

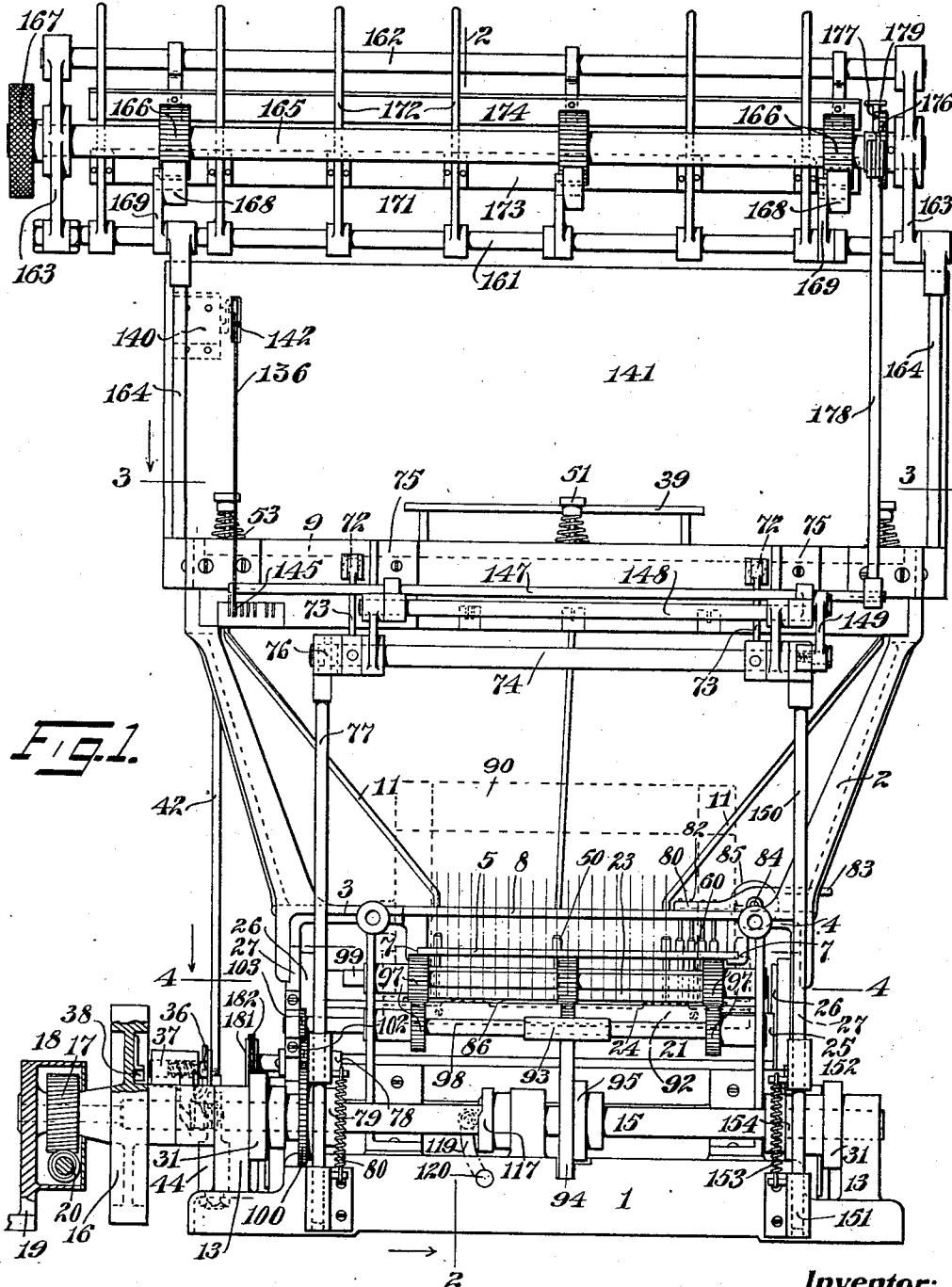
J. POWERS.
PERFORATING MACHINE.

APPLICATION FILED SEPT. 25, 1908. RENEWED OCT. 15, 1910.

992,246.

Patented May 16, 1911.

4 SHEETS-SHEET 1.



Witnesses:

G. G. Fuss,
H. D. Penny

Inventor:

James Powers;
By his Attorney,
F. H. Richards.

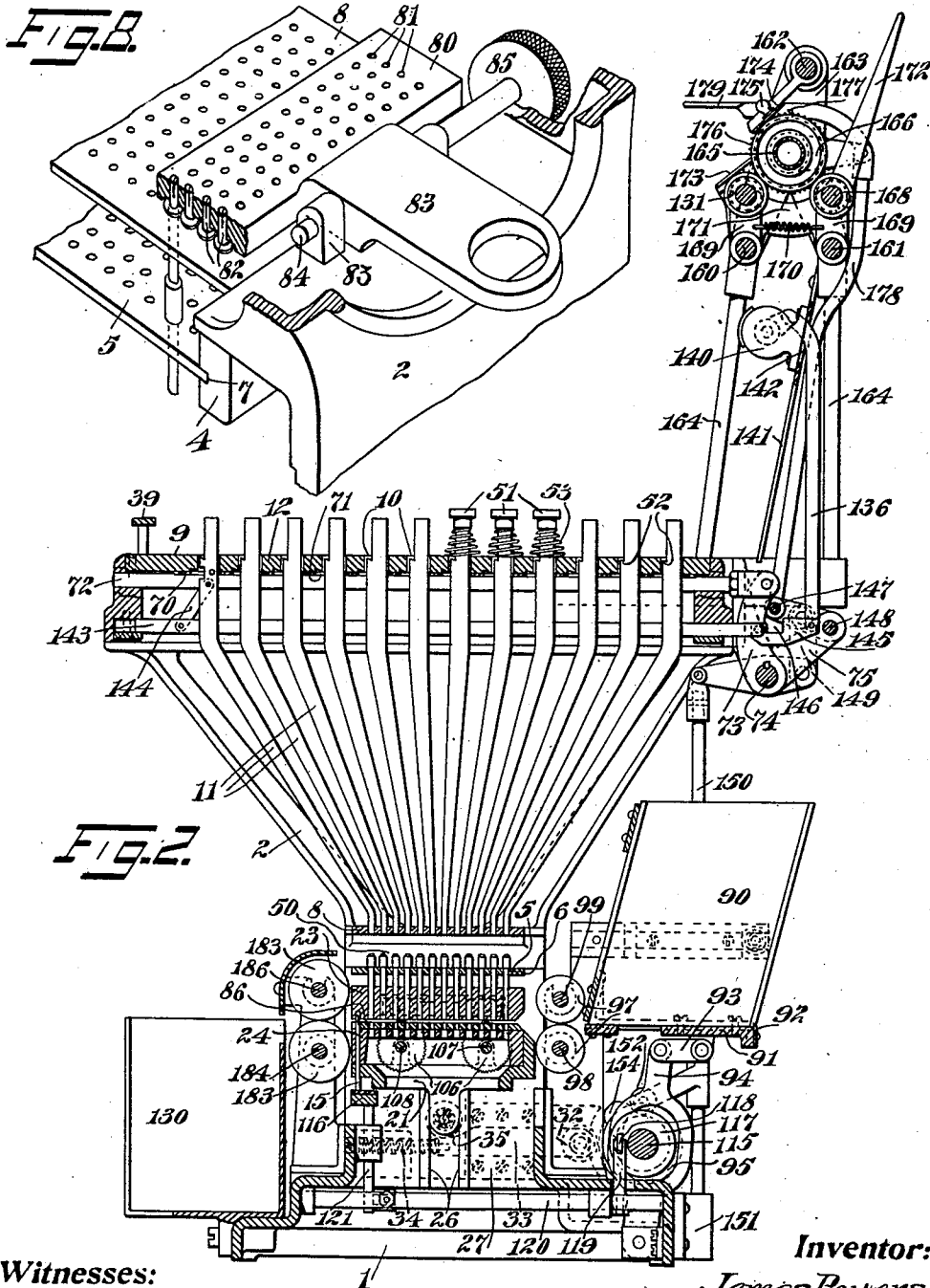
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 4.

