are out of printing position and hence out of the way of this long stroke of the bed.

Thus in case a setting-change is to be made the change takes place between printing at the forward printing station and punching at the adjacent punching station. If the change is from "00001" to "00002" the ticket section at the printing station is printed "00001" and the ticket section at the punching station is then punched "00002."

The short and long strokes of the bed which bring about the printing and punching respectively and the movement of the numbering wheels into and out of operative position form part of the subject matter of a copending patent application of Arnold R. Bone, filed concurrently herewith.

It is not fundamentally necessary that the printing stroke be so short that it will not operate the punches at the time of printing. If the printing stroke of the bed were as long as the punching stroke of the bed, each ticket section would be punched twice, and when a change in setting occurred between these two punchings, excess punching would appear. A more complicated code which ignored the excess punching would then need to be used. For example, if the punching station were to punch a ticket section with perforations indicative of "00001" and also with perforations indicative of "00002" the code would need to be such that the superfluous punched hole or holes would be ignored or would not affect the reading.

It may be observed that in many cases the index gears **100** will be initially set at "00000" and the numbering print wheels and interposers will have the corresponding setting. As will appear below, this does not require printing or punching any ticket section with this "00000" designation.

The change in setting is preferably conditioned upon a ticket section being present at the punching station. For consecutive number ing the change when permitted to take place by presence of a ticket section at the punching station, will take place at each cycle. For repeat many cycles as correspond to repeated printing and numbering such change in setting is suppressed for as punching, and will occur only when a leading section of a ticket is presented to the rear or punching station and no ticket spans the two stations. In either case however the change, when made, will intervene between the time of printing at a print station and the time of punching at the punching station in the same cycle. Thus for either type of operation there is a constant relation between the settings of he numbering wheels and their corresponding interposers.

Thus when the first section of ticket material is delivered to the punching station, and the index wheels are in their "00000" setting, there will be an attempted printing at the printing station with the numerals "00000," but no ticket section there to receive this printing, then change in setting to "00001," and a punching of this indicia at the punching station. This punched ticket section will receive the printed "00001" in the next cycle at the printing station before the time for change in setting.

Control—In General

While the suppression of operation of the setting-changing means and inking means could be controlled either mainly or entirely mechanically, it is more convenient to employ a largely electrical form of control. One reason for this is that it is desirable for the ticket material to be sensed in the punching die during a period which includes both forward feed of the material and the printing up-and-down movement of the bed (both of which operations precede the setting change by only a small part of the cycle). These requirements are best met by a microswitch which can participate in the up and down movement of the bed and respond to the slight thickness of the ticket material if the latter is in the die either moving forward, stationary, or moving up and down. A further reason for a largely electrical form of control is that the largely electrical forms of control here shown will permit the control system's final decision as to whether to suppress setting change and inking to be made only a short time before the time when these operations are scheduled in the cycle, and yet let this decision be put into effect in due time, thereby permitting high speed operation of the machine as a whole.

Referring to FIGS. 11 and 12 a normally open microswitch **150** is mounted on the stripper plate **32** and is controlled by a plunger **151** which extends upwardly from a feeler element **152** resting on the lower die element **30***a* and slidable vertically within the upper die element **31**. Introduction of the ticket material into the punching station closes the microswitch **150**.

Control Circuit of FIG. 16.—In General

Referring to the wiring diagram of FIG. 16 the die sensing microswitch **150** closes the activating circuit of an automatic switch R–1 which controls the energization of both the ink solenoid **96** and the setting changing solenoid **146**.

As a result, before the first ticket section reaches the punching station and after the last ticket section of a run has left the punching station, there can be no inking or automatic change in setting. In any of the types of operation described below, no change in setting occurs and no inking occurs in any cycle in which a ticket section is not delivered to the punching station, because the opening of die sensing switch **150** and deenergization of the operating coil of automatic switch R–1 breaks the circuits to the ink solenoid **96** and the setting-changing solenoid **146**.

