

May 6, 1952

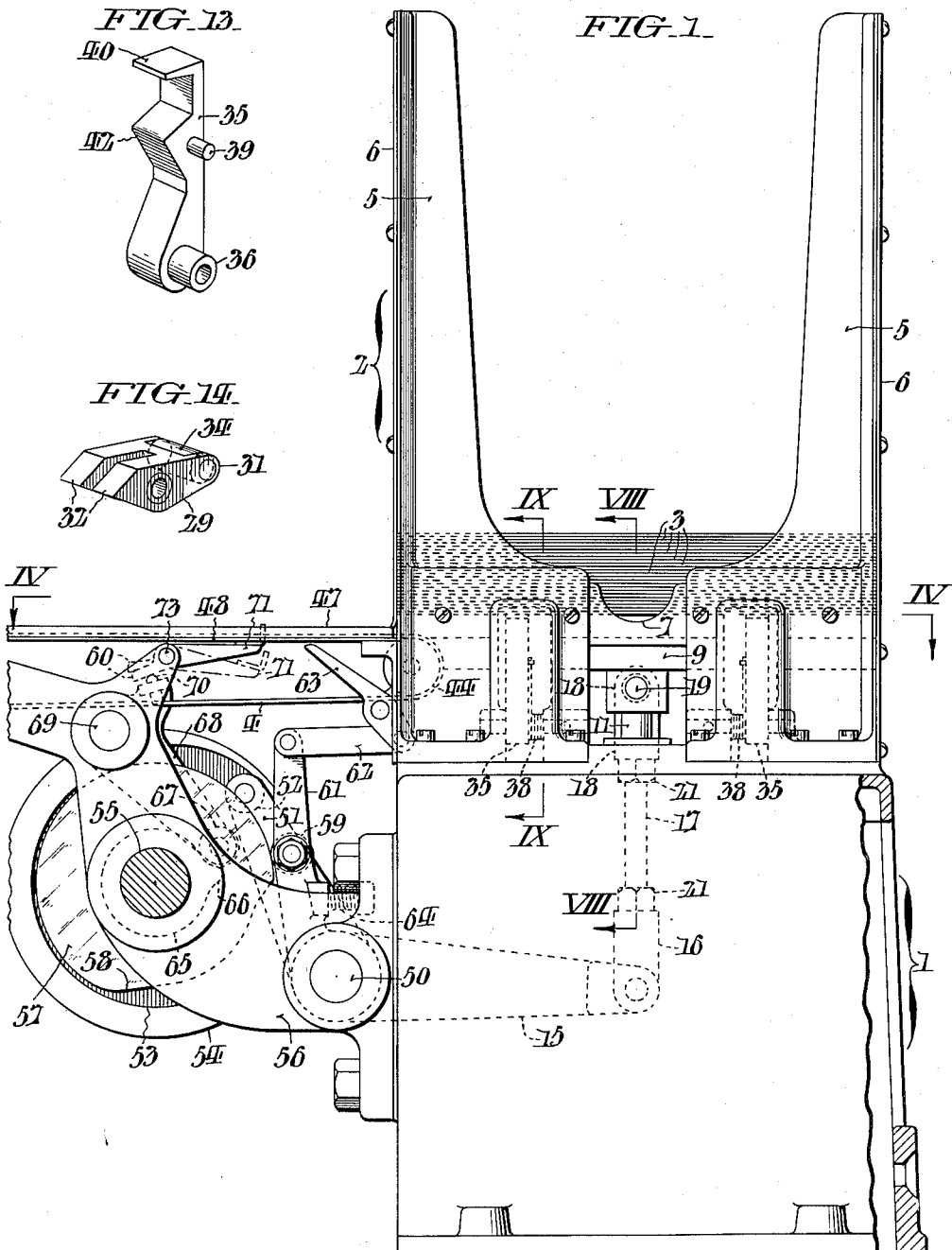
T. A. FEDERWITZ

2,595,346

STACKING DEVICE FOR CARDS OR THE LIKE

Filed Sept. 4, 1948

6 Sheets-Sheet 1



WITNESSES

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