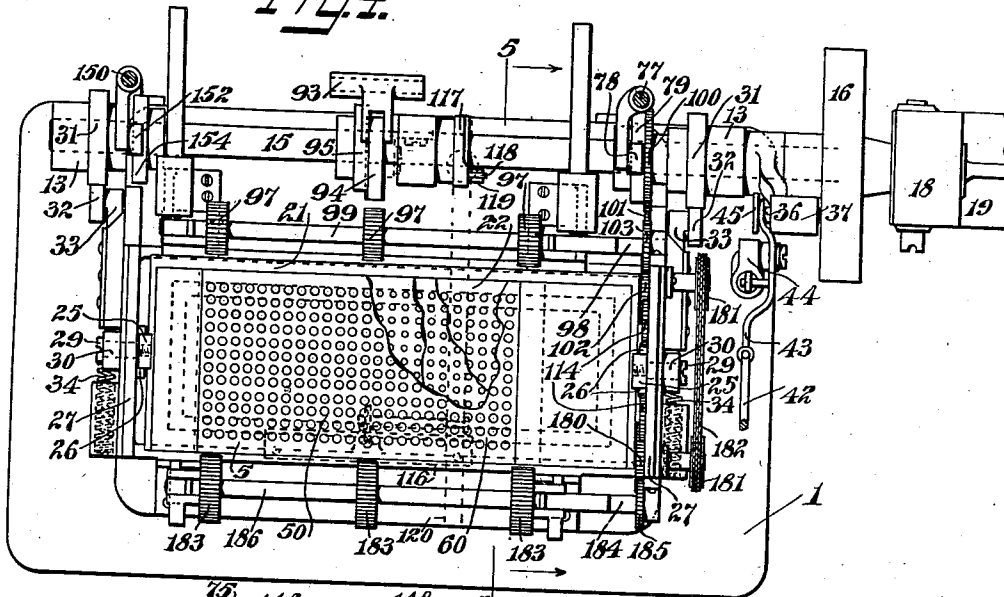
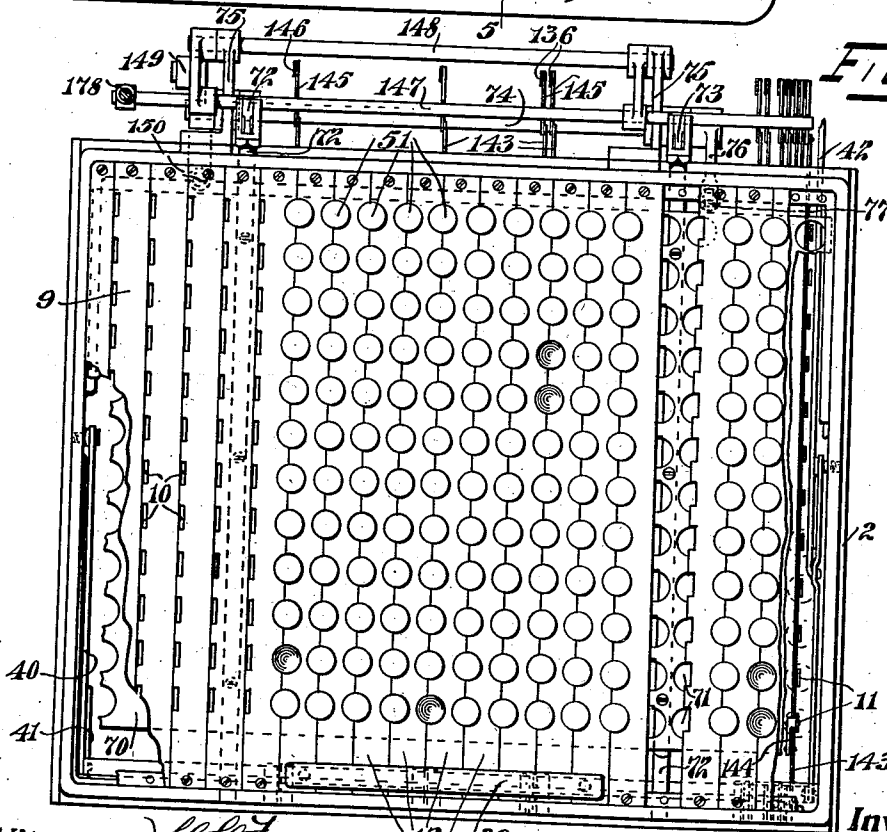


Fig. 3.



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H. D. Penney

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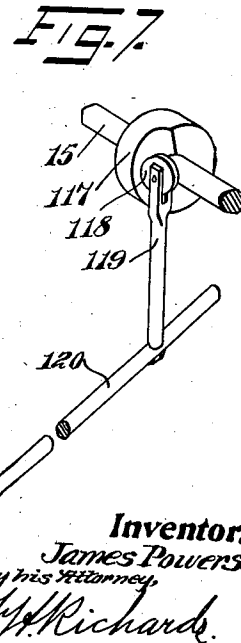
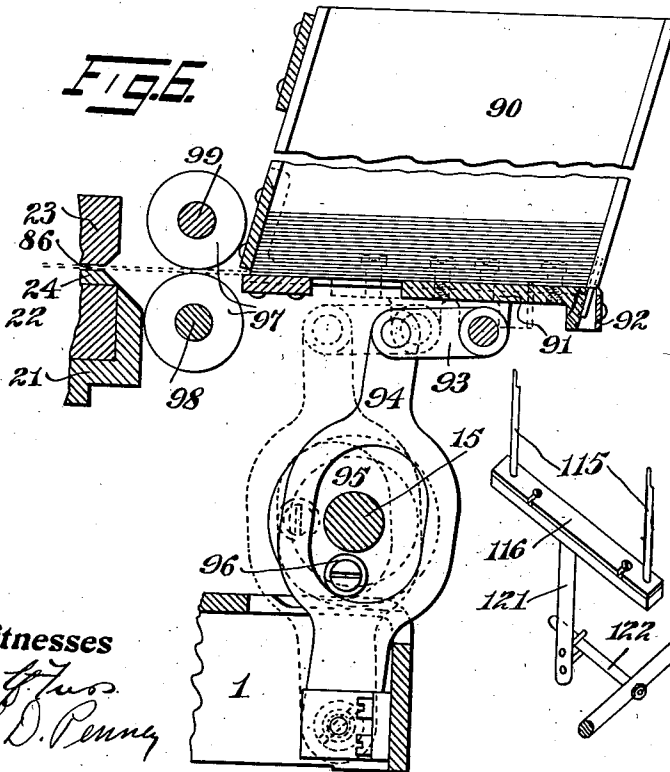
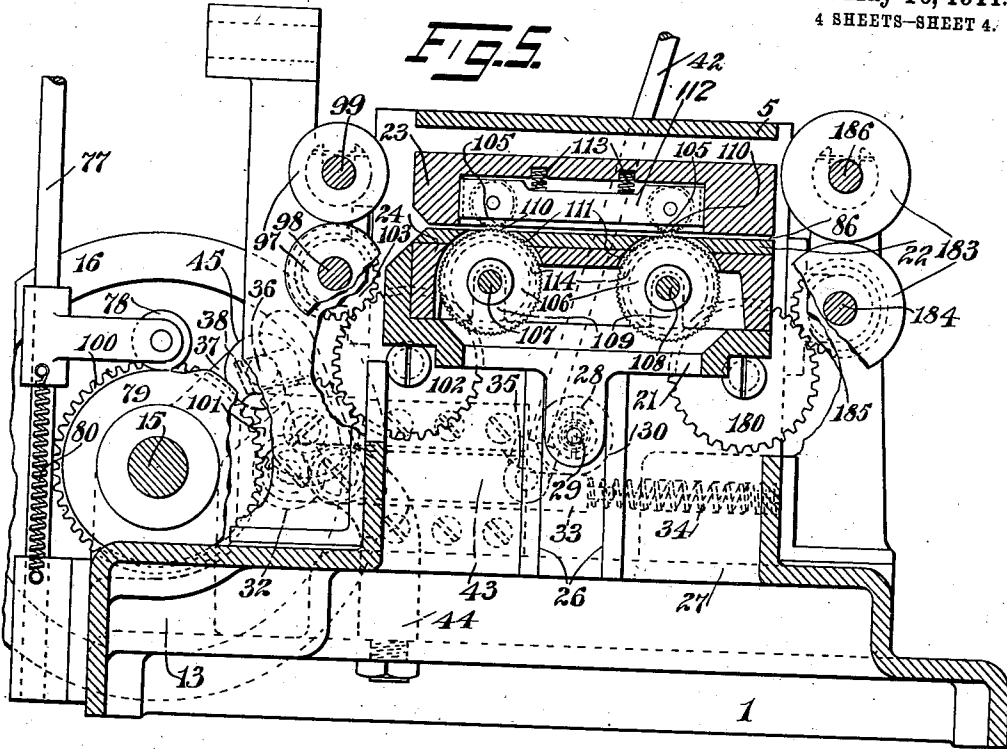
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4 SHEETS-SHEET 4.



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UNITED STATES PATENT OFFICE.

JAMES POWERS, OF WASHINGTON, DISTRICT OF COLUMBIA.

PERFORATING-MACHINE.

992,246.

Specification of Letters Patent.

Patented May 16, 1911.

Application filed September 25, 1908, Serial No. 454,749. Renewed October 15, 1910. Serial No. 587,312.

To all whom it may concern:

Be it known that I, JAMES POWERS, a citizen of the United States, residing in Washington, in the District of Columbia, have invented certain new and useful Improvements in Perforating-Machines, of which the following is a specification.

This invention relates to perforating or punching machines, the present improvement relating more particularly, however, to that class of machines designed for punching census and other like forms of cards, it being an improvement in part upon the improved machine shown and described in my contemporaneously pending application, Serial No. 425,831, filed April 8, 1908, the object of the present invention being to provide an improved power-driven perforating machine in which the cards or other blanks are automatically fed to and from the punching mechanism.

A further object of the invention is the provision of an improved machine in which the several mechanisms,—by means of which all the perforations in the cards may be made at one time and the operator given an opportunity to determine prior to the making of such perforations whether or not the card will be properly punched to accord with the facts to be indicated, and also the perforations made in a series of cards counted up and readily ascertained,—are somewhat modified and improved.

A further object of the invention is the provision of an improved means for punching the classifying perforations in the cards.

A further object of the invention is the provision, in connection with the present improvement, of an improved schedule feeder or copy holder automatically driven from the same source of power that operates the other mechanisms of the machine.

In the present machine, aside from improvements made in the several mechanisms set forth and described in my prior application, one of the main improved features resides in the means for feeding the cards or blanks to and from the punching mechanism. In my prior machine, the cards were individually placed in a carrier by the operator, the carrier then manually pushed into position and, after being punched, were returned to their original position by the manual release of a lever, all of which required time. In the present instance, however, a bundle of cards or other blanks is

placed in a suitable receptacle therefor and the cards automatically selected and fed one at a time to the punching mechanism and therefrom into a suitable receptacle, whence they are removed in piles, the operator in the present instance having nothing whatever to do with the feeding of the cards except to place them in stacks or piles in one receptacle and remove them in like manner from the other, so that the entire time of the operator may be devoted to the operation of the keys which set and lock the punches of the punching mechanism.