In the circuit of FIG. 16, selector switches **160***a* and **160***b* are separately shown for clarity of illustration of the circuit, but will normally be combined in the form of a double switch operated by a single knob, the dotted line extending between these indicating their mechanical connection. With this switch **160***a*, **160***b* set at "continuous" no automatic change in setting takes place. Set at "consecutive" the change takes place for each ticket sec-

tion. Set at "repeat" the change takes place as controlled by a switch **162** which is manually set to correspond with the number of ticket sections which are to be printed and punched with the same indicia, this number of ticket sections normally corresponding with the number of sections per ticket.

Repeat Operation With the Circuit of FIG. 16

With selector switch **160***a*, **160***b* set at "repeat" the action is as follows. Closing of the die sensing switch **150** energizes the actuating coil of automatic switch R–1 with the result of establishing a circuit from the line through contact 3 of automatic switch R–1 to the ink solenoid **96** and a stepping switch **165**, and a circuit from the line through contact 6 of automatic switch R–1, selector switch **160***a* and contact 4 of an automatic switch R–2 to the setting-changing solenoid **146**. The machine is thereby conditioned for inking and automatic change in setting.

The pin **141** is withdrawn by solenoid **146** from the path of the follower arm **140** of FIG. 13, allowing the drive pawl **110**, when rocked, to engage one or more of the index drive rings **102** to change the setting by one digit. This rocking of the pawl **110** and change of the setting occurs as the print wheels are rocked to inking position after the short printing stroke of the bed.

After the change in setting a switch **170**, operated by a cam **171** on the camshaft **50**, closes momentarily, thereby completing a circuit through the energizing coil of automatic switch R–2. Contact 4 of automatic switch R–2 is thereby opened and the setting-changing solenoid **146** deenergized. Additionally, contact 6 of this automatic switch is closed, establishing a holding circuit for automatic switch R–2 through contact 4 of an automatic switch R–3. The effect of holding circuit is that automatic switch R–2 remains energized, and since its contact 4 is held open, the setting-changing solenoid **146** remains deenergized after switch **170** opens.

As the switch **170** opens, a similar switch **175** driven by a cam **176** on shaft **50** closes, establishing a circuit from contact 3 of automatic switch R–2 to the actuating coil **177** of the stepping switch **165**. Referring to FIGS. 17A and 17C an impulse applied to the actuating coil **177** causes the coil to depress a pivoted armature **178** of the stepping switch which acts through a drive pawl **179** and ratchet wheel **180** to advance the stepping switch shaft **181** and contact arm **182** one step, i.e., to the first contact of the stepping switch, at which position it is held by a holding pawl **185**.

Successive impulses to the actuating coil **177** in successive cycles advance the stepping switch **165** from one contact to the next.

A resetting coil **191** when energized in any of the ways described below will depress an armature **192**, FIG. 17A, carrying an arm **192***a* overlying the tail of holding pawl **185**, to disengage the pawl **185** from the ratchet wheel **180** and allow the stepping switch to be reset to zero position by means of a coil spring **193**. One occasion at which this resetting coil may become energized is in the event of a misfeed and removal of the ticket material from the bed without completion of the last section of the last ticket. This energization of the resetting coil is through contact 5 of automatic switch R–1 and switch **189** in the closed position. Opening of the die sensing switch **150** when no ticket material is present at the die will deenergize the actuating coil of automatic switch R–1, allowing its contact 5 to close to energize the resetting coil **191**. Switch **189** is a microswitch that tends to assume an open position. As shown in FIGS. 17A and 17D switch **189** is mounted above the pivoted armature **192** and arm **192***a* of the resetting coil **191** so that when the armature is held down the switch **189** can assume its open position, and when the armature rises, away from the resetting coil **191**, switch **189** is closed. The resetting coil **191** when energized thus causes the switch **189** to open.

