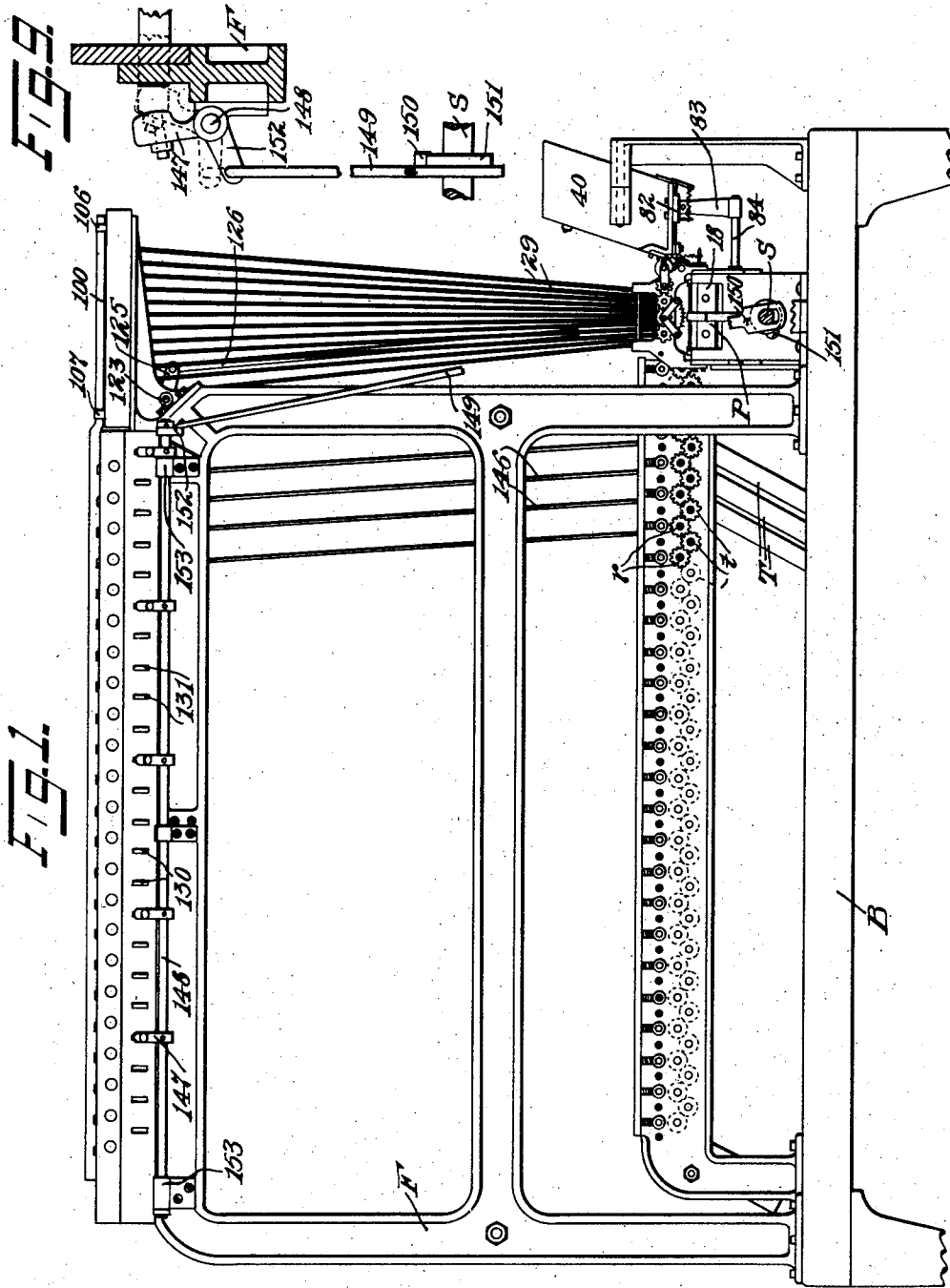


J. POWERS.
MACHINE FOR COMPILING AND SORTING STATISTICS.
APPLICATION FILED APR. 28, 1909.

Patented May 6, 1913.

6 SHEETS—SHEET 1.

1,061,118.



Witnesses:
C. G. Fust,
H. O. Penney

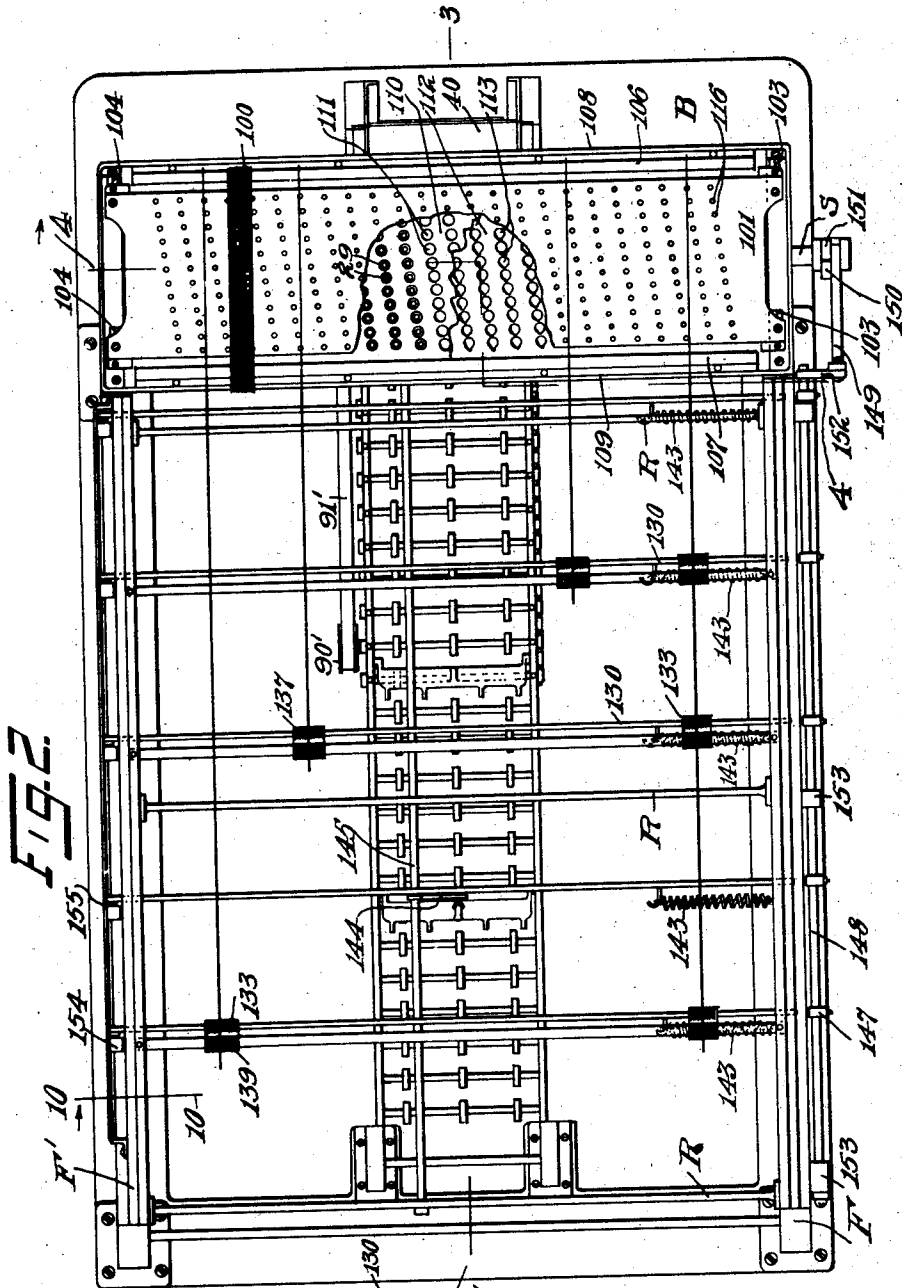
Inventor:
James Powers,
By his Attorney,
F. H. Richards.

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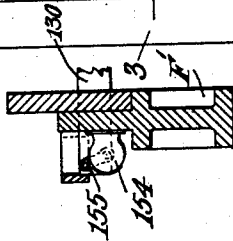
Patented May 6, 1913.

6 SHEETS-SHEET 2.



Witnesses:
H. G. F. F. F.
H. D. Penny

FIG. 10.



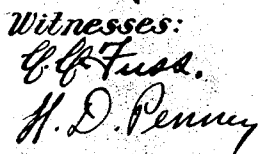
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1,061,118.