In the drawings accompanying and forming part of this specification, Figure 1 is a rear view of this improved machine; Fig. 2 is a vertical cross sectional view taken in line 2—2, Fig. 1, looking in the direction of the arrows; Fig. 3 is a horizontal cross sectional view taken in line 3—3, Fig. 1, looking in the direction of the arrows; Fig. 4 is a horizontal cross sectional view taken in line 4—4, Fig. 1, looking in the direction of the arrows, part of the perforated plates constituting part of the punching mechanism being broken away; Fig. 5 is a vertical cross sectional view taken in line 5—5, Fig. 4, looking in the direction of the arrows; Fig. 6 is a detail sectional view of one part of the card feeding means; Fig. 7 is a detail view of another part thereof; and Fig. 8 is a perspective view of the removable gang punching means used to classify the cards.

Similar characters of reference indicate corresponding parts throughout the different figures of the drawings.

The present improvement comprises in a general way, punch-selecting means or what may be properly designated key mechanism for determining the particular punch or punches to be used and for locking that punch or punches in position to properly perform the required work, punching means for perforating the card, means connected with part of the mechanism and shown herein connected with the keys for registering or counting up certain of the items punched, means, designated as gang punching means and which in the present instance is removable independently of the main punching mechanism, for punching certain items on the card so that all cards of a certain series may be punched alike, whereby the cards may be readily classified, for automatically releasing all of the punch-selecting keys thereby to permit them to re-

turn to their normal position, means for automatically feeding the cards to and from the punching mechanism, and a schedule or copy feeding means for the schedule in accordance with which the cards are to be punched; all of which means or mechanisms are, in the present embodiment of the machine and after the keys have been individually selected and operated in accordance with the items to be punched, thrown into operation by the shifting of a single lever or key by the operator. Thus, the present improvement comprises generally an improved mechanism in which the items to be punched may be successively selected before any one item is punched, and then all of such items punched simultaneously in the card on the operation of a single lever, and in which certain items so punched may all be counted or registered, and in addition, the card be automatically fed to and carried away from the punching mechanism, and also as a new card is brought into position the schedule or copy actuated or fed so that the new card may be perforated in accordance with such schedule, all operated by power-driven means.

In the present embodiment of this machine it is shown particularly adapted for use with that form of card usually used in connection with the census, although it is to be understood that the machine in the present or in a somewhat modified form thereof may be used for various purposes. In the preferred form shown, suitable frame work is provided for the support of the several mechanisms hereinafter described. This frame work is shown comprising a suitable base 1 supporting what may be designated as a basket frame 2, this latter comprising a lower supporting portion consisting of a pair of inwardly extending brackets 3 and 4 for carrying the punch-supporting plate 5. This plate has a series of perforations 6, one for each punch. This plate is supported at its ends by grooves 7 formed in the inwardly extending brackets 3 and 4, whereby it may be, together with the punches carried thereby, shifted into and out of position. Above this punch-supporting plate 5 is located a similarly formed plate 8 having a corresponding number of perforations for the reception of the lower ends of the key-levers hereinafter described. Secured to the top of the basket frame is a top plate or platform 9 having openings 10 therethrough, one for each of the key-levers 11, these openings in the present instance being shown as elongated slots. This top plate is made up of a number of bars 12, each cut out along its edge to form the key-openings referred to, the bars being fastened at their ends to the top of the basket frame.

Secured to the base is a pair of brackets 13 having sleeves 14 for the reception of the

driving shaft 15. Mounted loosely on this driving shaft is a driving pulley 16, which is continuously rotated from any suitable source of power. In the present instance this pulley is rotated by means of worm gearing 17 suitably housed, as at 18, the housing bracket 19 preferably being of a form which will permit it to be attached to the table or other suitable support on which the machine may be mounted. The worm 20 of this worm gearing is of a form which will enable it to be attached to a suitable motor shaft.

Supported below the punch-carrying plate 5 and on the base of the frame work is a die-carrying support comprising a suitable frame 21 carrying the die 22. This die-carrying frame or support 21 is provided at its ends with guides 25 adapted to slide in guideways 26 located on the inner side of the side walls 27 of the base. Projecting from the guides 25 and through elongated slots 28 in these side walls 27 is a pair of studs 29. On the outer ends of these studs are fixed rolls 30.

For shifting the die-carrying support toward and from the dies suitable means is provided, which is an improvement upon that shown and described in my prior application, as it is not only much simpler in construction, but is much quicker in operation. This means comprises in the present instance, a pair of cams 31 fixed to the driving shaft 15 in position to engage a pair of rollers 32 carried one by each of a pair of cam slides 35 working in suitable bearings of the base. Each of these cam slides is held in engagement with its cam on the driving shaft by a suitable spring 34, and each slide is provided with a cam surface 35 engaging with the roller carried by the guide of the die-carrying support, whereupon when the slides are shifted in one direction, as forward, the die-carrying support will be lifted and when the slide, through the medium of its spring, is shifted backward or returned to its normal position, the die-carrying support will be lowered away from the punches. The shifting of the die-carrying support, however, only occurs when the constantly rotating driving wheel hereinbefore referred to is connected or clutched to the driving shaft, and to secure this result I use substantially the same means as that shown and described in my prior application, although the details thereof are somewhat modified. This connecting means consists of a shiftable pin 36 rotatable with an arm 37 fixedly secured to the driving shaft. The pin is spring actuated so as to move outwardly into position to be engaged by a projection 38 on the driving wheel. This clutch connection between the driving wheel and its shaft is controlled by a member which in the present instance is in the form of a thumb

bar 39 located in front of the keys. This bar is carried by a lever frame 40 pivoted adjacent to the upper end of the basket frame, a suitable spring 41 being used to return the bar to its normal position. This lever frame is connected by a rod 42 with a pin shifting member or lever 43 pivoted to a suitable bracket 44 on the base of the machine. One arm of this lever 43 is held in position by a spring, (not shown), to engage the head 45 of the shiftable pin and hold it out of contact with the driving wheel. On the depression of the thumb-bar 39, however, the lever will be shifted, thereby to release the head of the shiftable pin and permit the latter to be shifted by its spring into position to engage the stud on the driving wheel, thus connecting up the same with its shaft so as to rotate the same and actuate the die-carrying support in the manner hereinbefore stated, that is to say, the rotation of the driving wheel will rotate, through the medium of this connecting pin and its arm, the shaft thereby to raise and lower the die-carrying frame. The head of the shiftable pin as it completes its rotation is engaged by said lever 43, which is bent to form a cam surface thereby to retract the pin and shift it away from the driving wheel stud.

The punching mechanism in the present improvement is similar to that set forth in my prior application, and comprises a series of punches arranged in two sets, one set comprising the main set consisting of a series of punches 50, only some of which are shown in Fig. 1, corresponding in number with the number of actuating keys or punch-selecting devices, and the other set comprising the gang or classifying punches 60 consisting of the desired number of punches for classifying the cards. These latter punches are not under the control of the keys. These two sets of punches and the perforated plates of the die-carrying member constitute the male and female die forming the card punching or perforating means for forming the perforations in the cards. Both sets of punches 50 and 60 are shown formed as headed pins having suitably formed punching ends and are supported by the plate 5, through the openings of which the punches extend, the heads resting upon such plate. Each of the key-levers 11 which select and lock the punches 50 of the main set in their punching position is provided with a suitable finger-piece or cap 51 carrying the designating character thereon, and which, of course, can be readily changed by the substitution of one for another at any time. Each of the key-levers 11, corresponding in number as hereinbefore stated with the number of punches that make up the main set, is provided with an offset 52 and is maintained in its normal position by means of a spiral spring 53, in this in-

stance located above the top plate, each spring being operative when its key is depressed to pull or shift the key into such position that the offset of the key will come under the underside of the platform or top plate 9 and thus be held down in its punch-locking position. In other words, as each key is depressed against the tension of its spring the spring will act to shift the key so that the offset thereon will lock the key in such depressed position with the lower end thereof in juxtaposition to its particular punch, thereby to prevent the upward movement of the punch. When the desired number of keys have been thus manipulated and the punches of the set 50 locked against separate movement, it will be observed that if the die is shifted upward with the card to be punched those punches which are locked in position will perforate the card, while those punches not locked in position will be shifted upward in the punch-carrying plate 5 by the card as the weight of such punches is not sufficient to perforate the card. After the desired keys have been manipulated to thus select the proper punches and lock them in position to perforate the card, the operator may then, by an examination of the depressed keys, immediately determine whether the proper keys have been depressed. If one or more are incorrectly depressed a mere touch will release them from their locked position. This being determined, the operator will then actuate the thumb bar 39, whereupon the shiftable pin 36 will be released and connection be made between the same and the constantly rotating driving wheel to thereby rotate the driving shaft and shift the die and its card upward into engagement with the key-locked punches, whereupon the card will be perforated by those punches which are locked against movement by the keys. After the card is properly punched in the manner just described, the die, together with the card is lowered away from the punches and the keys all released and returned by the action of the springs to their normal position, while the punches remain hanging in the plate 5.

The releasing of the keys is obtained in the present organization by suitable key-releasing means substantially similar to that shown and described in my prior application, except that instead of being located on the top of the platform 9 of the machine it is located underneath the same. It comprises a shiftable or sliding plate 70 provided with suitable openings 71 for the passage of the key-levers 11 therethrough. This plate is suitably guided under the platform 9 and is connected with the power driven shaft by a pair of rods 72 connected to the key-shifting plate 70. These rods at their rear ends are connected by links 73

with a rock shaft 74 supported in brackets 75 attached to the frame work. One end of this rock shaft 74 is provided with an arm 76 to which the upper end of a rod 77, mounted to slide in sleeves on the base, is attached. This sliding rod 77 is provided with a roll 78 held in engagement with a cam 79 carried by the driving shaft by means of a spring, whereby, at the proper time, as the shaft rotates this sliding rod 77 will move upward to shift the rock shaft and thereby shift the key-releasing plate and release the keys from their depressed positions, this occurring after the punching of the card.