As indicated above when the resetting coil **191** depresses the armature **192**, the arm **192***a* removes the pawl **185** from the ratchet wheel **180**, this position being shown in FIG. 17B, allowing the switch **165** to assume its zero position. A detent **194**, pivoted at **194***a*, swings over the depressed arm **192***a* holding this down even after the resetting coil **191** becomes deenergized.

A continuous flow of current through the resetting coil **191** by way of automatic switch R–1 is prevented because the switch **189** remains open so long as the arm **192***a* is held down by the detent **194**.

Detent **194** has an arm extending into the downward path of the drive pawl **179**, and in the initial stroke of the drive pawl **179**, after a resetting of the switch to zero, pawl **179** swings the detent **194** clear of arm **192***a*, allowing this to rise, allowing the holding pawl **185** to become effective as in FIG. 17C, and causing the microswitch **189** to close.

The stepping switch **165** advances one step per cycle without closing any circuit until it reaches the step contact with which switch **162** is in circuit, shown in FIG. 16 as step contact No. 3. Thereupon the actuating coil of automatic switch R–3 is energized, closing a branch circuit through contact 6 of automatic switch R–3 and the resetting coil **191**. The stepping switch **165** thereupon returns to zero position and switch **189** opens. At the same time, contact 4 of automatic switch R–3 opens, breaking the holding circuit of automatic switch R–2, deenergizing the actuating coil of automatic switch R–2, allowing its contact 4 to close and reenergize the setting-changing solenoid **146**. In the next cycle the setting of the print wheels and interposers will be automatically changed.

It will be observed that the attainment by the stepping switch **165** of step contact 3 in this case has indicated that three successive ticket sections have been delivered to the punching station, there having been three closures of the cam operated switch **175** since the die sensing switch **150** has detected the first ticket section, so that since the tickets are assumed to have three sections each, the next ticket section to be delivered at the punching die will be a leading ticket section. Change of setting is prevented in the event of sections of the same ticket being printed and punched because at these times there have not yet been enough steps of movement of the stepping switch to reenergize the setting-changing solenoid.

Consecutive Operation With the Circuit of FIG. 16

For consecutive operation, selector switch **160***b* in an open position prevents automatic switch R–2 from being energized. The circuit to the setting-changing solenoid **146** through contact 4 of automatic switch R–2 remains uninterrupted so long as the die sensing switch **150** is closed and the actuating coil of automatic switch R–1 energized. A change in setting is accordingly made each time a ticket section is delivered to the punching station. Since contact 3 of automatic switch R–2 remains open, the stepping switch **165** does not operate.

Consecutive Operation With the Circuit of FIG. 16

For continuous operation selector switch **160***a* in an open position prevents the setting-changing solenoid **146** from being energized and no automatic changing of setting is made.

Control Circuit of FIG. 18

The control circuit of FIG. 16 can advantageously be replaced by the control circuit of FIG. 18 which forms a part of the subject matter of the said patent application of Arnold R. Bone filed concurrently herewith.

In employing the control circuit of FIG. 18 the switch **162**, the stepping switch **165** and its resetting means, the cam operated switchs **170** and **175** and the automatic switch R–3 of FIG. 16 are eliminated, the automatic switches corresponding to R–1 and R–2 of FIG. 16 are

simplified to single pole automatic switches, and the control of the repeat operation involves use of additional sensing means.

In this control circuit of FIG. 18 the die sensing switch **150** actuates an automatic switch R–1*a* which energizes the ink solenoid **96** in a manner similar to the circuit of FIG. 16. Also similarly to the circuit of FIG. 16, energization of automatic switch R–1*a* is a condition to the energization of the setting-changing solenoid **146**. Thus no setting change or inking occurs until the leading section of ticket material is delivered into the punching die.

A selector switch **160***c* may be manually set at either of its consecutive or repeat positions, or in an intermediate open position which causes continuous operation with no setting change.