6 SHEETS--SHEET 3.



三六九

By his Attorneys

Inventor:
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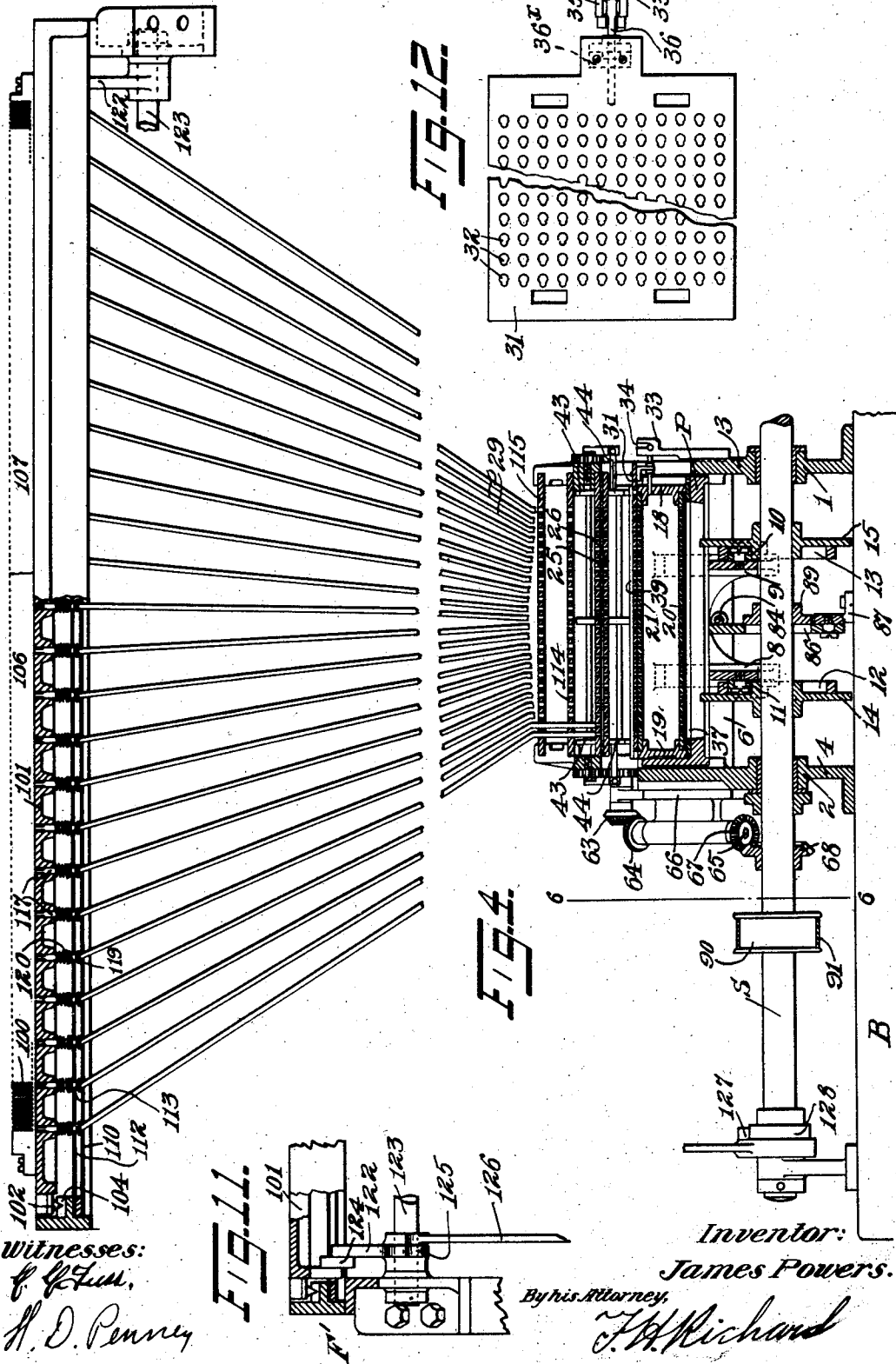
J. H. Richards.

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1,061,118.

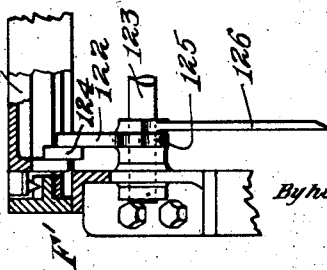
Patented May 6, 1913.

6 SHEETS-SHEET 4.



Witnesses:
f. f. f.
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FIG. 11.



By his Attorney,

J. H. Richard

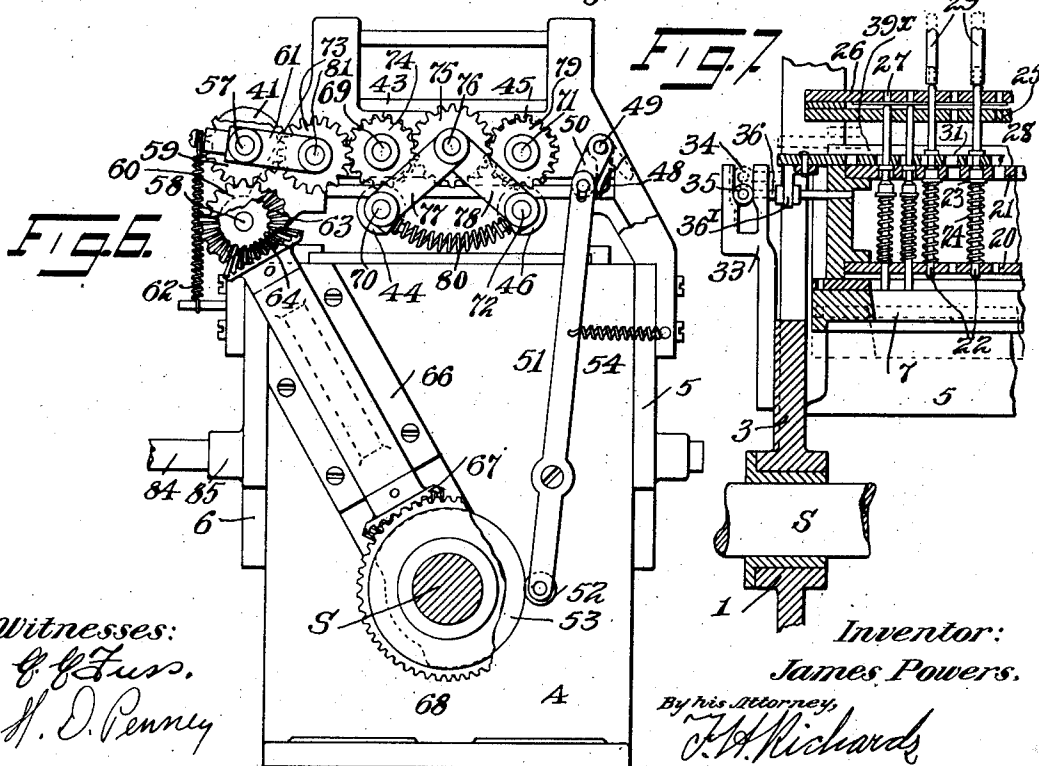
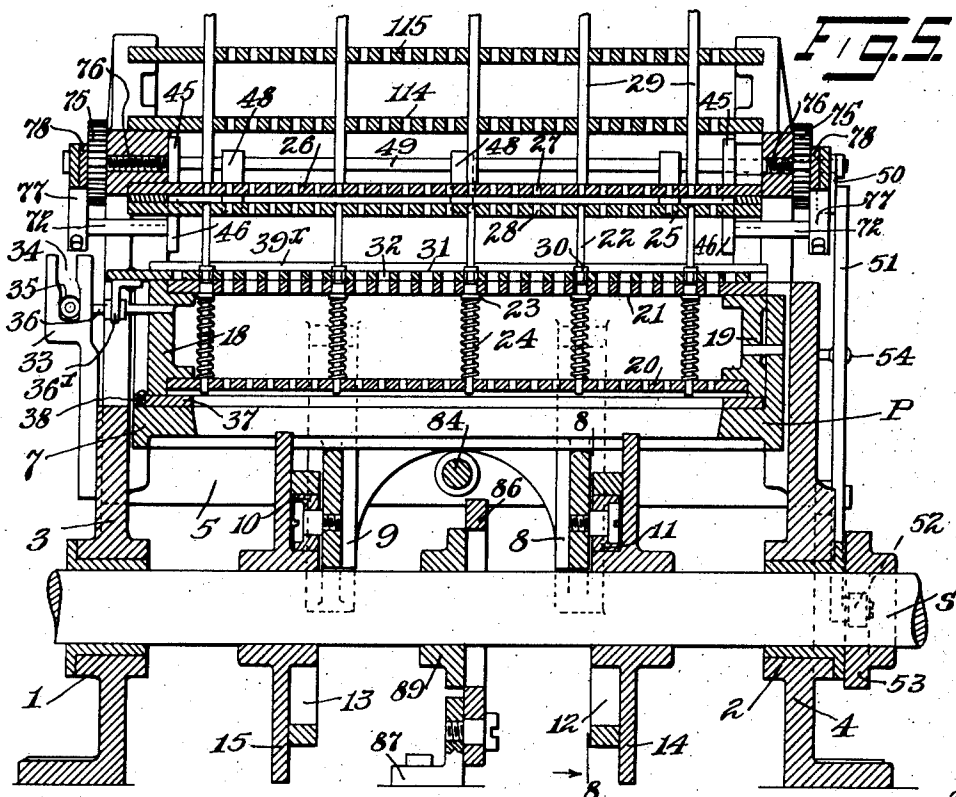
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Patented May 6, 1913.

6 SHEETS—SHEET 5.



Witnesses:
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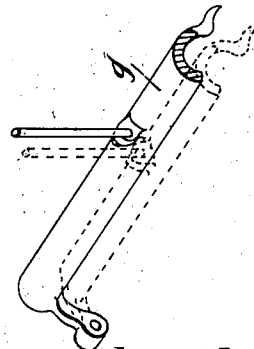
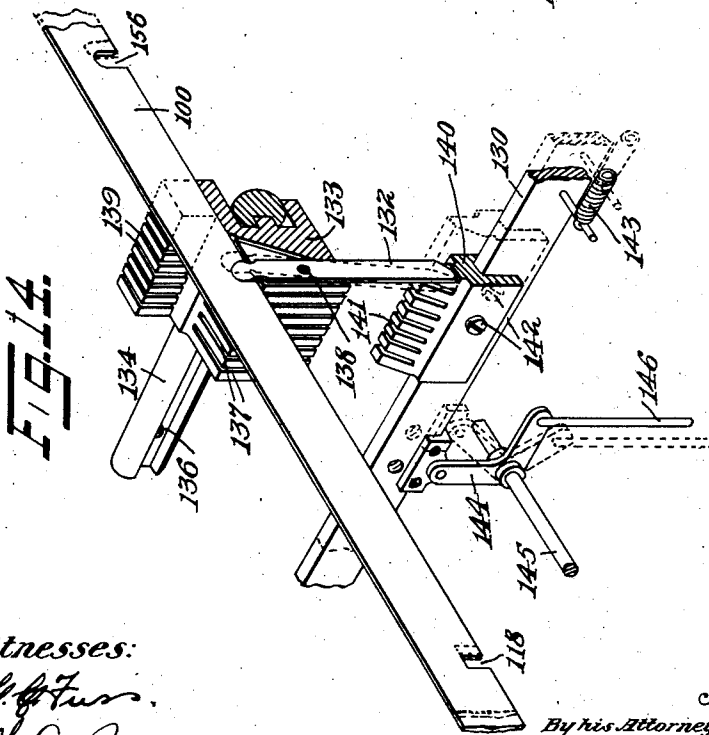
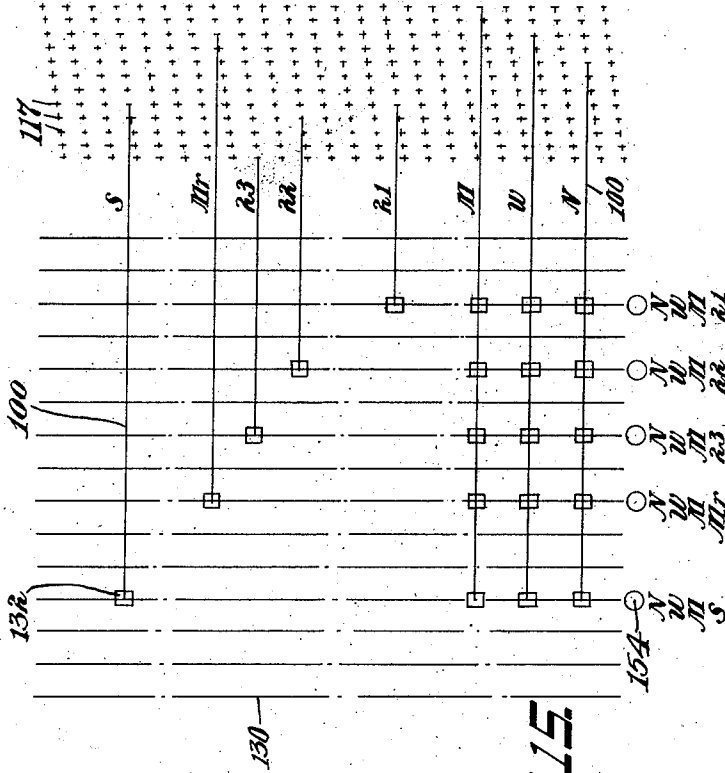
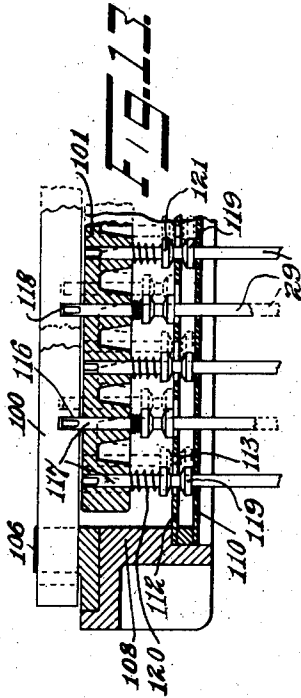
Inventor:
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J. POWERS.
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APPLICATION FILED APR. 28, 1909.