In a machine of this character it is necessary that all of the cards of a series shall be punched at one or more places alike, that is to say, if the population and its characteristics of a particular locality are being recorded, then all of the cards for that locality should be classified in such a manner that should any one or more of the cards get out of place it can be readily determined to what locality it belongs. Prior to my before mentioned improvement this has been done subsequent to the main punching of the cards by means of an independent punching apparatus, a series of cards being usually punched at the same time, so that should the operator drop a card on the floor, or otherwise misplace the same prior to its being punched to indicate to what class it belonged, there has been no means of ascertaining to what locality the card belonged and to what class or series of cards it should be returned. To do away with the above mentioned serious disadvantages I provided means whereby, independently of the main set of punches, the card will also be punched to indicate to which class it belongs. This I accomplished by the provision of a separate gang of punches 60 not under the control of the keys, as hereinbefore stated. In my prior machine, however, whenever these punches required resetting, which was frequent, it necessitated the removal of the plate 5 carrying both sets of punches, and as the punches were loosely hung in the plate it followed that if by any accident the plate was dropped by the operator or tilted and the punches fell out considerable loss of time resulted in replacing them, thus necessitating a very careful handling of the plate to avoid such accidents. In order to do away with these disadvantages, the present machine is so constructed that it avoids the necessity of removing the punch-carrying plate 5 at any time.

In my prior machine the overhanging part 60 of the bracket 4 was in juxtaposition to the heads of these gang punches in order to prevent the upward movement of the particular punches which were in position. But, as stated, in order to change the punches

of this set it necessitated the removal of the punches of both sets. In the present machine, instead of utilizing the overhanging part of the bracket to prevent the upward movement of the punches of the particular set under consideration, I provide a removable locking member or plate 80 for locking the punches 60 in position in a similar manner to that in which the punches of the other set 50 are locked in position by the keys. This plate, (see Fig. 8), is provided with a series of perforations 81 corresponding in number with the punches of this gang 60. The punches of this set are shown somewhat longer than the punches of the main set, being hung, however, upon the same punch-carrying plate 5, so that their upper ends will be immediately under the perforated plate 8 which guides the lower ends of the key-levers.

In my prior machine, only the punches which were to be used each time a certain set of cards was to be punched could be placed in position, but in the present instance, the entire gang of punches may be set in the punch-carrying plate 5, since those punches which are not locked will be raised by the card and their upper ends pass into the openings of the plate 8 and thus not punch the card, while the particular punches which are to be utilized for punching the card will be prevented from being raised by the card by means of the locking member 80 referred to, and for this purpose this member, as stated, is provided with a series of perforations 81. Short studs or pins 82, which may be readily fastened in position when the member 80 is removed, are carried by this plate 80 with the heads thereof in position to engage the upper ends of the punches of the classifying gang, so that when certain punches of the classifying gang are to be used to punch perforations in the card, pins corresponding to the positions of these punches are placed in the removable plate 80 and the plate then re-set on top of the guiding plate 8. For this purpose the plate is provided with a suitable handle 83 and a fastening, which in the present instance comprises a pair of uprights or brackets 83' having openings registering with an opening through the handle of the plate and in which a pin 84, provided with a knurled head 85, is passed.

From the foregoing it will be seen that when certain pins are placed in position in this removable locking plate they will prevent the corresponding punches of the gang from being raised by the card, so that the card will be punched by those particular punches which cannot be raised upward by the card as the same is raised by the dies, the other punches of the set, however, being sufficiently loose so that as the card raises these punches will be raised and thus remain idle

without punching the card. Thus the particular punches 60 which it is desired shall perforate the card will be locked in precisely the same manner as the punches of the other set 50 are locked by the depressed keys.

The die 22 hereinbefore referred to comprises a pair of perforated plates 23 and 24, the perforations of both of which plates register and correspond in number with the number of punches carried by the punch carrying plate 5 and are spaced apart, as at 86, for the reception of a card or blank intermediate thereof. These plates are fixedly connected to and form a part of the die carrying frame 21. In my prior machine it was necessary to space these die plates 23 and 24 sufficiently far apart for the passage of both the card carrier and card. In the present instance, however, as the shiftable card carrier is entirely done away with the plates are spaced just sufficiently apart to permit the passage of the card therebetween, which, as hereinbefore stated, is automatically selected and fed into position.

The card carrying and feeding means comprises, in the present instance, a suitable stationary card carrier in the form of a receptacle 90, preferably of skeleton formation, usually located at the rear of the machine and of a size to receive a stack or pile of cards. This card receptacle is fixedly attached to the frame work, a part of the bottom thereof being movable. This movable part comprises a sliding member or plate 91 suitably guided at the bottom of the receptacle, and on the bottom of this receptacle, including this plate, the cards are placed. The rear edge of this movable plate is provided with what may be termed a picker or knife edge 92 the sharp edge of which projects just sufficiently above the upper side of the movable plate 91 to engage the outer edge of the lowermost card of the pack and force it forward when the plate is shifted forward toward the punches. For shifting this plate backward and forward, the underside thereof is connected by a link 93 with a slotted cam link 94, (see Fig. 6), the lower end of which is pivoted to the base, and through the slot of this link the driving shaft of the machine passes. Mounted on the driving shaft is a cam 95 carrying a roll 96 which engages with the inner surface of the elongated slot of the link, and as the shaft rotates it will reciprocate the sliding plate backward and forward. As the plate is shifted forward toward the punching mechanism, it will carry the lowermost card with it and into position to have its forward edge engaged by suitable feed rolls 97, which in the present instance are shown as a set of six rolls located in pairs. These rolls are knurled rolls, thereby to obtain a proper grip on the card, and are carried by a pair of shafts 98 and 99 suitably journaled on

the frame work of the machine, (see Fig. 5). One of these shafts, as 98, is positively driven from the driving shaft by means of a set of gears, one, as 100, mounted on the driving shaft and another, as 103, on the feed-roll carrying shaft, with intermediate gears 101 and 102 therebetween. The motion imparted to this feed-roll shaft 99 is, by friction, imparted to the companion shaft 98, while the feed rolls of each pair may be properly held in sufficient frictional contact through the medium of springs connected to the frame work and to the ends of the upper shaft, which is so mounted that it is capable of slight play in its journals or supports.

For insuring the proper feeding of the card between the die plates and, therefrom after it has been punched, the die is provided with knurled feed rolls 105 and 106. These rolls are likewise located in pairs, two pair at each end of the card, one of each pair being positively driven, and in the present instance the lower rolls are shown as the positively driven ones. These four lower rolls 106 are mounted upon a pair of shafts 107 and 108, two upon each, which are fixedly supported in the side members of the frame work or base, the side members of the die-carrying support 21 having elongated slots 109 through which these shafts pass, so that the die may be raised and lowered relatively to these feed rolls. In other words, the lower feed rolls do not move with the die, but when the die is in its lowermost position a part of the periphery, as 110 of each feed roll projects through an opening 111 in the lower perforated die-plate 24. Co-operating with these lower feed rolls are the upper feed rolls 105 carried by the upper perforated die-plate 23. The two rolls at each end of the card are carried by a bar 112 and move up and down with the die and are held in frictional contact with the lower rolls by suitable springs 113 when the die is in its lowered position.

For positively driving the lower set of feed rolls 106, suitable gearing is provided, and for this purpose each feed roll shaft is provided at one end with a gear 114, that of the rear shaft 107 being in mesh with the intermediate gear 102 hereinbefore referred to, while that of the front shaft 108 is in mesh with another intermediate gear journaled on the base. Secured to the studs or shafts of these intermediate gears 102 and 108 is a pair of sprocket wheels 181 connected by a sprocket chain 182, whereby the motion imparted to the rear lower feed rolls is also imparted to the front lower feed rolls.

In operation it will be observed that the card is fed into position between the die-plates 23 and 24 when the die is in its lowermost position, at which time the feed rolls 105 carried by the upper die-plate 23 are in position to grip the card on the upper sur-

face, while the under surface is gripped by the lower feed rolls 106, which are fixed against movement with the die. After the card is fed into position, and when the die is raised, the forward feeding of the card ceases owing to the fact that, although the lower feed rolls are positively driven, the card is carried away from the peripheries thereof in a manner which will be readily understood. For limiting the forward feed of the card, in other words, for preventing the card from being fed from the die prior to the punching thereof, a suitable stop mechanism is provided, (see Figs. 2 and 7), which, in the present instance, comprises a pair of reciprocating stop pins 115 movable in a pair of openings located at the front of the die support 21. These stop pins 115 are carried by a bar 116 and are reciprocated at the proper time by a cam 117 carried on the driving shaft, in engagement with a roll 118 secured to the upper end of a bar 119 carried by a rock shaft 120 suitably supported in the base of the machine. This rock shaft is connected at its other end by means of rods 121 and 122 with the pin-supporting bar hereinbefore referred to. When the card is fed into position from the receptacle 90, at which time, as hereinbefore stated, the die is at rest in its lowered position, these stop pins 115 are raised and in position to engage the forward edge of the card and position it in the die. As the die is shifted upward with the card, the further feeding of the card stops in the manner hereinbefore described and the card is perforated. When the die and card return to normal position the stop pins are drawn downwardly, so that their upper ends are carried away from the space between the die-plates, at which time the feed rolls carried at the underside of the die operate to feed the card forward and out from the die, another card being fed at this time into position to take the place of the perforated card. As the perforated card is fed forward it is gripped by a feeding mechanism located at the front side of the machine, which, in the present instance, comprises two pair of knurled feed rolls 183 mounted in a similar manner to those at the rear side of the machine, the lower shaft 184 in the present instance having a gear 185 in mesh with the intermediate gear 180 hereinbefore referred to, by means of which it is positively driven. Motion is imparted by frictional contact of the feed rolls carried thereon to the upper feed rolls carried on the upper shaft 186 which may be held in engagement therewith by means of springs, the shaft 186 being mounted in suitable bearings which will allow slight play thereof. Located at the forward side of the base is a suitable card receiver 130 for the cards as they are perforated and fed from the punching mechanism.