Repeat Operation With the Circuit of FIG. 18

In repeat operation, energization of the setting-changing solenoid is secured through a circuit which includes automatic switch R–1*a* when energized, switch **160***c* in the repeat position and an automatic switch R–2*a* when energized.

With the die sensing switch **150** closed and the operating coil of automatic switch R–1*a* accordingly energized, a circuit is established through contact 6 of automatic switch R–1*a* and the primary of a transformer **200**. The actuating coil of automatic switch R–2*a* is in a circuit which includes the secondary of the transformer and also a sensing brush **201** consisting of a bundle of wires located at the printing station in a position to penetrate a sensing hole in a last or trailing section of a ticket at the printing station, to make electrical contact with a stationary contact plate **202** (FIGS. 19 and 20). This contact is prevented by ticket material at the area on which the end of the brush rests.

Such a sensing hole is indicated at **203** in the last or trailing sections of the tickets shown in FIG. 14 as printed and punched by repeat operation.

Then either if no ticket section occupies the printing station or if a last or trailing ticket section having a sensing hole occupies the printing station, automatic switch R–2*a* will be actuated and the setting-changing solenoid **146** will be actuated, provided of course that automatic switch R–1*a* is actuated by the die sensing switch being closed. Change of setting is prevented in the event of sections of the same ticket being printed and punched because under these conditions a section lacking a sensing hole is present at the printing station and the setting-changing selonoid **146** remains deenergized.

The sensing brush **201** need not necessarily be located at the printing station but may be at one step of feed in rear thereof. The brush **201** could, in theory, be located at the punching station in which case the sensing hole **203** would be in the leading instead of the trailing section of each ticket. The sensing of a hole **203** would again indicate that the same ticket did not span the two stations.

Preferably the sensing brush penetrates the sensing hole and makes contact with the contact plate **202** in a deenergized condition, is energized only after the feeding stroke is completed, and is again deenergized shortly after the change in setting is completed. This may be accomplished by insertion in the circuit to the brush **201** of a normally-open switch **170***a* operated by a cam on cam shaft **50** in a manner similar to the switches **170** and **175** of the circuit of FIG. 16. This cam-operated switch **170***a* is held closed by its cam during the part of the cycle in which brush **201** is to be energized as indicated above.

Consecutive Operation With the Circuit of FIG. 18

When the selector switch **160***c* is set for "consecutive" the transformer **200**, sensing brush **201** and automatic switch R–2*a* are continuously deenergized and the setting-changing solenoid **146** is controlled solely by the die sensing switch **150** and automatic switch R–1*a*. In this operation an automatic change in setting is made in each cycle at which a ticket section is delivered to the punching station.

Continuous Operation With the Circuit of FIG. 18

When the selector switch **160***c* is left in an intermediate open position the setting-changing solenoid **146** is deenergized, no automatic change in setting takes place and all ticket sections are punched and printed with identical indicia.

Timing Diagram

In the timing diagram of FIG. 21 the timing of the setting-change and inking, movement of the bed, feed of ticket material, and initial closure of the die sensing switch **150** are the same regardless of whether the FIG. 16 or FIG. 18 control circuit is used. As evident from the descriptions of these circuits, the two cam driven switches **170** and **175** are used with the circuit of FIG. 16 but not with that of FIG. 18, and the sensing brush **201** and cam driven switch **170***a* are used with the circuit of FIG. 18 but not with that of FIG. 16.

It may be seen that the die sensing switch **150** is initially closed by the leading ticket section of a batch at the 10° point of the cycle. This switch would of course remain closed as long as ticket material is at the switch. The feed of ticket material continues to 65° and the printing occurs at 90°.

The swinging of the bank of print wheels to inking position takes place from 115° to 170° and it is during this swinging movement to inking position that the change in setting can occur. With the print wheels still in inking position punching occurs near the 270° position.

Then, with the circuit of FIG. 16 cam operated switch **170** closes, which with repeat operation will deenergize the setting-changing solenoid **146**. The setting-changing solenoid remains deenergized until the stepping switch **165** attains the contact which is in circuit with switch **162**.