1,061,118.

Patented May 6, 1913.

6 SHEETS—SHEET 6.



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H. D. Penny.

Inventor:

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By his Attorney

F. H. Richards.

UNITED STATES PATENT OFFICE.

JAMES POWERS, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO POWERS ACCOUNTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF MAINE.

MACHINE FOR COMPILING AND SORTING STATISTICS.

1,061,118.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed April 28, 1909. Serial No. 492,713.

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 Machines for Compiling and Sorting Statistics, of which the following is a specification.

The object of this invention primarily is to produce an apparatus or machine that will coöperatively engage a plurality of records, on one or a plurality of articles, such as a web or a series of cards, for the purpose of sorting the records into groups corresponding to predetermined groups of statistics or facts contained on the records or cards; which means is directly and positively operated by mechanical connections between the record engaging means and the sorting members.

A further object is to provide such mechanism with means whereby the grouping of the result can be quickly and easily changed to produce different combinations or groups of the same facts on the cards or record.

A further object is to provide means for compiling or counting both the groups of sorted records, and also to count other records either singly or in groups at the same time.

Heretofore, it has been possible to produce such results in an apparatus only by the employment of intricate electrical devices, wherein the adjustment for varying the results by groups necessitated a large and complicated amount of changes in the various conductors, requiring a considerable length of time and increasing the size and cost of doing a certain work. Such machines are liable to error from the uncertainty of the contacts, by which the necessary circuits are not closed or completed, that often occurs from a little dust or small objects working in at the contacts. With applicant's construction it is only necessary to shift a single block or member for each of the different single facts for each unit change in the group, that merely requires the adjustment along a single bar of such member in most cases, while in others it requires merely the shifting from one bar to another of such member, or else the placing of an additional member on the bar.

In the accompanying drawings representing an apparatus embodying my invention,

Figure 1 is a side elevation. Fig. 2 is a plan view. Fig. 3 is a vertical broken section enlarged on the line 3—3 indicated in Fig. 2. Fig. 4 is a broken vertical section enlarged on the line 4—4 indicated in Fig. 2. Fig. 5 is a vertical section enlarged of the card support and various parts connected therewith being taken through the main shaft. Fig. 6 is an end view of some of the parts shown in Fig. 5 being taken on the line 6—6 indicated in Fig. 4. Fig. 7 is a fragmentary view of some of the parts shown in Fig. 5. Fig. 8 is a section on the line 8—8 indicated in Fig. 5 showing one of the cams. Fig. 9 is an enlarged broken section showing resetting means for the cross bars. Fig. 10 shows enlarged a section on the line 10—10 indicated in Fig. 2 showing one of the counters. Fig. 11 is a section showing the means for shifting the pin plate. Fig. 12 is a broken plan view of the locking plate for the push pins. Fig. 13 is a fragmentary section enlarged through the shiftable plate for the stop pins and showing the push rods engaging therewith and also the slides. Fig. 14 is a perspective view showing somewhat diagrammatically latches engaging with the slides and the cross bars, and their connections with the sorting guides; and Fig. 15 is a diagrammatic view indicating the operation of the counters from the various groupings. Fig. 16 is a fragmentary view of the frame member F showing a front view of a counter mounted thereon.

The machine is shown as comprising broadly, a support for the perforated card or other record, a device coöperating therewith having a member operated mechanically for each record or perforation in the card; a series of slides or selecting members one for each of the said card coöperating members, and which are mechanically and positively actuated, one for each of the perforations in the card; a series of sorting guides mechanically connected with the slides and positively operated therefrom according to the actuation of one or a plurality of slides; and also means for causing the record or card to be advanced after the operation of its said coöperating means, to the series of guides to be engaged by the operated guide and deflected thereby, whereby the cards are sorted according to predetermined single records or groups of rec-

ords thereon. All of such mechanism is automatically operated in the machine to produce such operations successively in rapid sequence. In connection with the means for operating the sorting guides, are arranged a number of compiling members or counters, whereby the number of cards sorted into each group can be counted; and further, other records contained on the cards that have been sorted can also be compiled at the same time.

The apparatus as shown may be divided into four groups of devices; first, the pin box for directly coöperating with the card, together with means for feeding the card into the pin box and to advance it therefrom after its record has performed the operation. Second, the movable plate carrying push pins operated from the push rods that are actuated in the pin box. Third, the selectors or slides operated from the stop pins, and the cross bars with the adjustable latches connecting the slides and the cross bars; with which are associated the counters. And fourth, the sorting guides operated from the cross bars, together with the means for advancing the card from the pin box to the sorting guide to be deflected thereby.

The machine is shown as comprising a bed B, on which are two frame members F and F' connected at the top by brace rods R. The main shaft S is mounted in bearings 1 and 2 in two upright plates 3 and 4 that are parallel and form part of the pin box device. (See Figs. 4, 5 and 6.) The plates 3 and 4 are connected by cross plates 5 and 6 at the front and back thereby inclosing a chamber in which reciprocates vertically the pin box denoted generally by P. The pin box comprises a rectangular frame 7, having two depending brackets 8 and 9, that carry rollers 10 and 11 respectively, operating in cam slots 12 and 13 of cam disks 14 and 15, fast on the shaft S. By this means the pin box is raised and lowered in guides 16 and 17.

The pin box has a removable carrier, comprising two end blocks 18 and 19 having perforated plates 20 and 21, secured at the top and bottom thereof. These perforations register in the two plates, and guide the push pins 22, that project some distance beyond the upper plate 21. The pins carry stops 23 that are engaged by coil springs 24 between the plates, pushing the pin upward until the stop engages the top plate. Two of the pins are shown in the normal upper position at the right end of Fig. 7 and also in the position shown in Fig. 5. But when these pins are depressed by engagement with a record that is not perforated at the engaging portions, the pins will recede into the box, as indicated in Fig. 7, and the springs will be compressed. The record or perforated card is placed on a supporting member, that is shown as formed by two plates 25 and 26

that have registering perforations 27 and 28, corresponding with the perforations in the card, with which the said pins in the pin box register; the plates being supported a short distance above the pin box with the pins projecting into the lower plate 25 but not through the same, permitting the free insertion of a card. When the pin box is elevated from the rollers 10, 11, engaging the cam slots 12, 13 on rotation of the shaft, the pins will pass through the perforations in the card and through the upper plate 26. But where the card is not perforated the pins will engage the card and be thereby depressed, as indicated by the two pins at the left in Fig. 7. The elevated pins that have passed through the perforations in the card, engage with push rods 29, that by suitable mechanism further described serve to actuate the compiling and sorting means. Unless the spring 24 were of great strength, the engagement with the push rods would serve to depress these push pins, and suitable locking means are provided for locking the push pins after passing through the record card. Each of the pins 22 carries a lug 30 and these lugs when the pin is elevated, are located just above the top of a locking plate 31, having apertures 32 through which the pins and lugs pass. These apertures are made somewhat key-hole shape, and the lugs normally pass freely through the larger portion of the openings. But after the elevation of the pin box raises the pins with the lugs free from these openings the lock plate is advanced to bring the pin into the smaller portion of the opening, and the lugs will rest at the margin of the opening on the pin plate. (See Fig. 12.) The lock plate 31 slides on the pin plate 21, and the further advance of the pin box and the locking plate, will cause the push pins to be positively advanced therewith, the lugs engaging the locking plate and preventing the pins being pushed backward by engagement with the push rods 29. For reciprocating this lock plate 31 a bracket 33 is secured to the frame member 16 and has a cam slot 34, in which rides a roller 35 fast on an arm 36 secured to the lock plate by bracket 36'. (See Fig. 7.) As the pin plate rises the roller rides in the cam portion of the slot, and as soon as the lugs on the pins that are elevated by passing through the record perforations pass beyond the lock plate, the lock plate is shifted to cause the narrow portions of the slots to ride under the lugs; and the further advancement of the pin carrier with the lock plate, will cause the latter to advance the push pins to engage the push rods. The lugs on the pins that have engaged the non-perforated portions of the carrier will not be engaged by the lock plate. On the return movement of the carrier, the lock plate will be caused to recede in its normal position by

the same cam slot, that is double acting. During the upward movement the push pins do not penetrate the upper plate 26 of the card support nor engage the stop pins until the lock plate has been shifted to lock the pins, when the pins will be given a positive movement to actuate the push rods. By this it will be seen that the cards or records only operate to depress the push pins at their non-perforated portions, permitting the other pins to be advanced; and that the springs only permit the pins to be depressed by the card and serve to retain the other pins in their normal position until they pass through the perforated support for the card; whereupon the selected pins are secured in the lock plate before they perform their actual work of advancing the push rods.