The counting mechanism is substantially similar to that shown and described in my prior application and is operated in a substantially similar way, and therefore a detailed description thereof is not deemed necessary. This counting or registering means comprises, in the present instance, a counter, one for each of the keys, according to the number of keys it is desired to have the counting mechanism attached to. The frame work of the machine is provided with a back plate or upright 141 having openings 142. Attached to the front of this upright and adjacent to each opening is located a counter 140, each attached to its key by a suitable sliding bar 143 guided in the frame work and connected by a link 144 with its key. The rear end of this bar 143 is pivotally connected by a link 145 with a connecting lever 136 the upper end of which extends through the opening 142 in the back plate and is connected with the counter. The link 145 is provided with a recess 146 in its upper edge which is normally in position under a cross bar 147, which is connected by arms to a rod 148 mounted in brackets on the rear of the frame work, and one of these arms is connected by a link 149 with a reciprocating rod 150 mounted to slide in a sleeve 151 attached to the base of the machine. This rod 150 is provided with a roll 152 held by means of a spring 153 in contact with a cam 154 located on the driving shaft, whereby at the proper time the counting mechanism will be operated in the same manner as that shown and described in my prior application.

Heretofore in machines of this class the copy or schedule holder has been separate and independent of the machine, and consequently it has been necessary to manually operate the same. In the present improvement, however, I have provided a schedule holder which is automatically operated, and this from the main driving shaft, so that as each card is perforated and a new card fed into position the schedule or copy will be fed into a new position to correspond with the perforations which it is desired to puncture in the blank card. This schedule holder, in the present instance, is shown located above the back-plate 141 to which the counters are attached, and is made up in the present embodiment of three triangularly located supporting rods 160, 161 and 162 carried by a pair of A-shaped frames 163, two rods, as 160 and 161, in parallelism at the lower end thereof and the other rod 162 above the same. The lower pair of rods is supported by uprights or rods 164 secured to the top of the basket frame. Journaled in these frames 163 is a main feed shaft 165 carrying a plurality of knurled feed rolls 166, shown in the present instance as three in number. The shaft is provided with a knurled hand-wheel 167 at one end thereof

for turning the same by the operator to feed the schedule into position. In engagement with each of these knurled feed rolls is a pair of gripping rolls 131 and 168, preferably of rubber, each mounted on an arm 169 carried by one of the lower rods, the two arms being pulled toward each other by a spring 170 whereby the rolls are held in frictional contact with the knurled roll. A suitable paper guide 171, made up of arms 172, is also carried by the lower pair of rods and extends upwardly and backwardly for guiding the schedule into position between the rolls. At the front side of the machine and supported by the front ends of the paper guide arms 172 is a fixed line bar 173 for the schedule. Carried by the upper rod is a swinging line bar 174 provided with a knob 175. This line bar 174, when in its normal position adjacent to the first mentioned line bar, will leave a space just sufficient for the line of matter which is to be copied on the card by perforations to be seen by the operator. By swinging the shiftable line bar upwardly the operator may see any additional matter as occasion may require.

For shifting the feed rolls 166 and thereby feed the schedule into position as each successive card is brought into position, suitable means is provided, which, in the present instance, comprises a ratchet 176 fixed to the feed roll shaft and a ratchet pawl 177 connected by a rod 178 with the bar 147 which engages the recessed links of the counters, whereby as the counting mechanism operates the schedule will be fed so that a new line of matter will be brought into position to be read by the operator. Should the operator, however, desire to feed the schedule other than line by line the pawl may be lifted by means of a suitable hand lever 179 forming a part thereof. The pawl may be held in engagement with the ratchet by a suitable spring.

From the foregoing it will be seen that all that the operator has to do is to insert the schedule and place it in position with the uppermost line located in the correct position, whereupon the machine will feed the same line by line as the cards are punctured, and that after a pile of cards is placed in the rear card receptacle the machine will feed them successively and punch them in accordance with the keys which are depressed, and that all the operator has to do is to set the keys in accordance with the schedule and then touch the thumb bar and the card will be punched.

I claim as my invention:

1. In a machine of the class specified, the combination of punching mechanism, means for automatically and positively feeding cards to and through the punching mechanism and comprising rotary devices carried by a part of said punching mechanism, and

means for actuating the punching mechanism and the feeding mechanism in timed relation.

2. In a machine of the class specified, the combination of punching mechanism, means for automatically and positively feeding cards to and through the punching mechanism and comprising rotary devices carried by a part of said punching mechanism, a driving shaft, and means connected therewith for operating the punching mechanism and card feeding means, in timed relation.

3. In a machine of the class specified, the combination of punching mechanism, and means for automatically and positively feeding cards to and through the punching mechanism and comprising rolls carried by and located adjacent to the ends of a part of the punching mechanism whereby each card will be gripped at its ends, and power driven mechanism for operating the punching mechanism and card feeding mechanism, in timed relation.

4. In a machine of the class specified, the combination of two independent sets of punches, one forming a gang punching mechanism adapted to punch the cards to indicate the class to which they belong, and means for automatically feeding cards to and from such punching mechanism.

5. In a machine of the class specified, the combination of punching mechanism including a shiftable die and two independent sets of punches, one forming gang punches, and means for automatically feeding cards to and from such punching mechanism.

6. In a machine of the class specified, the combination of punching mechanism comprising two series of punches, key mechanism for setting and locking one set of said punches, and means for automatically feeding cards to and from the punching mechanism.

7. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches and a shiftable die, key operated means for selecting and locking the punches of one set in their punching positions, means for feeding cards to and from the punching mechanism, and power driven means for shifting the die and actuating the card feeding means.

8. In a machine of the class specified, the combination of punching mechanism including punches, key-levers having their ends in position to directly engage and lock said punches, and means for automatically feeding cards to and from the punching mechanism.

9. In a machine of the class specified, the combination of punching mechanism comprising a series of punches and a shiftable die, key levers having their ends in position to directly engage and lock the punches in

their punching position, means for feeding cards to and from the punching mechanism, and power driven means for shifting the die and actuating said card feeding means.

- 5 10. In a machine of the class specified, the combination of punching mechanism comprising a series of punches and a shiftable die, key levers having their ends in position to directly engage and lock the punches in
10 their punching positions, means for feeding cards to and from the punching mechanism, power driven means for shifting the die and actuating said card feeding means, and means controlled by a single member for
15 starting the driving mechanism.

11. In a machine of the class specified, the combination of punching mechanism including punches, key-operated means for locking the punches, power driven means for auto-
20 matically feeding cards to and from the punching mechanism, and means under the control of a single key for starting the power driven means.

12. In a machine of the class specified, the combination of an intermittently rotating driving shaft, a constantly rotatable wheel mounted thereon, punching mechanism, means connected with the driving shaft for feeding cards to and from the punching
30 mechanism, and means for connecting the rotating wheel with the driving shaft.

13. In a machine of the class specified, the combination of an intermittently rotating driving shaft, a constantly rotatable wheel mounted thereon, punching mechanism, means connected with the driving shaft for feeding cards to and from the punching mechanism, and means for connecting the rotating wheel with the driving shaft, said
40 means controlled by a key-actuated lever.

14. In a machine of the class specified, the combination of an intermittently rotating driving shaft, punching mechanism connected therewith, means also connected with
45 the driving shaft for feeding cards to and from the punching mechanism, a constantly rotatable wheel on said driving shaft, and means for connecting said wheel with said shaft thereby to rotate the same and actuate
50 the punching mechanism and the card feeding means.

15. In a machine of the class specified, the combination of an intermittently rotating driving shaft, punching mechanism connected therewith, means also connected with
55 the driving shaft for feeding cards to and from the punching mechanism, a constantly rotatable wheel on said driving shaft, and means for connecting said wheel with said shaft thereby to rotate the same and actuate
60 the punching mechanism and the card feeding means and controlled by a key-actuated lever.

16. In a machine of the class specified, the combination of a driving shaft, punching

mechanism comprising a series of punches and a shiftable die operatively connected with the driving shaft, means also connected with the driving shaft for feeding cards to and from the punching mechanism, a constantly rotatable wheel mounted upon said shaft, and means for connecting said wheel with said shaft thereby to rotate the same and shift the die and operate the card feeding means.

17. In a machine of the class specified, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die operatively connected with the driving shaft, means also connected with the driving shaft for feeding cards to and from the punching mechanism, a constantly rotatable wheel mounted upon said shaft, means for connecting said wheel with said shaft thereby to rotate the same and shift the die and operate the card feeding means, and a depressible member for controlling such connection.

18. In a machine of the class specified, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die operatively connected with the driving shaft, means also connected with the driving shaft for feeding cards to and from the punching mechanism, a constantly rotatable wheel mounted upon said shaft, means for connecting said wheel with said shaft thereby to rotate the same and shift the die and operate the card feeding means, and a thumb bar for controlling such connection.

19. In a machine of the class specified, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with said shaft, key operated selecting and locking mechanism for the punches, means also connected with said shaft for feeding cards to and from the punching mechanism, a constantly rotatable wheel mounted on said shaft, and means for connecting said wheel with said shaft thereby to rotate the same and shift the die and actuate the card feeding means.

20. In a machine of the class specified the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with said shaft, key operated selecting and locking mechanism for the punches, means also connected with said shaft for feeding cards to and from the punching mechanism, a constantly rotatable wheel mounted on said shaft, and means for connecting said wheel with said shaft thereby to rotate the same and shift the die and actuate the card feeding means and controlled by a depressible member located adjacent to the keys.

21. In a machine of the class specified, the combination of punching mechanism includ-

ing a series of punches, key-operated means for selecting and setting the punches in their punching positions to punch a plurality of holes simultaneously in either a vertical or horizontal row, and card feeding means for automatically feeding a card to and from the punching mechanism.