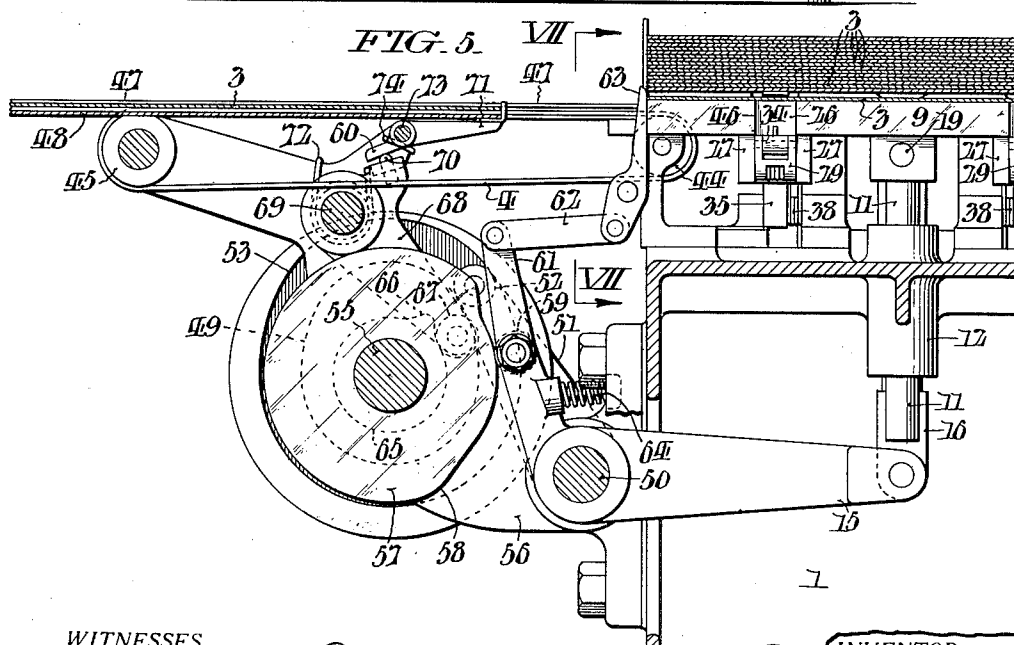
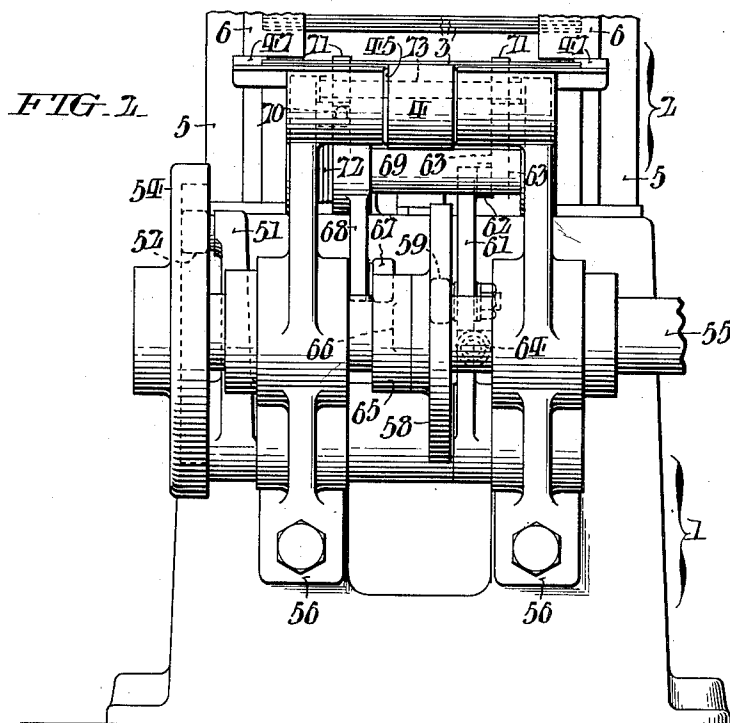
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6 Sheets-Sheet 2



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FIG. 3.