Finally cam operated switch **175** closes, which in repeat operation actuates the stepping switch. In the cycle in which the stepping switch attains the contact which is in circuit with switch **162** the setting-changing solenoid is reenergized, making the device ready for a change in setting in the next cycle.

With the circuit of FIG. 18, provided the die sensing switch **150** is closed by ticket material at the punching station, and if the ticket section delivered to the printing station has a sensing hole or if no ticket section is delivered to the printing station, the circuit through sensing brush **201** will be closed from about 75° to about 170° under control of cam-driven switch **170***a*, and the change in setting will take place between 115° and 170°.

Inking Control

It can be seen that with either the control circuit of FIG. 16 or the control circuit of FIG. 10 there is no inking of the print wheels in any cycle in which a ticket section is not delivered to the die sensing switch or detector **150**. Since, as explained in connection with the timing diagram, the time for inking follows the time for printing in any cycle, the print wheels are left uninked at the end of the cycle in which they have printed the last section of the procession of ticket material. The print wheels are not further inked in any of the cycles in which the machine is run to clear it of printed and punched ticket material. In the next run, the print wheels are not inked in any cycle preceding delivery of the first section of ticket material to the sensing switch **150**. During the printing stroke of the bed in this cycle in which the first section of ticket material is delivered to the sensing switch **150**, the print wheels are still in uninked condition, and only receive ink after the attempted printing at the empty printing station and the subsequent automatic change in setting in this cycle. Thus the printing wheels

do not operate in inked condition except in cycles in which a ticket section receives a printing impression.

We claim:

1. In an indicia-applying machine, two indicia-applying devices having changeable settings and interconnected in fixed relation as to their respective settings to apply corresponding indicia at respective rear and forward stations, means for effecting operations of said devices, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of the operation of the machine including operations of the devices at the two said stations, an operation of the device at the rear station following operation of the device at the forward station in such cycle, and means for automatically changing the settings of said devices in between the so related operations.

2. In an indicia-applying machine, two indicia-applying devices having changeable settings and interconnected in fixed relation as to their respective settings to apply corresponding indicia at respective rear and forward stations, means for effecting operations of said devices, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of the operation of the machine including operations of the devices at the two said stations, an operation of the device at the rear station following operation of the device at the forward station in such cycle, means for automatically changing the settings of said devices in between the so related operations, and means conditioning the operation of the setting-changing means upon the presence of a ticket section at the rear station.

3. In a printing and punching machine a printing device including printing elements at a printing station and a punching device including punching elements at a punching station, one of said stations being a rear and the other being a forward station, interposers controlling the punching elements, connections between the printing elements and the interposers such that the settings of the printing elements and the interposers correspond, feeding means for delivering ticket material to said stations with a step by step movement, a cycle of operation of the machine including operations of the devices at the two said stations, an operation of the device at the rear station following an operation of the device at the forward station in such cycle, and means for automatically changing the settings of the printing elements and interposers in between the so related operations.

4. In a printing and punching machine a printing device including printing elements at a printing station and a punching device including punching elements at a punching station, one of said stations being a rear and the other being a forward station, interposers controlling the punching elements, connections between the printing elements and the interposers such that the settings of the printing elements and the interposers correspond, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of operation of the machine including operations of the devices at the two said stations, an operation of the device at the rear station following an operation of the device at the forward station in such cycle, means for automatically changing the settings of the printing elements and interposers in between the so related operations, and means conditioning the operation of the setting-changing means upon the presence of a ticket section at the rear station.

5. In an indicia-applying machine, two indicia-applying devices having changeable settings and interconnected in fixed relation as to their respective settings to apply corresponding indicia at successive stations, means for advancing sectional ticket material step by step, means for effecting operation of the device at the forward said station without effecting the corresponding operation of the device at the rearward said station, means for effecting operation of the device at the rearward said station without effecting the corresponding operation of the device at the forward station, and means for automatically changing the setting of both said devices after such operation at the forward station but before such operation at the rearward station.