22. In a machine of the class specified, the combination of punching mechanism including a series of punches, key-operated means for selecting and setting the punches in their punching positions to punch a plurality of holes simultaneously in both horizontal and vertical rows, and card feeding means for automatically feeding a card to and from the punching mechanism.

23. In a machine of the class specified, the combination of punching mechanism including a series of punches and a shiftable die, key operated means for selecting and setting the punches in their punching positions to punch a plurality of holes simultaneously in either or both a vertical or a horizontal row, card feeding means, and power driven means for operating the punching mechanism and the card feeding means whereby all of the set punches will perforate the card at the same time.

24. In a machine of the class specified, the combination of gang punching mechanism comprising punches adapted to punch the cards to indicate the class to which they belong, and removable means for selecting and locking the particular punches of the gang to be utilized.

25. In a machine of the class specified, the combination of gang punching mechanism comprising punches adapted to punch the cards to indicate the class to which they belong, and removable means for selecting and locking the particular punches of the gang to be utilized, said means comprising a member having perforations and pins located therein.

26. In a machine of the class specified, the combination of gang punching mechanism comprising punches adapted to punch the cards to indicate the class to which they belong, and removable means for selecting and locking the particular punches of the gang to be utilized, said means comprising a member having perforations corresponding in number with the number of punches of the gang and stop pins adapted to be secured in such perforations.

27. In a machine of the class specified, the combination of gang punching mechanism comprising a series of punches adapted to punch the cards to indicate the class to which they belong, a perforated plate supported in position adjacent to the upper ends of said punches, and removable means supported on top of said perforated plate for selecting and locking the particular punches of the gang to be utilized.

28. In a machine of the class specified, the combination of gang punching mechanism comprising a series of punches adapted to punch the cards to indicate the class to which they belong, a perforated plate supported in position adjacent to the upper ends of said punches, and removable means supported on top of said perforated plate for selecting and locking the particular punches of the gang to be utilized, said means comprising a perforated member and stop pins carried in the perforations thereof.

29. In a machine of the class specified, the combination of gang punching mechanism comprising a series of punches adapted to punch the cards to indicate the class to which they belong, a perforated plate supported in position adjacent to the upper ends of said punches, removable means supported on top of said perforated plate for selecting and locking the particular punches of the gang to be utilized, said means comprising a perforated member and stop pins carried in the perforations thereof, and means for removably securing said member in position adjacent to the top of said plate and comprising a detachable pin.

30. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches, key-operated means for selecting and locking the punches of one set in their punching positions, and removable means for locking some of the punches of the other set in position.

31. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches, key-operated means for selecting and locking the punches of one set in their punching positions, and removable means for locking some of the punches of the other set in position and comprising a perforated member and stop pins carried in the perforations thereof.

32. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches, key-operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in position, and means for automatically feeding cards to and from the punching mechanism.

33. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches, key-operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in position and comprising a perforated member and stop pins carried in the perforations thereof, and means for automatically feeding cards to and from the punching mechanism.

34. In a machine of the class specified, the combination of punching mechanism com-

prising two sets of punches, removable means for locking some of the punches of one set in position, and means for automatically feeding cards to and from the punching mechanism.

35. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches and a shiftable die, key operated means for selecting and locking the punches of one set in their punching positions, means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, and power-driven means for shifting the die and actuating the card feeding means.

36. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches and a shiftable die, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, and power-driven means for shifting the die and actuating the card feeding means.

37. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches and a shiftable die, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, and power-driven means for shifting the die and actuating the card feeding means, said removable means comprising a perforated member and stop pins carried in the perforations thereof.

38. In a machine of the class specified, the combination of a perforated plate, two sets of punches carried thereby, one adapted to punch the cards to indicate the class to which they belong, and removable means located above said last set of punches for selecting and locking some of the punches against movement.

39. In a machine of the class specified, the combination of a perforated plate, two sets of punches carried thereby, one adapted to punch the cards to indicate the class to which they belong, removable means located above said last set of punches for selecting and locking some of the punches against movement, and key operated means for selecting and locking the punches of the other set in their punching positions.

40. In a machine of the class specified, the combination of a perforated plate, two sets of punches carried thereby, one adapted to punch the cards to indicate the class to which they belong, removable means located

above said last set of punches for selecting and locking some of the punches against movement, key operated means for selecting and locking the punches of the other set in their punching positions, and automatically operated means for feeding cards to and from the punching mechanism.

41. In a machine of the class specified, the combination of a perforated plate, two sets of punches carried thereby, one adapted to punch the cards to indicate the class to which they belong, a shiftable die cooperating with said punches, removable means located above said last set of punches for selecting and locking some of the punches against movement, and power-driven means for shifting said die toward and from the punches.

42. In a machine of the class specified, the combination with punching mechanism including punches, of key-operated means for selecting and locking the punches in their punching positions, means for automatically feeding cards flatwise to the punching mechanism, counting mechanism, and means for automatically operating said feeding means, feeding cards flatwise to the punching mechanism in sequence.

43. In a machine of the class specified, the combination of punching mechanism, means for feeding cards to and from the punching mechanism, counting mechanism, and power-driven means for intermittently operating the card feeding means punching mechanism and counting mechanism in sequence.

44. In a machine of the class specified, the combination of punching mechanism comprising a series of punches and a shiftable die, means for feeding cards to and from the punching mechanism, counting mechanism, and power-driven means for intermittently shifting the die and operating the card feeding means and counting mechanism.

45. In a machine of the class specified, the combination of gang punching mechanism adapted to punch the cards to indicate the class to which they belong and including a shiftable die, means for feeding cards to and from the punching mechanism, counting mechanism, and power-driven means for intermittently shifting the die and actuating the card feeding means and counting mechanism.

46. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in position, counting mechanism, and means for actuating said counting mechanism.

47. In a machine of the class specified, the combination of punching mechanism com-

prising two sets of punches, key operated means for selecting and locking the punches of one set in their punching positions, means for locking some of the punches of the other set in their punching positions, counting mechanism, means for feeding cards to and from the punching mechanism, and driving mechanism for actuating the card feeding means and counting mechanism.

48. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, counting mechanism, means for feeding cards to and from the punching mechanism, and driving mechanism for actuating the card feeding means and counting mechanism.

49. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches and a shiftable die, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, counting mechanism, and power driven means for shifting the die and actuating the card feeding means and counting mechanism.

50. In a machine of the class specified, the combination of punching mechanism comprising two sets of punches, one set adapted to punch the cards to indicate the class to which they belong, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, and means for automatically feeding cards to and from the punching mechanism.

51. In a machine of the class specified, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected to said driving shaft, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, and counting mechanism, said card feeding means and counting mechanism being connected with the driving shaft for operation thereby.

52. In a machine of the class specified, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected to said driving shaft, key operated means for selecting and locking the punches of one set

in their punching positions, removable means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, counting mechanism, said card feeding means and counting mechanism being connected with the driving shaft for operation thereby, a constantly rotating wheel on said driving shaft, and means for connecting said wheel with said shaft.

53. In a machine of the class specified, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected to said driving shaft, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, counting mechanism, said card feeding means and counting mechanism being connected with the driving shaft for operation thereby, a constantly rotating wheel on said driving shaft, means for connecting said wheel with said shaft, and a shiftable member for controlling such connection.

54. In a machine of the character specified, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected to said driving shaft, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, counting mechanism, said card feeding means and counting mechanism being connected with the driving shaft for operation thereby, a constantly rotating wheel on said driving shaft, means for connecting said wheel with said shaft, and a shiftable member for controlling such connection, said member being located adjacent to the keys.

55. In a machine of the class specified, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected with said driving shaft, key operated means for selecting and locking the punches of one set in their punching positions, removable means for locking some of the punches of the other set in their punching positions, means for feeding cards to and from the punching mechanism, counting mechanism, said card feeding means and counting mechanism being connected with the driving shaft for operation thereby, a constantly rotating wheel on said driving shaft, means for connecting said wheel with said shaft, and a shiftable member for controlling such

connection, said member being located adjacent to the keys and comprising a thumb bar.

56. In a punching machine, the combination of punching mechanism, means for automatically feeding cards to and from the punching mechanism, a driving shaft, and means connected with the driving shaft for stopping the cards to permit the same to be punched.

57. In a punching machine, the combination of a driving shaft, punching mechanism one part shiftable relatively to the other and connected with the driving shaft for actuation thereby, means for feeding cards to and from the punching mechanism, and means also connected with the driving shaft for stopping the cards to permit the same to be punched.

58. In a punching machine, the combination of a driving shaft, punching mechanism one part shiftable relatively to the other and connected with the driving shaft for actuation thereby, means also connected with the driving shaft for feeding cards to and from the punching mechanism, and means connected with the driving shaft and actuated thereby for stopping the cards to permit the same to be punched.

59. In a punching machine, the combination of a driving shaft, punching mechanism one part thereof shiftable relatively to the other and connected with the driving shaft for actuation thereby, means also connected with the driving shaft for feeding cards to and from the punching mechanism, and reciprocating card stopping means also connected with the shaft for operation thereby.

60. In a punching machine, the combination of a driving shaft, punching mechanism one part thereof shiftable relatively to the other and connected with the driving shaft for actuation thereby, means also connected with the driving shaft for feeding cards to and from the punching mechanism, and reciprocating card stopping means also connected with the shaft for operation thereby and comprising a pair of pins shiftable relatively to the shiftable part of the punching mechanism.

61. In a punching machine, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with the driving shaft for actuation thereby, means connected with the driving shaft for feeding cards to and from the punching mechanism, and means also connected with said shaft and operated thereby for stopping the cards to permit the same to be punched.