For convenience in assembling the device, the carrier for the push pins is supported in the pin box on a plate or slide 37 that is locked in place by a screw 38 at one end. (See Fig. 5.) On withdrawing this plate, first removing the bracket 33, the carrier will drop a distance equal to the thickness of the plate, and the pins will have their upper ends lowered from the openings in the lower plate 25 of the card support. Thereupon the carrier and pins can be withdrawn at the open end of the pin box from which the bracket has just been removed. The lock plate is carried on the upper plate 21 of the carrier and guided by gibs 39 and 39', shown in Fig. 3 of the drawing.

Means are preferably provided for automatically feeding the cards successively into the supporting member, or plates 25 and 26, and a hopper 40 is shown in Fig. 3 whose bottom outlet is opposite these plates, a pair of feed rollers 41 and 42 being arranged to engage the ejected bottom card and feed it in between these plates. Several sets of pairs of rollers 43, 44, and 45, 46, are provided to engage the card at its end portions while on the card support, that serve to receive the card from the feed rollers 41, 42 and position it on the support, and also serve to advance the card from the support after the push pin has cooperated with the record perforations of the card. Instead of having these pairs of rollers operate intermittently, they are shown as continuously operated, and lightly spring pressed so as to not unduly wear the card. The card is arrested after it is drawn into position by these pairs of rollers, by a series of detent arms 48 fast on a spindle 49. (See Fig. 6.) A slotted rock arm 50 fast on this spindle engages a pin on a lever 51 whose roller 52 rides on a cam 53 on the shaft S and is held in engagement therewith by a spring 54. By this means when a card is fed in from the said rollers, the arms 48 will arrest the card in proper position to register with the holes in the supporting plates. But after cooperation

with the stop pins, this cam will swing the lever and detents, and the said pairs of rollers will advance the card from the support. To entirely remove the card from the rollers, a pair of rollers 55 and 56, a short distance beyond the support, engage the card and entirely withdraw it from the support. Thereupon, the detents are again closed to position the next card fed in to the support. The sets of pairs of rollers 41, 42 are mounted on spindles 57 and 58, that are connected by gears 59 and 60. The spindle 58 is carried by a pair of links 61 on each side swinging on pins 81, the links being connected by springs 62 drawing the rolls together. A miter gear 63 on the spindle 58 meshes with a miter gear 64 on an inclined spindle 65, carried by a bracket 66 suitably secured to the side member. A miter gear 67 on the spindle 65 meshes with a miter gear 68 on the shaft S, whereby the rollers 41, 42 are continuously rotated. The rollers 43 and 44 are carried on spindles 69 and 70 respectively; and the rollers 45 and 46 are carried on spindles 71 and 72 respectively. A gear 73 on pins 81 connects the said gear 59 with a gear 74 on the spindle 69. And the latter meshes with a gear 75 on a pivot pin 76 that connects links 77 and 78. Gear 75 meshes with a gear 79 fast on spindle 71, by which means all of these rollers are continuously operated from the main shaft. The lower rolls 44 and 46 on the spindles 70 and 72 are spring pressed by means of links 77 and 78 on each side being pressed apart by a spring 80, on each side. By this means the rollers engaging the card on the support are lightly spring pressed together, and will not injure the card while it is retained in the support by the said detents 48; but as soon as the detents are raised the card will be ejected from the support. Suitable means are provided for intermittently feeding the cards from the hopper 40, such as a slide 82 on a bracket 83, (see Fig. 3) carried by a rod 84 sliding in bushings 85 in the pin box. A yoke arm 86 is pivoted to the rod 84 and has its lower end pivoted to a bracket 87 on the base B. A crank pin roller 88 on a disk 89 rides in the opening in this yoke and serves to rock the yoke and reciprocate the slide 82; which slide engages the lowermost card and advances it a distance sufficient to be gripped by the rollers 41, 42.

After the card is ejected or drawn out from the record support, it passes between pairs of guide rolls $a'-a^2$, $b'-b^2$, $c'-c^2$, $d'-d^2$. But four pairs of these rolls are indicated, but obviously the series may contain any desired number according to the number of groups or piles into which it is desired to segregate the cards by the sorting means. These rolls are fast on spindles n^1 , n^2 , n^3 , n^4 , etc., and these spindles are spaced

a sufficient distance apart in the adjacent pairs, to permit the card to be deflected after passing between any one pair, downwardly from the path of movement through the alining rolls. Suitable guides or shutters are provided between each pair of rolls, that operate as sorting guides to deflect the card downwardly from the rolls. Between each pair of rolls is a guide or shutter g, g', g^2 , etc., that will normally be held above the path of the cards out of engagement therewith, but through the operation of mechanism connecting with the push rods, and co-operating means just described, one of these guides will be lowered and the cards advanced between the rolls, will be caused to pass downwardly. If desired suitable receptacles T are placed below these guides into which the groups of cards will be directed. The spindles of the lower rolls of these series are connected by a series of gears r, r , etc. which gears are connected by another set of gears t, t , etc., so that they all rotate in the same direction. (See Fig. 1.) These gears are driven by suitable means, such as a belt pulley 90 on one of the gear spindles connected by belt 91 to a pulley 92 on the main shaft S . See Figs. 2 and 4. Each of the said push rods 29, when elevated by the described means, from a perforation in the record card, serves to cause the operation through connecting means of one of a series of selecting members or slides 100 moving horizontally at the top of the frame. The connecting means is shown as comprising a pin plate 101 having openings therein arranged out of longitudinal alinement as indicated in Fig. 2. The openings are shown arranged in inclined rows, there being one opening for each of the slides and which registers therewith. Suitable guide plates 106 and 107 have vertical slots in which are guided these slides. The plate 101 has a longitudinal movement horizontally below the slides, having V-blocks 102, 103, on each side that slide in corresponding grooves in supporting blocks 104, 105, in the side bars F^2 and F^3 of the frame. (See Fig. 4.) At this part of the frame are two cross members 108, 109 extending between the side frames, which carry a plate 110 having openings 111, and a plate 112 having openings 113, that are somewhat key-hole shaped. The upper ends of the push rods 29 in their normal lowered position extend into the openings in the lower plate, but do not project through the plate, the rods resting at their lower ends on the perforated plate 26 of the record support, in position for engagement with the push pins v . The lower ends of these push rods 29 are guided in a pair of stationary perforated plates 114, 115 supported above the pin box. The openings in the plates 110, and 112, register with the openings 116, in the

plate 101, and these openings evidently do not correspond in position with the openings in the perforated record support, nor with the openings in the plates 114 and 115 adjacent thereto having corresponding openings. These openings in the pin plate 101 are arranged transversely of the machine for the purpose of having the openings to each register with one of the slides, that are arranged parallel across the machine. For this reason the push rods have to be bent sidewise, and spread out as indicated in Figs. 1, 3 and 4. In each of the openings in the pin plate 101 is arranged a stop pin 117 extending down through the key hole slot 113 in the plate 112, and resting on the top of the push rod 29 in the apertured plate 110 the top of the stop pin in such position being flush with the top of such plate. When the push rod is elevated, from the said means coöperating with a record card, these pins 117 will be pushed upward. Each stop pin registers with one of the slides 100, that is provided with a notch 118 therein to receive the pin. After a push rod has raised a stop pin, and holds it in this position, if the pin plate 101 is advanced, the engagement of a pin 117 with its corresponding bar at the notch, will advance the slide 100; and retraction of this plate will return the slide to former position. As each pin engages only one slide, the shifting of the pin plate after a number of push rods have been raised from corresponding perforations in the card, will cause corresponding slides to be advanced. Each of the stop pins 117 is provided with a lug 119 that passes clearly through the larger portion of the key-hole opening 113 in the plate 112, in the normal position of the stop pin, (See Fig. 13.) But as soon as the pin plate 101 is advanced, the pins will be carried along with it, and the lugs 119 will ride on top of the plate 112, and rest on this plate at the margin of the smaller portion of the key hole slot. This will permit the push rods to be withdrawn without releasing the stop pins, by the completion of operation of the pin box releasing the push rods. As soon as the pin plate 101 returns to normal position the stop pins reaching the larger portion of the opening, will fall through the same to again engage the push rod. To assist in returning the stop pins to normal position, coil springs 120 are placed on the pins pressing between the pin plate 101 and lugs 121 on the pins, and holds it fast on the stop pin.

The pin plate 101 is reciprocated from the main shaft by the cranks 122 at each end of a rock shaft 123, that connect with the pin plate by links 124 one at each end. This shaft is rocked by a crank arm 125 fast on the shaft 123, from rod 126 that is reciprocated by a roller pin 127 riding on a cam 128

on shaft S, that is timed to reciprocate the pin plate at the proper time in the operation of the machine.

A series of cross bars 130 are provided slidable in slots 131 in the frame members F and F'. These cross bars are connected with the slides by certain means, and when the slides have been shifted by the described means coöperating with a record card, the cross bars are thereupon free to be advanced, by suitable means. The advancement of these cross bars serves to actuate the sorting guides *g*, *g'*, etc., with which they are respectively connected. Immediately thereafter, the card is advanced from the support through the sets of rollers described, until engaged by the sorting guide that has been lowered from the operation of a cross bar, when the card will be deflected to its proper receptacle, or other place. In connection with each of these cross bars, is a compiling member or counter that will record the number of operations of each cross bar, and its connected guide. But there may be more cross bars provided than guides, and therefore a larger number of facts compiled than cards sorted.