6. An indicia-applying machine as claimed in claim 5 in which the two devices are printing and punching devices respectively, located next to each other at adjoining positions in the advance step-by-step of the ticket material.

7. An indicia-applying machine as claimed in claim 5 in which the two devices are printing and punching devices respectively, located next to each other at adjoining positions in the advance step-by-step of the ticket material, the punching device being the device at the rear station and the printing device being the device at the forward station.

8. In an indicia-applying machine, two indicia-applying devices having changeable settings and interconnected in fixed relation as to their respective settings to apply corresponding indicia at successive stations, means for advancing sectional ticket material in a procession step by step to both stations, said stations being located next to each other at adjoining positions in the step by step advance of the ticket material, means for effecting operation of the forward device and then operation of the rearward device, means for automatically changing the settings of both devices in between said operations in a given cycle, and means for preventing the change in setting after operation of the forward device upon the last ticket section of the procession.

9. In an indicia-applying machine, two indicia-applying devices having changeable settings and interconnected to apply corresponding indicia at respective rear and forward stations, means for effecting operations of said devices, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of the operation of the machine including operations of the devices at the devices at the two said stations, an operation of the device at the rear station following operation of the device at the forward station in such cycle, and means for automatically changing the settings of said devices in between the so related operations in those cycles in which a leading section of a ticket receives the operation of the device at the rearward station while avoiding changing the settings in other cycles.

10. In an indicia-applying machine, two indicia-applying devices having changeable settings and interconnected to apply corresponding indicia at respective rear and forward stations, means for effecting operations of said devices, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of the operation of the machine including operations of the devices at the two said stations, an operation of the device at the rear station following operation of the device at the forward station in such cycle, setting-changing means tending at each cycle to change the settings of said devices in between the so related operations in such cycle, and means for disabling the setting-changing means in cycles other than those in which the leading section of a ticket receives the operation of the rearward station.

11. In an indicia-applying machine, two indicia-applying devices having changeable settings and interconnected to apply corresponding indicia at respective rear and forward stations, means for effecting operations of said devices, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of the operation of the machine including operations of the devices at the two said stations, an operation of the device at the rear station following operation of the device at the forward station in such cycle, and means for automatically changing the settings of said devices in between the so related operations in such cycle, means for disabling the setting-changing means in cycles in which the same ticket spans the forward and rear stations, and means for

disabling the setting-changing means in cycles in which no ticket section is present at the rear station.

12. An indicia-applying machine as claimed in claim 11 including manually settable means for avoiding the first-mentioned disabling action while retaining the second-mentioned disabling action, for converting the machine to consecutive operation in which the setting is changed in consecutive cycles.

13. In a printing and punching machine a printing device including printing elements at a printing station and a punching device including punching elements at a punching station, one of said stations being a rear and the other being a forward station, interposers controlling the punching elements, connections between the printing elements and the interposers such that the settings of the printing elements and the interposers correspond, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of operation of the machine including operations of the devices at the two said stations, an operation of the device at the rear station following an operation of the device at the forward station in such cycle, and means for automatically changing the settings of the printing elements and interposers in between the so related operations in those cycle in which a leading section of a ticket receives the operation of the device at the rearward station while avoiding changing the settings in other cycles.

14. In a printing and punching machine a printing device including printing elements at a printing station and a puching device including punching elements at a punching station, one of said stations being a rear and the other being a forward station, interposers controlling the punching elements, connections between the printing elements and the interposers such that the settings of the printing elements and the interposers correspond, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of operation of the machine including operations of the devices at the two said stations, an operation of the device at the rear station following an operation of the device at the forward station in such cycle, setting-changing means tending at each cycle to change the settings of the printing elements and interposers in between operation of the printing elements and operation of the punching elements in such cycle, and means for disabling the setting-changing means in cycles other than those in which a leading section of a ticket receives the operation of the rearward station.