62. In a punching machine, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with the driving shaft for actuation thereby, means con-

nected with the driving shaft for feeding cards to and from the punching mechanism, and means also connected with said shaft and operated thereby for stopping the cards to permit the same to be punched and comprising a pair of pins shiftable in openings of said die.

63. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, the latter comprising a pair of die members spaced apart for the reception of a card therebetween, means for shifting said die, and automatically operated shiftable means carried by one of said members for stopping the cards for permitting the same to be punched.

64. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, the latter comprising a pair of die members spaced apart for the reception of a card therebetween, means for shifting said die, and automatically operated means carried by one of said members for stopping the card to permit the same to be punched.

65. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, the latter comprising a pair of die members spaced apart for the reception of a card therebetween, means for shifting said die, and automatically operated reciprocating means carried by one of said members for stopping the card to permit the same to be punched.

66. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, the latter comprising a pair of die members spaced apart for the reception of a card therebetween, means for shifting said die, and reciprocating means carried by one of said members for stopping the card to permit the same to be punched and actuated by the die shifting means.

67. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, the latter comprising a pair of die members spaced apart for the reception of a card therebetween, a driving shaft connected with said die for shifting the same, a cam on said driving shaft, a pair of reciprocating stop pins carried by said die, and means connecting said pins with said cam for shifting the same at the proper time to stop and release the card.

68. In a punching machine, the combination of punching mechanism comprising a series of punches and a die shiftable toward and from the punches, card feeding means carried by said die and comprising rotatable rolls, and means for rotating the same.

69. In a punching machine, the combination of punching mechanism comprising a

series of punches and a die shiftable toward and from the punches, card feeding means carried by said die and comprising rotatable rolls, and means for rotating some of said rolls.

70. In a punching machine, the combination of punching mechanism comprising a series of punches and a die, and card feeding means carried by said die and comprising rolls.

71. In a punching machine, the combination of punching mechanism comprising a series of punches and a die, card feeding means carried by said die and comprising rolls, and means for rotating some of said rolls.

72. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft connected with said die for shifting the same, and card feeding means carried by said die and comprising rolls a part thereof connected with said shaft for rotation thereof.

73. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding means carried by said die and comprising rolls a part thereof connected with said shaft for rotation thereby, and shiftable means carried by said die for stopping the card to permit the same to be punched.

74. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding means carried by said die and comprising rolls a part thereof connected with said shaft for rotation thereby, and shiftable means also connected with said shaft and carried by said die for stopping the same to permit the card to be punched.

75. In a punching machine, the combination of card feeding means comprising three sets of rolls, means for driving said rolls, and punching mechanism located between two of the sets of rolls and carrying one set thereof.

76. In a punching machine, the combination of card feeding means comprising three sets of rolls, means for driving said rolls, and punching mechanism located between two of the sets of rolls and comprising a shiftable die carrying one set thereof and means for shifting said die.

77. In a punching machine, the combination of card feeding means comprising three sets of rolls, means for driving said rolls, and punching mechanism located between two of the sets of rolls and comprising a shiftable die and means for shifting said die, said die comprising a pair of members

spaced apart for the reception of a card therebetween.

78. In a punching machine, the combination of card feeding means comprising three sets of rolls, means for driving said rolls, and punching mechanism located between two of the sets of rolls and comprising a shiftable die and means for shifting said die, said die comprising a pair of perforated members spaced apart for the reception of a card therebetween.

79. In a punching machine, the combination of card feeding means comprising three sets of rolls, punching mechanism comprising a die located between two of the sets of rolls, one set of rolls being carried by said die, and means for driving said rolls.

80. In a punching machine, the combination of a shiftable die comprising a pair of perforated members spaced apart for the reception of a card therebetween, means for shifting said die, card feeding means carried by said die and comprising a series of rolls a part thereof fixed against movement with the die, and means for driving said rolls.

81. In a punching machine, the combination of a shiftable die comprising a pair of perforated members spaced apart for the reception of a card therebetween, card feeding rolls carried by said die a part thereof movable therewith and a part thereof fixed against movement therewith, and means for shifting the die and driving said rolls.

82. In a punching machine, the combination of a shiftable die comprising a pair of perforated members spaced apart for the reception of a card therebetween, card feeding rolls carried by said die a part thereof movable therewith and a part thereof fixed against movement therewith, and means for shifting said die and driving the last mentioned rolls.

83. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die comprising a pair of perforated members spaced apart for the reception of a card therebetween, a driving shaft for shifting said die, card feeding rolls located at each side of said die and driven by said shaft, card feeding rolls carried by said die and also driven by said shaft, a part of said last mentioned card feeding rolls being fixed against movement with said die.

84. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding rolls located at each side of said die and driven from said shaft, said die comprising a pair of perforated members spaced apart, a plurality of card feeding rolls carried by one of said members for movement with the die, and a plurality of card feeding rolls cooperating with the

last mentioned rolls and fixed against movement with said die.

85. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding rolls located at each side of said die and driven from said shaft, said die comprising a pair of perforated members spaced apart, a plurality of card feeding rolls carried by one of said members for movement with the die, and a plurality of card feeding rolls cooperating with the last mentioned rolls and fixed against movement with said die and driven from said shaft.

86. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding rolls located at each side of said die and driven from said shaft, said die comprising a pair of perforated members spaced apart, a plurality of card feeding rolls carried by one of said members for movement with the die, a plurality of card feeding rolls cooperating with the last mentioned rolls and fixed against movement with said die and driven from said shaft, and a pair of receptacles for the reception of the cards before and after they are punched, one in position to feed the cards to one set of feed rolls and the other in position to receive them from another set of feed rolls.

87. In a machine of the class specified, the combination of punching mechanism including punches and a die shiftable toward and from the punches, a driving shaft connected with the die for shifting the same, card feeding means comprising a receptacle having a card feeder connected with the driving shaft for operation thereby, and means connecting with the said driving shaft for feeding the cards from said feeder to the die in timed relation to the die movement.

88. In a machine of the class specified, the combination of punching mechanism, a card feeding means comprising a receptacle having a movable bottom for shifting the lowermost card therein, and means connected with said bottom for shifting the same, and card feeding means for feeding the card shifted by said bottom and comprising rolls a part thereof carried by the punching mechanism.

89. In a machine of the class specified, the combination of punching mechanism, card feeding means comprising a receptacle having a movable bottom for shifting the lowermost card therein, means connected with said bottom for shifting the same, and card feeding means for feeding the card shifted by said bottom, a part thereof carried by the punching mechanism.

90. In a machine of the class specified, the

combination of punching mechanism, card feeding means comprising a receptacle having a movable bottom for shifting the lowermost card therein, means connected with said bottom for shifting the same, and card feeding means for feeding the card shifted by said bottom, a part thereof carried by the punching mechanism and comprising rolls connected with the means which operates said card shifter.

91. In a machine of the class specified, the combination of punching mechanism comprising punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having a reciprocating card feeder connected with said shaft, and a plurality of sets of rolls for feeding the cards from the card feeder to the shiftable die and away therefrom.

92. In a machine of the class specified, the combination of punching mechanism comprising punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having a reciprocating card feeder connected with said shaft, and a plurality of sets of rolls for feeding the cards from the card feeder to the shiftable die and away therefrom, some of said rolls carried by said die.

93. In a machine of the class specified, the combination of punching mechanism comprising punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having a reciprocating card feeder connected with said shaft, and a plurality of sets of rolls for feeding the cards from the card feeder to the shiftable die and away therefrom, some of said rolls carried by the die and a part thereof shiftable therewith and a part fixed against movement with said die.

94. In a machine of the class specified, the combination of punching mechanism comprising punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having a reciprocating card feeder connected with said shaft, and a plurality of sets of rolls for feeding the cards from the card feeder to the shiftable die and away therefrom, some of said rolls carried by the die a part thereof shiftable therewith and a part fixed against movement with said die and connected with said shaft for rotation thereby.

95. In a machine of the class specified, the combination of punching mechanism comprising punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having a reciprocating card feeder connected with said shaft, a plural-

ity of sets of rolls for feeding the cards from the card feeder to the shiftable die and away therefrom, some of said rolls carried by the die a part thereof shiftable therewith
 5 and a part fixed against movement with said die and connected with said shaft for rotation thereby, and card stopping means for the card.

96. In a machine of the class specified, the
 10 combination of punching mechanism comprising punches and a shiftable die, a driving shaft connected with said die for shifting the same, card feeding means comprising
 15 a receptacle having a reciprocating card feeder connected with said shaft, a plurality of sets of rolls for feeding the cards from the card feeder to the shiftable die and away therefrom, some of said rolls carried
 20 by the die a part thereof shiftable therewith and a part fixed against movement with said die and connected with said shaft for rotation thereby, and card stopping means shiftable
 25 relatively to the shiftable die and also connected with the driving shaft for operation thereby.

97. In a machine of the class specified, the combination of punching mechanism comprising a series of punches and a shiftable die comprising a pair of perforated members
 30 spaced apart for the reception of a card therebetween, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having a movable bottom for shifting the lowermost
 35 card and connected with said driving shaft for operation thereby, feeding rolls for receiving the cards from said movable bottom and connected with said driving shaft for rotation thereby, a plurality of feeding rolls
 40 carried by the die and also connected with said driving shaft for rotation thereby, and a plurality of feeding rolls also connected with the driving shaft for rotation thereby for receiving the card after it is punched to
 45 feed the same away from the die.

98. In a machine of the class specified, the combination of punching mechanism comprising a series of punches and a shiftable die comprising a pair of perforated members
 50 spaced apart for the reception of a card therebetween, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having a movable bottom for shifting the lowermost
 55 card and connected with said driving shaft for operation thereby, feeding rolls for receiving the cards from said movable bottom and connected with said driving shaft for rotation thereby, a plurality of
 60 feeding rolls carried by the die and also connected with said driving shaft for rotation thereby, a plurality of feeding rolls also connected with the driving shaft for rotation thereby for receiving the card after it
 65 is punched to feed the same away from the

die, and a receptacle for receiving the cards from the last set of feed rolls.