One or a plurality of latch members are provided for each of the bars, and the bars are provided with means tending to shift them when released from the latch members, upon swinging of the latches by the slides. Swinging latches 132 are pivoted to blocks 133, that are removably attached to supporting bars 134, (see Fig. 11) and adjustably therealong, preferably by screws 135 passing through apertures 136 in the bars into the blocks. The block is shown as having a number of vertical slots 137, in one or more of which swing the latches 132, on removable pivot pins 138; whereby the latches can be readily removed or shifted which latches project into notches 156 in the slides 100. These blocks may also have slotted guide portions 139 registering with the slot for the latches, and serving to guide the slides 100. Suitable means are provided for causing the latches to engage the cross bars, such as blocks 140 having slots 141 into which the latches normally extend. These blocks may be adjusted along the bar by means of screws 142. In the normal position of the slides 100, the latches extend into the slotted block of the cross bars and lock them against movement. But upon the latch or all of the latches that engage a cross bar being shifted by movement of the engaging slide, the cross bar is free to move, and is advanced by suitable means, such as a coil spring 143 extended between the cross bar and the frame. It will be seen that by having a plurality or series of the latches engaging a single cross bar, which latches each is controlled by a separate slide, the bars will not be liberated until all of such slides are shifted, and hence

the cross bar will only move when a record is operated upon containing the perforations corresponding to these slides, that must be shifted to swing all of the latches for this bar. As will be further explained these perforations may correspond to a certain group of facts, and only the cards containing such perforations will actuate a certain cross bar. The other cross bars can be operated by other different latches from other slides, or other groups of slides, whereby any desired combination can be arranged to operate a single cross bar. The cross bars are connected with the sorting guides *g* by means of a bent lever 144 rocking on a transverse rod 145, and pivoted by one arm to the cross bar, while the other arm connects by rod 146 with the guide *b*. By this means the shifting of the bar will raise and lower the guide, as indicated in Fig. 15. After the sorting guide has been shifted and the card advanced to be deflected thereby, the cross bar is returned to its former position before the latches are restored to engaging position by the return of the slides 100. This is effected by a series of arms 147 (see Fig. 9) fast on a rock shaft 148 supported in bearings 153 at the side of the machine. The shaft is rocked by a rod 149 connected to an arm 152 fast on the shaft; the rod having roller pin 150 that rides on a cam 151 on the main shaft S. These arms are normally in the position shown in Fig. 9 and merely advanced to return the bar and hold it in such position until it can be engaged by the latches, whereupon the lever is returned to its former position free from the bar to permit it to be shifted by its operating spring, as soon as the latches are swung by the proper slides to release the bar.

The counters 154 are provided on the frame F adjacent each of the cross bars 130 (see Fig. 10) and connected therewith by an arm 155 whereby each reciprocation of the bar will cause the counter to register.

The operation of the device is as follows: In the hopper 40 are placed perforated cards, such as cards that are perforated by perforating machines such as set forth in applications, Serial No. 425,831 and 454,749 filed by me, for this particular purpose. These machines are designed especially for operations on cards for compiling and tabulating data, such for instance, as statistics relating to the census, or for various business operations, like insurance records, statistics for railway companies, and the like. The lowermost card will be engaged by the slide 82 and advanced through an opening 40^x in the hopper, to be received by the rolls 41-42, that are continuously operated from the main shaft by the described means. The slide 82 is operated intermittently, and one card fed at each rotation of the main driving shaft S. These rolls will feed the

card in between the plates 25 and 26, where it will be engaged first by the rolls 43 and 44 then by rolls 45 and 46 and further advanced until it strikes the detent 48, that is now in its normal arresting position, and the card will be arrested with its perforations registering with the perforations in these plates. As stated the lower rolls 45 and 46 are lightly spring pressed against the card, and although these rolls are continuously rotated, the detents will prevent further movement of the card, and these rolls will not injure the card. At this stage of the operation the pin box P is elevated by the cam rollers 10 and 11 on the main shaft in the described manner, and the card will be engaged by all of the push pins 22 passing through the lower supporting plate 25. The various perforations that may be on the card will permit the advance of the push pins at the registering perforations of the plates, while the remaining push pins engaging the non-perforated portions of the card will be prevented from advancing and their coil springs 24 will be compressed; in other words they will be depressed into the carrier, as indicated in Fig. 7 by the two pins at the left, the other two pins having advanced through perforations in the card. In the latter position, it will be seen that the two pins depressed will have their lugs 30 now below the locking plate 31 while the two elevated pins will have their lugs 30 above the locking plate as in their normal position shown in Fig. 5, as these pins were not depressed. At this stage cam roller 35 will engage the walls of the cam slot 34 and shift the locking plate so that the margins of the smaller portion of the key-hole slot 32 will engage the bottom of this lug on all of the advanced push pins. The further advancement of the carrier will cause the advanced pins 22 to strike the push rods 29, and as the lock plate prevents recession of the push pins into the carrier, the push rods 29 will be advanced or elevated, which push rods correspond to the perforations in the card now on the supporting plate.

This advancement of the push rods will elevate the push pins 117 engaging therewith, and these push pins will enter the notches 156 in their respective engaging slides 100; as indicated in Fig. 13. At this stage of the operation the described means will advance the pin plate 101, from the cam 128, on the shaft S, connecting rod 126, etc. The push pins 29 are retained in the elevated position by the carrier being held in its advanced position, until a slight movement of the pin box 101, and this will cause the lugs 119 on each of the push rods 29, to ride over the smaller portion of the key hole openings 113 in the plate 112, so that upon the release of the push rods and their return to normal position, the push

pins that have been advanced will be locked in the elevated position in engagement with the slides 100. The advance of the pin plate 101 will cause the shifting of the slides 100 engaged by the push pins advanced, the other slides remaining stationary. The advancement of the slides will each swing the latches 132 in engagement therewith, and the latter will thereby be swung out of engagement with the slotted block 140 on the cross bars 130. When all of the latches engaging in one of the bars 130 have been swung to release the bar the spring 143 will shift the bar endwise, and the latter movement will rock the levers 144, shift the connecting rods 146, and swing the sorting guides g , that are respectively connected therewith. At the same time each counter connected with the bar advanced is operated and the operation recorded. The next step in the operation of the machine is to swing the detents 48 that have up to this period retained the card in the pin box whereby the card is free to be advanced by the pairs of rollers engaging therewith into engagement with the rollers 55, 56 and the card is advanced between the series of rollers a' , a^2-b' , b^2 , etc. The sorting guide is held depressed until the card has sufficient time to pass through all of the rollers, that are operated at a high speed, and the engaging shutter will deflect the card into the proper receptacle T. It will be understood that all of these operations are performed in the proper sequence, by the proper design and arrangement of the several cams on the main shaft by which they are controlled, and that such members as are necessary may be held in the advanced position for the proper length of time in the cycle of operation. It will further be understood that the cross bars 130 will be held in the advanced position to retain the shutter depressed, until it has engaged the card, thereupon the bar is returned to its position for engagement with the latches by the bent lever 147, and held in such position until the return of the pin box 101 has retracted the slides and reset the latches 132 in these cross bars; whereupon the said lever 147 is returned to normal position, as the cross bar is now held by the latches against movement from its spring. Of course in a large variety of cards that may be placed in the box, certain of them will not have all of the perforations corresponding to a certain group contained therein, whereby all of the latches 132 that engage with the cross bar 130 will not be tripped. This means that the cross bar will not operate to close a shutter or register the counter. And upon the card being advanced it will pass through all of the rollers and may be received into the reject box J at the end of the series of rollers. The latches 132 are set by shifting

their blocks 133 along the bar 134, so that each latch corresponds with a certain perforation in the card that records a certain predetermined fact or item. It will readily be seen that a number of latches can be set to engage the same cross bar 30. And the spring 142 cannot advance the cross bar until all of these latches have been shifted by their engaging slides. Of course, different cross bars have differently arranged latches engaging therewith whereby different groups of facts are registered, and the card corresponding therewith will be sorted into the different box, as only the sorting guide corresponding with the cross bar will be depressed. The adjustment of the latch 132 will generally require the adjustment of the slotted block 140 on the cross bar engaged by the latch.

In Fig. 15 is shown diagrammatically an example of the operation of the machine. The horizontal lines represent the slides 100, and each is shown as engaging a different one of the stop pins 117 in the pin plate 101. The lowermost bar 100 may be actuated from a perforation on a census card, corresponding to an inhabitant who is a native, indicated by N. The next bar W may represent a white person, the next one M may represent a male person. The vertical lines in this diagram correspond to cross bars 130 and the rectangles correspond to the latches 132. Now five of the cross bars are shown provided with latches 132, and the first cross bar in operation has a latch at its intersection with the slide for N, also one for W, and one for M. This same first engaged cross bar has another latch connecting with the slide indicated by the numeral 21, which may be operated from a perforation in the census card indicating that the individual is twenty-one years of age. The second cross bar engaged has a fourth latch connecting with a slide indicated by 22 indicating an individual twenty-two years of age, operated from a corresponding perforation in the card. The third cross bar from the pin plate engaged has a latch similarly corresponding to a perforation in the card for twenty-three years of age. It will be seen that when a bundle of cards are placed in the hopper and the machine set in operation, all cards having four perforations corresponding to native, white, male and twenty-one years of age will operate the slides to swing the four latches and release the first engaged cross bar. The indicator connected therewith will register one and the sorting guide operated therefrom will be lowered so that when this card passes from the box to the rollers it will be deflected into the proper receptacle. Now, the operation of these three slides indicated by N, W, and M respectively will operate the next two engaged cross bars, and three of the latches for each of these cross bars

will be tripped, but the fourth latch bar of each of them will not be tripped and hence the cross bar cannot actuate. But, when a record card becomes engaged in the pin box and has the perforations corresponding to native, white, male and twenty-two years of age, the four latch bars for the second said cross bar will all be swung and this cross bar will advance, to operate its register and its sorting guide. Evidently as the fourth latch bar for the other two cross bars will not be tripped they will not operate but only this second cross bar. And when the card is introduced containing perforations corresponding to native, white, male and twenty-three then the third said latch bar will be released to operate its counter and sorting guide; while the other two latch bars will not be tripped. Obviously other groupings can be recorded from a set of cards where they cannot be grouped at the same time with other groups; for instance, at the same time that the machine is set to record these three facts of the native, white, and males that are of the three said ages, it can be ascertained the number of all of such cards of the native, white and males who are either married or single. This is done as indicated, by placing another cross bar indicated by Mr for a latch connected with the fourth engaged cross bar that also has latches connected with the M, W, and N slides. And another slide S' has a latch connecting with the fifth engaged cross bar that also has the three latches connected with the slides for M, W and N. Each of the cards corresponding to the native, white males will trip the three latches of the two latter cross bars of any age whatever. Now, all of these cards presumably contain a perforation indicating married or a perforation indicating single consequently every one of the cards having the three perforations for native, white and male will have a fourth perforation that will trip the latch corresponding to the married or else the one for the single, and one of these four or five cross bars will be operated. The counter for these cross bars will register at each operation. But the sorting guide for these latter two, if they are situated beyond the three sorting guides for the three first mentioned cross bars can be actuated without interfering with the sorting, because the card will be deflected by one of the three guides before reaching either of these guides. But if these two guides were between any of the said three sorting guides and the pin box, they could easily have the shutter removed.

Having thus described my invention, I claim:

1. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card thereon, a series of counters, a series

of latches including a plurality of latches for each of the counters, and mechanically operative means including the latches connecting the controlling means with the counters for positively actuating the counters from the controlling means according to different predetermined groups of records on the cards.

2. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card on the support, a series of counters, mechanically operative means connecting the controlling means with the counters for positively actuating the counters from the controlling means according to different predetermined groups of records on the cards said connecting means for each of the counters including an individual latch member for each unit of the group corresponding to such counter, the connecting means and latch members being organized for adjustment of the latch members to vary the individuals comprising the groups.

3. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card on the support, a series of counters, mechanically operative means connecting the controlling means with the counters for positively actuating the counters from said controlling means according to different records on the cards, said connecting means including a bar for each of the counters, and latch members adjustable along the bar.

4. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card on the support, a series of counters, mechanically operative means connecting the controlling means with the counters for positively actuating the counters from said controlling means according to different predetermined groups of records on the cards, said connecting means including a bar for each of the counters, latch members for each bar corresponding to the individuals of the group counted by such bar, the latch members being adjustable to thereby vary the grouping corresponding to such bar.

5. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card on the support, a series of counters, mechanically operative means connecting the controlling means with the counters for positively actuating the counters from the controlling means according to different predetermined groups of records on the cards, said connecting means including a bar for each of the counters, latch members for each bar corresponding to the individuals of the group counted by such bar, the latch members being adjustable to thereby vary

the grouping corresponding to such bar, the latch members being also interchangeable on different bars.

6. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card, a series of sorting guides, and mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the record card engaging means whereby the sorting guides are operated, means for advancing the cards from the support to the guides to sort the cards according to said group of records.

7. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card, a series of sorting guides, and mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the card engaging means to operate the guides according to different predetermined groups of records on the cards, and means for advancing the cards from the support to the guides to sort the cards according to said such records.

8. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card, a series of sorting guides, and mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the record card engaging means whereby the sorting guides are operated, according to different predetermined groups of records on the cards, means for operating the said controlling means, means for operating the card connecting means, and means for advancing the cards from the support to the guides after operation of said two means to sort the cards according to said group of records.

9. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card, a series of sorting guides, and mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the record card engaging means, means for advancing the cards from the support to the guides to sort the cards according to the records, said connecting means for each of the counters including an individual latch member for each counter, the connecting means and latch members being organized for adjustment of the latch members.

10. The combination of a support for a record card controlling means arranged adjacent the support for engagement with a record on the cards, a series of sorting guides and mechanically operative means connecting the controlling means and the sorting

guides for positively actuating the guides from the record card engaging means to operate the sorting guides according to different predetermined groups of records on the cards, means for advancing the cards from the support to the guides to sort the cards according to said group of records, said connecting means for each of the counters including an individual latch member for each unit of the group corresponding to such counter, the connecting means and latch members being organized for adjustment of the latch members to vary the individuals comprising the groups.

11. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card on the support, a series of sorting guides, mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the record card engaging means to operate the sorting guides according to different predetermined groups of records on the cards, means for advancing the cards from the support to the guides to sort the cards according to said group of records, said connecting means including a bar for each of the counters, latch members for each bar corresponding to the individuals of the group indicated by such bar, the latch members being adjustable along the bar to thereby vary the grouping corresponding to such bar.

12. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card on the support, a series of sorting guides, mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the card engaging means, means for advancing the cards from the support to the guides to sort the cards according to said group of records, and a series of counters one for each of the sorting guides and operatively connected therewith.

13. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card on the support, a series of sorting guides, mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the record card engaging means to operate the sorting guides according to different predetermined groups of records on the cards, means for advancing the cards from the support to the guides to sort the cards according to said group of records, and a series of counters one for each of the sorting guides and operatively connected therewith.

14. The combination of a support for a record card, controlling means arranged ad-

jacent the support for engagement with a card on the support, a series of sorting guides, mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the record card engaging means to operate the sorting guides according to different predetermined groups of records on the cards, means for advancing the cards from the support to the guides to sort the cards according to said group of records, said connecting means for each of the guides including an individual latch member for each unit of the group corresponding to such guide, the connecting means and latch members being organized for adjustment of the latch members to vary the individuals comprising the guides, and a series of counters one for each of the sorting guides and operatively connected therewith.

15. The combination of a support for a record card, a series of selecting members corresponding to the individual records on the cards, mechanically operative means organized to cause the operation of the selecting means respectively corresponding to the records of the card and placed on the support, a plurality of counters, and means connecting the selecting members with the counters and organized to be positively operated from the selecting means through direct mechanically operative connections according to different predetermined groups of records on the cards.

16. The combination of a support for a record card, a series of selecting members corresponding to the respective records in the card, means for causing the operation of the selecting members respectively corresponding to the records of a card placed on the support, a plurality of counters, and mechanically operative means connecting the selecting members with the counters to cause the counters to be positively operated from the selecting means according to different predetermined groups of records on the card, said connecting means for each of the counters including an individual latch member for each unit of the group corresponding to such counter, the connecting means and latch members being organized for adjustment of the latch members to vary the individuals comprising the groups.

17. The combination with a support for a record card, a series of slides corresponding to the records of the cards, means for causing the operation of the slides according to the record of the card on the support, plurality of counters, mechanically operative means connecting the slides with the counters and arranged to cause the counters to be positively operated from the slides according to different predetermined groups of records on the cards, said connecting means including a bar for each counter,

latch members for each bar corresponding to groups indicated by such bar and arranged to engage the slides, the latch members being adjustable for engagement with different slides.

18. The combination of a support for a record card, a series of slides corresponding to the respective records on the cards, record-controlled means for causing the operation of the slides respectively corresponding to the records of a card on the support, a plurality of counters, a cross bar slidably supported for each of the counters, swinging latch members arranged adjacent each of the cross bars and operatively connected with the slides to be swung thereby, the cross bars being normally engaged by the latches and held against movement until operation of the slides from the record controlled means to swing the latches and release the cross bars, and means for advancing the cross bars when released from the latches to actuate the counters.

19. The combination of a support for a record card, a series of slides corresponding to the respective records on the cards, record-controlled means for causing the operation of the slides respectively corresponding to the records of a card on the support, a plurality of counters, a cross bar slidably supported for each of the counters, swinging latch members arranged adjacent each of the cross bars and operatively connected with the slides to be swung thereby, the cross bars being normally engaged by the latches and held against movement until operation of the slides from the record controlled means to swing the latches and release the cross bars, means for advancing the cross bars when released from the latches to actuate the counters, means for returning the cross bars to engaging position, and means for resetting the slides to reengage the latches with the cross-bars.

20. The combination of a support for a record card, a series of slides corresponding to the respective records on the cards, record controlled means for causing the operation of the slides respectively corresponding to the records of a card on the support, a plurality of counters, a cross bar slidably supported for each of the counters, swinging latch members arranged adjacent each of the cross bars and operatively connected with the slides to be swung thereby, the cross bars being normally engaged by the latches and held against movement until operation of the slides from the record controlled means to swing the latches and release the cross bars, and means for advancing the cross bars when released from the latches to actuate the counters, the latches being adjustable for engagement with different slides and cross bars.

21. The combination of a support for a

record card, controlling means arranged adjacent the support for engagement with a card, a series of sorting guides, mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the card engaging means to operate the sorting guides according to different predetermined groups of records on the cards, card-advancing means comprising a series of pairs of cooperating rolls, the sorting guides being arranged between successive pairs of rolls whereby the card is deflected from the series of rollers by any one of the guides when actuated by said means.

22. The combination of slidable cross-bars, supporting rods adjacent the cross bars, slides extending transversely of the cross bars in proximity thereto and each provided with a series of notches, blocks adjustable on the supporting rods, latches pivoted to the blocks and having one end projecting into the respective notches in the slides, slotted blocks adjustable on the cross bars and engaged by the latches to prevent endwise movement of the cross bars, the latches being swung out of the notches in the cross bars by advancement of the slides, means for advancing the cross bars when all of the latches have been swung out of the slotted blocks thereon, sorting guides actuated by the cross bars, means for advancing the cards from the support to the guides to be sorted thereby, card-advancing means comprising a series of pairs of cooperating rolls, the sorting guide being arranged between successive pairs of rolls whereby the card is deflected from the series of rolls by any one of the guides when actuated by said means.

23. The combination of slidable cross bars, supporting rods adjacent the cross bars, slides extending transversely of the cross bars in proximity thereto and each provided with a series of notches, blocks adjustable on the supporting rods, latches pivoted to the blocks and having one end projecting into the respective notches in the slides, slotted blocks adjustable on the cross bars and engaged by the latches to prevent endwise movement of the cross bars, the latches being swung out of the notches in the cross bars by advancement of the slides, and means for advancing the cross bars when all of the latches have been swung out of the slotted blocks thereon.

24. The combination of slidable cross bars, supporting rods adjacent the cross bars, slides extending transversely of the cross bars in proximity thereto and each provided with a series of notches, blocks adjustable on the supporting rods, latches pivoted to the blocks and having one end projecting into the respective notches in the slides, slotted blocks adjustable on the cross bars and engaged by the latches to prevent endwise

movement of the cross bars, the latches being swung out of the notches in the cross bars by advancement of the slides, and means for advancing the cross bars when all of the latches have been swung out of the slotted blocks thereon, the cross bar blocks having slots in which are guided the slides.

25. The combination of slidable cross bars, supporting rods adjacent the cross bars, slides extending transversely of the cross bars in proximity thereto and each provided with a series of notches, blocks adjustable on the supporting rods, latches pivoted to the blocks and having one end projecting into the respective notches in the slides, slotted blocks adjustable on the cross bars and engaged by the latches to prevent endwise movement of the cross bars, the latches being swung out of the notches in the cross bars by advancement of the slides, means for advancing the cross bars when all of the latches have been swung out of the slotted blocks thereon, and counters actuated by the cross bars.

26. The combination of slidable cross bars, supporting rods adjacent the cross bars, slides extending transversely of the cross bars in proximity thereto and each provided with a series of notches, blocks adjustable on the supporting rods, latches pivoted to the blocks and having one end projecting into the respective notches in the slides, slotted blocks adjustable on the cross bars and engaged by the latches to prevent endwise movement of the cross bars, the latches being swung out of the notches in the cross bars by advancement of the slides, means for advancing the cross bars when all of the latches have been swung out of the slotted blocks thereon, and sorting guides operated from the cross bars.