15. In a printing and punching machine, a printing device including printing elements at a printing station and a punching device including punching elements at a punching station, one of said stations being a rear and the other being a forward station, interposers controlling the punching elements, connections between the printing elements and the interposers such that the settings of the printing elements and the interposers correspond, feeding means for delivering ticket material to said stations with a step-by-step movement, means for inking the printing elements, a cycle of the operation of the machine including operations of the devices at the two stations including inking of the printing elements, an operation of the device at the rear station following operation of the device at the forward station in such cycle, and means for automatically changing the settings of the printing elements and interposers in between said operations at the two stations, means for detecting ticket material, means conditioning the operation of the setting-changing means and inking means upon detection of ticket material by said detecting means additionally conditioning the setting-changing means for operation only in those cycles in which a leading section of a ticket receives the operation of the device at the rearward station.

16. In an indicia-applying machine, a printing device including printing elements at a printing station, means for inking the printing elements, feeding means for delivering sectional ticket material to the printing station with a step-by-step movement in which a step corresponds to the length of a ticket section, a punching device at a punching station one step of movement in rear of the printing station, a cycle of operation of the machine including a step of advance of the ticket material, then printing operation of the printing device, then inking of the printing elements, a detector of ticket material at said punching station one step of movement in rear of the printing station, means for automatically changing the settings of both devices and means for preventing inking in those cycles in which a ticket section is not moved to the detector, whereby operations of the printing device are in an uninked condition in cycles preceding printing on the first section of ticket material and following printing on the last section of ticket material of a run, said detector also controlling the setting-changing mechanism to prevent change in setting of both devices in such cycles in which inking is prevented.

17. In an indicia-applying machine, two indicia-applying devices having changeable settings and interconnected to apply corresponding indicia at successive stations, means for advancing sectional ticket material step by step to said indicia-applying devices, means for automatically changing the setting of said devices in between operations of the respective devices, electromagnetic means for enabling the setting-changing means to operate, a sensing switch responsive to the portions of ticket material at the rear one of said stations, and a circuit controlled by said sensing switch and controlling said electromagnetic means to avoid change of setting upon absence of a ticket section at said rear station.

18. An indicia-applying machine as claimed in claim 17 including a first automatic switch controlled by the sensing switch and controlling the electromagnetic means, a second automatic switch also controlling the electromagnetic means, and means for operating the second automatic switch to cause the electromagnetic means to avoid change in setting in the event of operations of the two indicia-applying devices upon sections of the same ticket which spans the two stations.

19. An indicia-applying machine as claimed in claim 17 including a first automatic switch controlled by the sensing switch and controlling the electromagnetic means, a second automatic switch also controlling the electromagnetic means, means for operating the second automatic switch to cause the electromagnetic means to avoid change in setting in the event of operations of the two indicia-applying devices upon sections of the same ticket which spans the two stations, and switching means for rendering the second automatic switch ineffective to cause the electromagnetic means to avoid change in setting.

20. In a printing and punching machine, a printing device including printing elements at a printing station and a punching device including punching elements at a punching station, the punching station being in rear of the printing station, interposers controlling the punching elements, connections between the printing elements and the interposers such that the settings of the printing elements and the interposers correspond, feeding means for delivering ticket material to said stations with a step-by-step movement, a cycle of the operation of the machine including operations of the devices at the two stations including inking of the printing elements, a punching operation of the device at the rear station following a printing operation of the device at the forward station in such cycle, means for automatically changing the settings of the printing elements and interposers in between the so related printing and punching operations, electromagnetic means for enabling the setting-changing means to operate, electromagnetic means for enabling the inking means to operate, a sensing switch sensing the presence of ticket material at the punching station, and a circuit controlled by said sensing switch and controlling both said electromagnetic means to avoid both change in setting and ink-

ing upon absence of a ticket section at the punching station.

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