99. In a machine of the class specified, the combination of punching mechanism comprising a series of punches and a shiftable
 70 die comprising a pair of perforated members spaced apart for the reception of a card therebetween, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having
 75 a movable bottom for shifting the lowermost card and connected with said driving shaft for operation thereby, feeding rolls for receiving the cards from said movable bottom and connected with said driving
 80 shaft for rotation thereby, a plurality of feeding rolls carried by the die and also connected with said driving shaft for rotation thereby, a plurality of feeding rolls also connected with the driving shaft for rotation
 85 thereby for receiving the card after it is punched to feed the same away from the die, and a receptacle for receiving the cards from the last set of feed rolls, some of the rolls carried by the die being shiftable there-
 90 with and others fixed against movement with said die.

100. In a machine of the class specified, the combination of punching mechanism comprising a series of punches and a shiftable
 95 die comprising a pair of perforated members spaced apart for the reception of a card therebetween, a driving shaft connected with said die for shifting the same, card feeding means comprising a receptacle having
 100 a movable bottom for shifting the lowermost card and connected with said driving shaft for operation thereby, feeding rolls for receiving the cards from said movable bottom and connected with said driving
 105 shaft for rotation thereby, a plurality of feeding rolls carried by the die and also connected with said driving shaft for rotation thereby, a plurality of feeding rolls also connected with the driving shaft for rotation
 110 thereby for receiving the card after it is punched to feed the same away from the die, a receptacle for receiving the cards from the last set of feed rolls, some of the rolls carried by the die being shiftable there-
 115 with and others fixed against movement with said die, and shiftable card stopping means also connected with the driving shaft.

101. In a machine of the class specified, the combination of punching mechanism
 120 comprising a series of punches and a shiftable die comprising a pair of perforated members spaced apart for the reception of a card therebetween, a driving shaft connected with said die for shifting the same,
 125 card feeding means comprising a receptacle having a movable bottom for shifting the lowermost card and connected with said driving shaft for operation thereby, feeding rolls for receiving the cards from said mov-
 130

able bottom and connected with said driving shaft for rotation thereby, a plurality of feeding rolls carried by the die and also connected with said driving shaft for rotation thereby, a plurality of feeding rolls also connected with the driving shaft for rotation thereby for receiving the card after it is punched to feed the same away from the die, a receptacle for receiving the cards from the last set of feed rolls, some of the rolls carried by the die being shiftable therewith and others fixed against movement with said die, and shiftable card stopping means also connected with the driving shaft and fixed against movement with the die.

102. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, an intermittently rotated driving shaft connected with said die, a constantly rotatable wheel mounted on said shaft, worm gearing for rotating said wheel, and clutch operated means for connecting said wheel with said shaft.

103. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, an intermittently rotated driving shaft, key operated selecting and locking means for the punches, card feeding means, counting mechanism, a constantly rotatable wheel mounted on said shaft, worm gearing for rotating said wheel, and clutch operated means for connecting said wheel with said shaft.

104. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft for shifting said die, and copy feeding means comprising rolls between which the copy is fed connected with said driving shaft for operation thereby.

105. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft for shifting said die, and copy feeding means connected with said driving shaft for operation thereby and comprising a plurality of feed rolls and ratchet mechanism for actuating said rolls.

106. In a punching machine, the combination of punching mechanism comprising a series of punches and a die, key operated levers for selecting and locking the punches, copy feeding means located above the keys, and means for operating the same.

107. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, a driving shaft for operating said die, key operated levers for selecting and locking the punches, counting mechanism connected with said shaft for operation thereby, and copy feeding means also connected with said shaft for operation thereby.

108. In a punching machine, the combination of punching mechanism, card feeding means, counting mechanism, copy feeding means, a driving shaft, means connecting said card feeding means with the driving shaft, means connecting the counting mechanism with the driving shaft, and means connecting the copy feeding means with the driving shaft whereby they are all operated from said shaft.

109. In a punching machine, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, card feeding means for feeding a card to and from the die and connected with said driving shaft for operation thereby, and copy feeding means also connected with the driving shaft for operation thereby.

110. In a punching machine, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, card feeding means for feeding a card to and from the die and connected with said driving shaft for operation thereby, copy feeding means also connected with the driving shaft for operation thereby, and counting mechanism also connected with the driving shaft for operation thereby.

111. In a punching machine, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, card feeding means for feeding a card to and from the die and connected with said driving shaft for operation thereby, copy feeding means also connected with the driving shaft for operation thereby, counting mechanism also connected with the driving shaft for operation thereby, and key operated levers for selecting and locking the punches in their punching positions.

112. In a punching machine, the combination of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, card feeding means for feeding a card to and from the die and connected with said driving shaft for operation thereby, copy feeding means also connected with the driving shaft for operation thereby, counting mechanism also connected with the driving shaft for operation thereby, key operated levers for selecting and locking the punches in their punching positions, a constantly rotatable wheel carried by said shaft, and means for connecting said wheel with said shaft thereby to operate the mechanism specified.

113. In a punching machine, the combina-

tion of a driving shaft, punching mechanism comprising a series of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, card feeding means for feeding a card to and from the die and connected with said driving shaft for operation thereby, copy feeding means also connected with the driving shaft for operation thereby, counting mechanism also connected with the driving shaft for operation thereby, key operated levers for selecting and locking the punches in their punching positions, a constantly rotatable wheel carried by said shaft, and means for connecting said wheel with said shaft thereby to operate the mechanism specified, said connecting means being under the control of a single member.

114. In a punching machine, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, key operated levers for selecting and locking one set of punches in position, card feeding means also connected with the driving shaft for operation thereby, counting mechanism also connected with the driving shaft for operation thereby, and copy feeding means also connected with said shaft for operation thereby.

115. In a punching machine, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, key operated levers for selecting and locking one set of punches in position, card feeding means also connected with the driving shaft for operation thereby, counting mechanism also connected with the driving shaft for operation thereby, and copy feeding means also connected with said shaft for operation thereby, said copy feeding means being located above the key operated levers and the counting mechanism.

116. In a punching machine, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, key operated levers for selecting and locking one set of punches in position, removable card feeding means also connected with the driving shaft for operation thereby, counting mechanism also connected with the driving shaft for operation thereby, and copy feeding means also connected with said shaft for operation thereby.

117. In a punching machine, the combination of a driving shaft, punching mechanism comprising two sets of punches and a shiftable die, the latter connected with the driving shaft for operation thereby, key operated levers for selecting and locking one

set of punches in position, card feeding means also connected with the driving shaft for operation thereby, counting mechanism also connected with the driving shaft for operation thereby, copy feeding means also connected with said shaft for operation thereby, a constantly rotatable wheel carried by said shaft, and means for connecting said wheel with the shaft and under the control of the operator thereby to throw the mechanism actuated by the shaft into operation.

118. In a punching machine, the combination of punching mechanism comprising a series of punches and a shiftable die, key levers for selecting and directly engaging and locking the punches in position, means for shifting the die, copy feeding means, and means for automatically shifting the same.

119. In a punching machine, the combination of punching mechanism, automatically operated copy feeding means comprising feed rolls and a shiftable line bar, and means for operating said copy feeding means.

120. In a punching machine, the combination of punching mechanism, copy feeding means automatically operative to feed the copy and comprising a plurality of feed rolls, a fixed line bar therefor, and a swinging line bar therefor.

121. In a punching machine, the combination of punching mechanism, copy feeding means automatically operative to feed the copy and comprising a plurality of feed rolls, a fixed line bar therefor, a swinging line bar therefor, ratchet mechanism for actuating one of said rolls, and means for operating said ratchet mechanism.

122. In a machine of the class specified, the combination of punching mechanism including punches and a die, the latter shiftable toward and from the punching mechanism, a driving shaft, and reciprocating means located below the die and shiftable in a plane transverse to the plane of movement of the die for operating said die and operatively connected with the driving shaft for movement thereby.

123. In a machine of the class specified, the combination of punching mechanism including a series of punches and a card carrying die shiftable toward and from the punches, a driving shaft, card feeding means having a part thereof shiftable in a plane transverse of the plane of movement of said die, reciprocating means shiftable below said die in a plane transverse to the plane of movement thereof for shifting said die and operatively connected with the driving shaft, and oscillatory means connected with the driving shaft for shifting the shiftable part of the card carrying means.

124. In a machine of the class specified, the combination of punching mechanism in-

cluding a shiftable card carrying die, card feeding means having a part thereof shiftable in a plane transversely of the plane of movement of said die, and means for shifting said die and said shiftable part of the card carrying means, said card feeding means also comprising feed rolls a part thereof shiftable with the die.

125. In a machine of the class specified, the combination of punching mechanism including a shiftable card carrying die, card feeding means having a part thereof shiftable in a plane transversely of the plane of movement of said die, and means for shifting said die and said shiftable part of the card carrying means, said card feeding means also including feed rolls effective to feed the card prior to the shifting of the die and thrown out of feeding operation on the shifting of the die.

126. In a machine of the class specified, the combination of punching mechanism in-

cluding a shiftable die, means carried by the die for feeding a card through the die and thrown out of operation on the shifting of the die, and means for shifting said die.

127. In a machine of the class specified, the combination of card punching mechanism, card feeding means including positively driven means for engaging each card flatwise and adjacent to its ends for feeding the cards through the punching mechanism thereby to permit each card to be punched between its ends, and power driven means for operating the punching mechanism and card feeding means in timed relation one in respect of the other.

Signed at 9 to 15 Murray St., New York, N. Y., Sept. 23rd, 1908.

JAMES POWERS.

Witnesses:

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A. B. MATTINGLY.