27. The combination of a support for a record card, a series of slides corresponding to the respective records on the card, means for causing the operation of the slides respectively corresponding to the records of a card placed on the support, a plurality of sorting guides, mechanically operative means connecting the slides with the guides to cause the guides to be positively operated from the slides according to different predetermined groups of records on the card, said connecting means including a bar for each of the guides, a latch member for each bar corresponding to the individuals of the group indicating by such bar and arranged to engage the slides, the latch members being adjustable for engagement with different selecting slides to thereby vary the grouping corresponding with such bar, and means for advancing the cards from the support to the guides to be sorted thereby.

28. The combination of a support for a record card, a series of slides corresponding to the respective records on the cards, me-

chanically operative means arranged to positively operate the slides respectively corresponding to the records on a card on the support, a plurality of counters, a cross bar slidably supported for each of the counters, swinging latch members arranged adjacent each of the cross bars and operatively connected with the slides to be swung thereby, the cross bars being normally engaged by the latches and held against movement until operation of the slides by said means to swing the latches and release the cross bars, and means for advancing the cross bars when released from the latches to actuate the counters.

29. The combination of a support for a record card, a series of slides each provided with notches, mechanical means cooperating with the record cards and organized to positively actuate the slides from the record cards according to the respective records of a card on the support, a series of slidable cross bars, supporting rods adjacent the cross bars, blocks adjustable on the supporting rods, latches pivoted to the blocks and having one end projecting into the notches in the slides, slotted blocks adjustable on the cross bars and engaged by the latches to prevent endwise movement of the cross bars, the latches being arranged to be swung out of the notches in the cross bars upon advancement of the slides, and means for advancing the cross bars when all of the latches have been swung out of the slotted blocks thereon.

30. The combination of a support for a perforated card, card engaging means arranged adjacent the support and controlled by a perforated card on the support, a series of counters, and mechanically operative means connecting the controlling means with the counters for positively actuating the counters from the controlling means according to different predetermined groups of perforations in the cards.

31. The combination of a support for a perforated card, means arranged adjacent the support for engagement with a card thereon and controlled by the perforations in the card, a series of sorting guides, and mechanically operative means connecting the controlling means and the sorting guides from the controlling means to operate the sorting guide according to different predetermined groups of perforations in the cards, and means for advancing the cards from the support to the guides to sort the cards according to the groups of perforations.

32. In combination, a perforated supporting plate, a pin box having a plate perforated similarly to said plate, a series of pins in the box projecting through its said perforations, the box being movable relative to said perforated plate to cause the pins to

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pass through the pin plate and the perforations in a card resting on the plate, the pins having resilient supports whereby engagement of the pins with non-perforated portions of the card will prevent advancement of such pins, and a locking plate connected with the pin box and arranged to lock all of the pins penetrating the record in their advanced position.

33. The combination of a perforated supporting plate, a pin box having a similarly perforated plate, pins carried by the box projecting through its plate and arranged to enter the said record supporting plate upon advancement of the pin box toward the plate, springs on the pins permitting depression of the pins upon engagement with non-perforated portions of a record on the perforated supporting plate, lugs on the pins, and a lock plate arranged to engage said lugs on the pins advanced through the perforations of the record on the perforated support plate and prevent depression of such pins.

34. The combination of a perforated supporting plate, a pin box having a similarly perforated plate, pins in the box projecting through such plate, springs on the pins for holding the pins advanced, the pins being arranged to enter the perforations in said supporting plate upon approach of the pin box to the plate to cause the pins to penetrate the perforations in a card placed on said plate while the pins engaging the non-perforated portions of the card will be depressed, the pins having stop lugs on their projecting portions, a stop plate having keyhole perforations through which the said pins and lugs pass freely at the larger portions of the perforations in the stop plate in its normal position, and upon the stop plate being shifted it will engage the lugs on the pins advanced through the card perforations to prevent recession of such pins.

35. In combination, a perforated supporting plate, a box having a similarly perforated plate, a series of pins in the box projecting through said perforations, the box being movable relative to said perforated plate to cause the pins to enter the plate and pass through perforations on a card on the plate, the pins having resilient supports whereby engagement of the pins with non-perforated portions of the card will prevent advancement of such pins, a locking plate arranged to lock all of the pins not depressed in their advanced position, a series of push rods supported to be engaged by the said pins when advanced through a perforated card on the support, means for advancing the pin box to cause the pins to penetrate a card on the plate at its apertured portions, means for thereupon moving the lock plate to lock the advanced pins against recession into the pin box, and means to fur-

ther advance the pin box to cause the said locked pins to actuate the push rods corresponding therewith.

36. The combination of a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the respective slides, pin stops carried in said apertures of the plate and arranged to engage the respective slides when advanced, a series of push rods having their ends arranged to engage the pin stops in the apertured plate to shift the pins to engage their respective slides upon advancement of the push rods whereby upon shifting of the pin plate the respective slides will be shifted corresponding to the push rods that have been advanced.

37. The combination of a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the respective slides, pin stops carried in said apertures of the plate and arranged to engage the respective slides when advanced beyond the plate, a series of push rods having their ends arranged to engage the pin stops in the apertured plate to shift the pins to engage their respective slides upon advancement of the push rods, whereby upon shifting of the pin plate the respective slides will be shifted corresponding to the push rods that have been advanced, and locking means for the pin stops.

38. The combination of a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the respective slides, pin stops carried in said apertures of the plate and arranged to engage the respective slides when advanced beyond the plate, a series of push rods having their ends arranged to engage the push pins in the apertured plate to shift the pins to engage their respective slides upon advancement of the push rod, whereby upon shifting of the plate the respective slides will be shifted corresponding to the push rods that have been advanced, and locking means for the pin stops arranged to engage therewith by the advancement of the plate and pins.

39. The combination of a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the respective slides, pin stops carried in said apertures of the plate and arranged to engage the respective slides when advanced beyond the plate, a series of push rods having their ends arranged to engage the push pins in the apertured plate to shift the pins to engage their respective slides upon advancement of the push rod, whereby upon shifting of the pin plate the respective slides will be shifted corresponding to the push rods that have been advanced, stop lugs carried by the pin stops,

and a fixed plate having key-hole slots through which the pins and lugs pass freely in their normal position, but upon advancement of the plate the pins will shift into the smaller part of the slots and the lugs will be engaged to retain the pins advanced by the push rods.

40. In combination, a perforated supporting plate, a box having a similarly perforated plate, a series of push pins in the box projecting through its perforated plate, the box being movable relative to said supporting plate to cause the push pins to pass through the plate and the perforations in a card on the plate, the push pins having resilient supports whereby engagement of the push pins with non-perforated portions of the card will prevent advancement of such push pins, a locking plate connected with the pin box and arranged to lock all of the push pins not advanced through the record card, a series of push-rods arranged to be engaged by the push pins when advanced through the record card, a series of slides, a pin-plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the slides, pin stops in said apertures of the pin plate and arranged to engage the respective slides when advanced, said push rods having their ends arranged to engage the pin stops in the apertured plate to shift the pin stops to engage their respective slides upon advancement of the push-rods by said means, whereby upon shifting of the pin plate the respective slides will be shifted corresponding to the push rods that have been advanced from the said means engaging the record.

41. In combination, a perforated supporting plate, a box having a similarly perforated plate, a series of push pins in the box projecting through its perforated plate, the box being movable relative to said supporting plate to cause the push pins to pass through the plate and the perforations in a card on the plate, the push pins having resilient supports whereby engagement of the push pins with non-perforated portions of the card will prevent advancement of some of the push pins, a locking plate connected with the pin box arranged to lock all of the push pins not advanced through the record card, a series of push rods arranged to be engaged by the push pins when advanced through the record card, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the slides, pin stops in said apertures of the plate and arranged to engage the respective slides when advanced, said push rods having their ends arranged to engage the pin stops in the apertured plate to shift the pin stops to engage their respective slides upon advancement of the push rods by said means, where-

by upon shifting of the pin-plate the respective slides will be shifted corresponding to the push rods that have been advanced from the said means engaging the record, means for advancing the pin box to cause the pins to penetrate the card on the plate at its apertured portions, means for thereupon moving the lock plate to lock the advanced pins, means to further advance the pin-box to cause the advanced pins to actuate the push rods corresponding therewith and cause the stop pins to engage the slides, and means for moving the pin plate to advance the slides engaged by the push pins advanced.

42. In combination, a perforated supporting plate, a box having a similarly perforated plate, a series of push pins in the box projecting through its perforated plate, the box being movable relative to said supporting plate to cause the push pins to pass through the plate and the perforations in a card on the plate, the push pins having resilient supports whereby engagement of the push pins with non-perforated portions of the card will prevent advancement of some of the push pins, a locking plate connected with the pin box arranged to lock all of the push pins not advanced through the record card, a series of slides, a pin-plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the slides, pin stops in said apertures of the pin plate and arranged to engage the respective slides when advanced, said push rods having their ends arranged to engage the pin stops in the apertured plate to shift the pin stops to engage their respective slides upon advancement of the push rods by said means, whereby upon shifting of the pin-plate the respective slides will be shifted corresponding to the push rods that have been advanced from the said means engaging the record, and counters operated from the slides.

43. In combination, a perforated supporting plate, a box having a similarly perforated plate, a series of push pins in the box projecting through its perforated plate, the box being movable relative to said supporting plate to cause the push pins to pass through the plate and the perforations in a card on the plate, the push pins having resilient supports whereby engagement of the push pins with non-perforated portions of the card will prevent advancement of some of the push pins, a locking plate connected with the pin box arranged to lock all of the push pins not advanced through the record card, a series of push-rods arranged to be engaged by the push pins when advanced through the record card, a series of slides, a pin-plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the slides, pin stops in said

apertures of the pin plate and arranged to engage the respective slides when advanced, said push rods having their ends arranged to engage the pin stops in the apertured plate to shift the pin stops to engage their respective slides upon advancement of the push rods by said means, whereby upon shifting of the pin-plate the respective slides will be shifted corresponding to the push rods that have been advanced from the said means engaging the record, cross bars actuated from the slides, and counters actuated by the cross bars.

44. In combination, a perforated supporting plate, a box having a similarly perforated plate, a series of push pins in the box projecting through its perforated plate, the box being movable relative to said supporting plate to cause the push pins to pass through the plate and the perforations in a card on the plate, the push pins having resilient support whereby engagement of the push pins with non-perforated portions of the card will prevent advancement of some of the push pins, a locking plate connected with the pin box arranged to lock all of the push pins not advanced through the record card, a series of push rods arranged to be engaged by the push pins when advanced through the record card, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the plate having apertures one for each of the slides, pin stops in said apertures of the pin plate and arranged to engage the respective slides when advanced, said push rods having their ends arranged to engage the pin stops in the apertured plate to shift the pin stops to engage their respective slides upon advancement of the push rods by said means, whereby upon shifting of the pin plate the respective slides will be shifted corresponding to the push rods that have been advanced from the said means engaging the record, cross bars actuated from the slides, sorting guides actuated from the cross bars, and means for advancing the cards from the supporting plate to the guides to be sorted thereby.

45. The combination of a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, a series of push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respec-

tive slides to be shifted thereby, the cross bars being normally engaged by the latches and locked against movement but released therefrom when the latches are shifted by advancement of the slides, and means for advancing the cross bars when released from the latches.

46. The combination of a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, a series of push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars each being normally engaged by a plurality of the latches and locked against movement but released therefrom when all of the engaging latches are shifted by advancement of the proper slides, and means for advancing the cross bars when released from the latches.

47. The combination of a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, a series of push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars each being normally engaged by a plurality of the latches and locked against movement but released therefrom when all of the engaging latches are shifted by advancement of the proper slides, means for advancing the cross bars when released from the latches, and counters actuated by the cross bars.

48. The combination of a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, a series of push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon

advancement of the push rods, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being each normally engaged by a plurality of the latches and locked against movement but released therefrom when all of the engaging latches are shifted by advancement of the slides, and means for advancing the cross bars when released from the engaging latches.

49. The combination of a support for a record card, a series of push rods corresponding to the respective records on the cards, means cooperating with a card on the supporting plate for advancing the push rods only having corresponding perforations in the card, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, the push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods by said means, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being normally engaged by the latches and locked against movement but released therefrom when the latches are shifted by advancement of the slides, and means for advancing the cross bars when released from the latches.

50. The combination of a support for a record card, a series of push rods corresponding to the respective records on the cards, means cooperating with a card on the supporting plate for advancing the push rods only having corresponding perforations in the card, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, the push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods by said means, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being normally engaged by the latches and locked against movement but released therefrom

when the latches are shifted by advancement of the slides, means for advancing the cross bars when released from the latches, and counters actuated from the push bars.

51. The combination of a support for a record card, a series of push rods corresponding to the respective records on the cards; means cooperating with a card on the supporting plate for advancing the push rods only having corresponding perforations in the card, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, the push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods by said means, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being normally engaged by the latches and locked against movement but released therefrom when the latches are shifted by advancement of the slides, and means for advancing the cross bars when released from the latches, counters actuated from the push bars, sorting guides actuated from the cross bars, and means for advancing the cards from the support to the guides to be sorted thereby.

52. The combination of a support for a record card, a series of push rods corresponding to the respective records on the cards, means cooperating with a card on the supporting plate for advancing the push rods only having corresponding perforations in the card, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, the push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods by said means, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being each normally engaged by a plurality of the latches and locked against movement but released therefrom when all of the engaging latches are shifted by advancement of the slides, means for advancing the cross bars when released from the

latches, a series of sorting guides actuated from the cross-bars, and means for advancing the cards from the supporting plate to the guides to be sorted thereby.

5 53. In combination, a perforated record supporting plate, a pin box having a similarly perforated plate, a series of push pins in the box projecting through said perforations, the box being movable relative to
10 said perforated plate to cause the push pins to pass through perforations in a card on a plate, the push pins having resilient supports whereby engagement of such pins with non-perforated portions of the card will
15 cause recession of the pins, a locking plate connected with the pin box arranged to lock all of the pins advanced, a series of push rods supported to be engaged by the said pins when advanced through a perforated
20 card on the support, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when
25 advanced in the plate, a series of push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods, means for advancing
30 the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being
35 normally engaged by the latches and locked against movement but released therefrom when the latches are shifted by advancement of the slides, and means for advancing the cross bars when released from the latches.

40 54. In combination, a perforated record supporting plate, a pin box having a similarly perforated plate, a series of push pins in the box projecting through said perforations, the box being movable relative to
45 said perforated plate to cause the push pins to pass through perforations in a card on a plate, the push pins having resilient supports whereby engagement of such pins with non-perforated portions of the card will
50 cause recession of the pins, a locking plate connected with the pin box arranged to lock all of the pins advanced, a series of push rods supported to be engaged by the said pins when advanced through a perforated
55 card on the support, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when
60 advanced in the plate, a series of push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being normally engaged by the latches and locked against movement but released therefrom when the latches are shifted by advancement of the slides, and means for advancing the cross bars when released from the latches.

ment of the push rods, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides
70 to be shifted thereby, the cross bars being normally engaged by the latches and locked against movement but released therefrom when the latches are shifted by advancement of the slides, means for advancing the cross
75 bars when released from the latches, sorting guides operated from the cross bars, and means for advancing the cards from the supporting plate to the guides to be sorted thereby.

80 55. In combination, a perforated record supporting plate, a pin box having a similarly perforated plate, a series of push pins in the box projecting through said perforations, the box being movable relative to said
85 perforated plate to cause the push pins to pass through perforations in a card on a plate, the push pins having resilient supports whereby engagement of such pins with non-perforated portions of the card will cause recession of the pins, a locking plate connected with the pin box arranged to lock
90 all of the pins advanced, a series of push rods supported to be engaged by the said pins when advanced through a perforated card on the support, means for advancing the pin box to cause the push pins to penetrate the card on the plate at its apertured portions, means for thereupon moving the
95 lock plate to lock the advanced pins against return into the pin box, means to further advance the pin box to cause the advanced pins to actuate the push rods corresponding therewith, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced
100 in the plate, a series of push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being normally engaged by the latches and locked against
105 movement but released therefrom when the latches are shifted by advancement of the slides, and means for advancing the cross bars when released from the latches.

110 56. In combination, a perforated supporting plate, a pin box having a similarly perforated plate, a series of push pins in the box projecting through said perforations, the box being movable relative to said perforated plate to cause the push pins to
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pass through perforations in a card on a plate, the push pins having resilient supports whereby engagement of such pins with non-perforated portions of the card will cause recession of the pins, a locking plate connected with the pin box arranged to lock all of the pins advanced, a series of push rods supported to be engaged by the said pins when advanced through a perforated card on the support, means for advancing the pin box to cause the push pins to penetrate the card on the plate at its apertured portions, means for thereupon moving the lock plate to lock the advanced pins against return into the pin box, means to further advance the pin box to cause the advanced pins to actuate the push rods corresponding therewith, a series of slides, a pin plate supported adjacent the slides and movable parallel therewith, the pin plate having apertures one for each of the slides, pin stops in said apertures of the plate arranged to engage the respective slides when advanced in the plate, a series of push rods having their ends arranged to engage the pin stops in the plate to shift them to engage their respective slides upon advancement of the push rods, means for advancing the pin plate to shift the slides engaged by the pin stops advanced by the push rods, a series of cross bars slidably supported, latches connected with the respective slides to be shifted thereby, the cross bars being each normally engaged by a plurality of latches and locked against movement but released therefrom when all of the engaging latches are shifted by advancement of the slides, means for advancing the cross bars when released from the latches, sorting guides operated from the cross bars, and means for advancing the cards from the supporting plate to the guides to be sorted thereby.

57. The combination with the supporting plate, of two sets of pairs of engaging rollers to engage a card on the plate, a driving shaft, means for continuously rotating the rolls from the driving shaft, a detent arranged to be engaged by the card advanced onto the plate when in registering position thereon, and means for intermittently swinging the detent at a predetermined period in the rotation of the driving shaft.

58. The combination with the supporting plate, and the feed rollers, the driving shaft, means for operating the rollers continuously from the driving shaft, of a detent member for arresting the card in proper position on the supporting plate for operation with its engaging means, a cam on the driving shaft, a lever connecting with the detent member at one end and having its other end engaging said cam, the cam being arranged to normally hold the lever with the detent in the card arresting position during the operation

of said card engaging means, the cam having a lever engaging portion whereby the lever will swing the detent to free the card for advancement by the rollers.

59. The combination with the supporting plate, and the feed rollers, the driving shaft, means for operating the rollers continuously from the driving shaft, of a detent member for arresting the card in proper position on the supporting plate for operation with its engaging means, a cam on the driving shaft, a lever connecting with the detent member at one end and having its other end engaging said cam, the cam being arranged to normally hold the lever with the detent in the card arresting position during the operation of said card engaging means, a spring arranged to press the lever against the cam, the cam having a depression into which the lever is pressed by the spring to swing it and shift the detent to free the card for advancement by the rollers.

60. The combination of a driving shaft, a card support, a pair of shafts carrying rollers in position to engage the top of a card on the support, means for driving said rollers continuously from the driving shaft, a pair of shafts opposite said pair of shafts respectively and carrying rollers coöperating with the rollers on said shafts to engage the lower surface of a card on the support whereby the card is advanced, a pair of links at each end of said latter shafts by which the rollers on the latter shafts can swing to and from their coöperating rollers, and springs connecting the links whereby the rollers are yieldingly pressed together.

61. The combination of a pair of perforated plates in close proximity with their perforations registering, a pin box carrying a series of pins arranged to enter the respective openings in the plates, the pins having resilient supports whereby engagement with a perforated card inserted between the plates will prevent advancement of the said pins at the portions of the card not having perforations registering with the plate perforations.

62. In combination, a pair of perforated plates arranged in close proximity with their perforations registering, a pin box carrying a plurality of pins arranged to pass through the perforated plates on approach of the pin box thereto, the pins being shiftable in the box whereby they can recede on engagement with non-perforated portions of a perforated card placed between the plates, locking means for the pins, an indicating means operated through the advanced and locked pins.

63. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with the card, a series of sorting guides, and me-

chanically operative means connecting the controlling means with the sorting guides for positively actuating the guides from the record card engaging means whereby the sorting guides are operated.

64. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card, a series of sorting guides, and mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the card engaging means to operate the guides according to different predetermined groups of records on the cards.

65. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card, a series of sorting guides, and mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the record card engaging means whereby the sorting guides are operated, according to different predetermined groups of records on the cards, means for operating the said

controlling means, and means for operating the card connecting means.

66. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card thereon, a series of sorting guides, mechanically operative means connecting the controlling means and the sorting guides for positively actuating the guides from the card engaging means, and a series of counters one for each of the sorting guides and operatively connected therewith.

67. The combination of a support for a record card, controlling means arranged adjacent the support for engagement with a card on the support, a series of counters, and mechanically operative means connecting the controlling means with the counters for positively actuating the counters from said controlling means according to different records on the cards.

JAMES POWERS.

Witnesses:

WILLIAM H. REID,
FRED. J. DOLE.