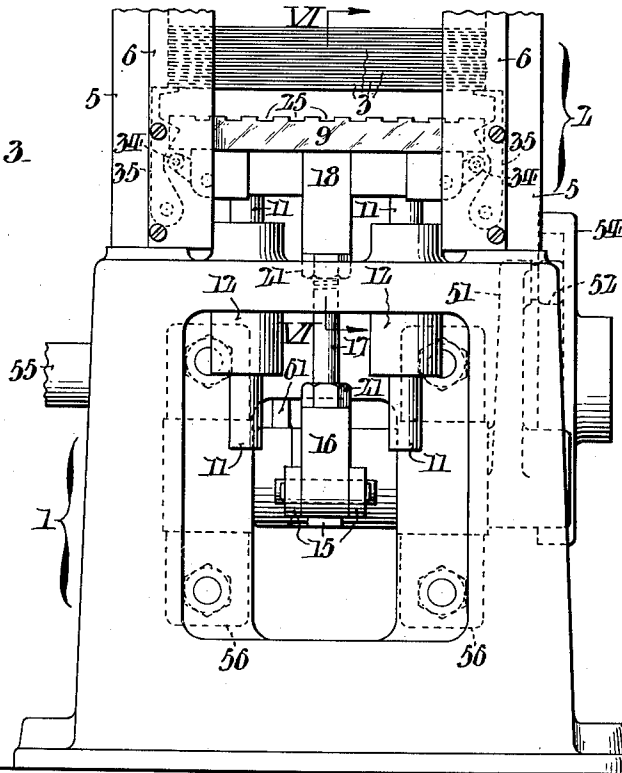
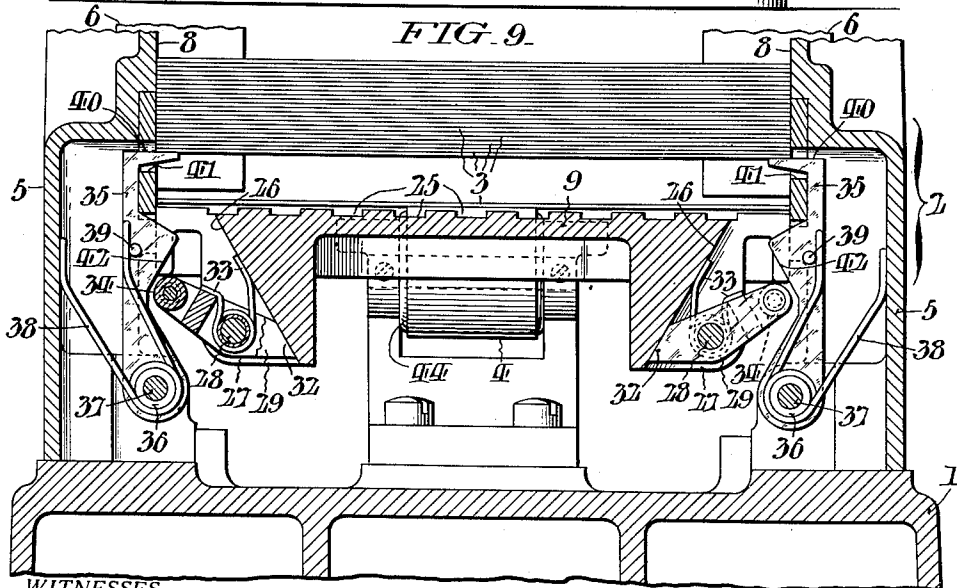


FIG. 9.



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FIG. 4

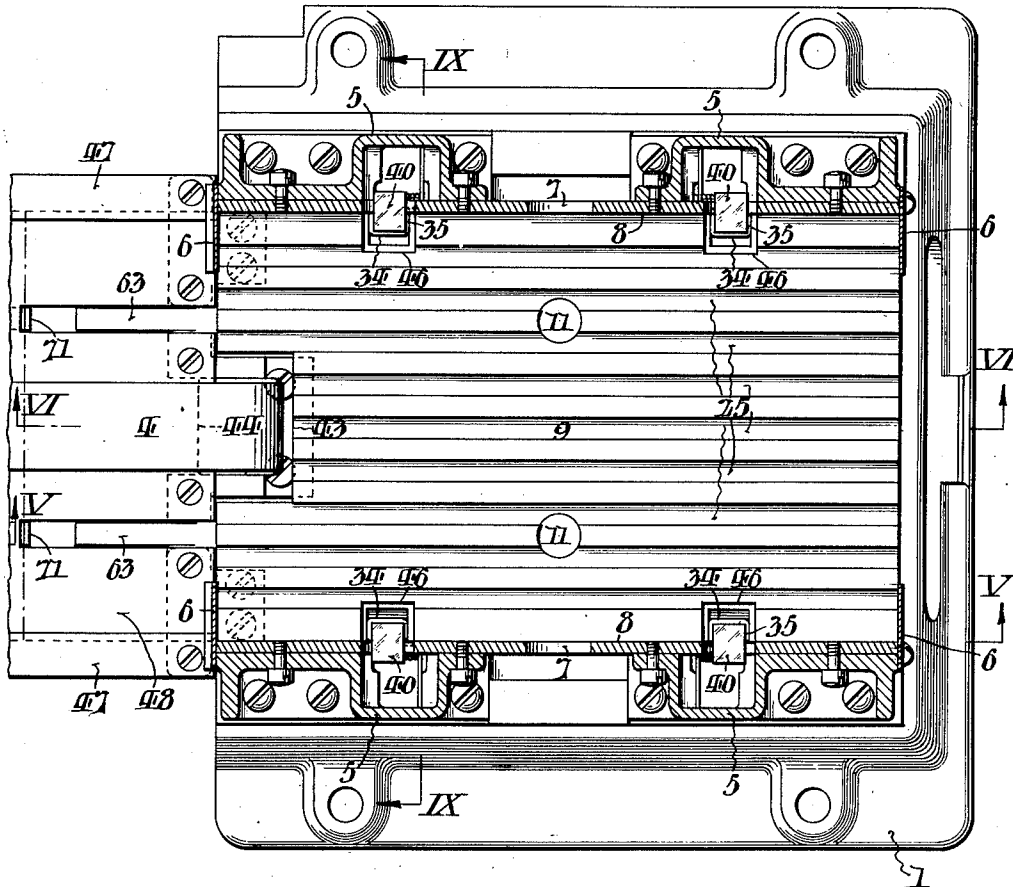
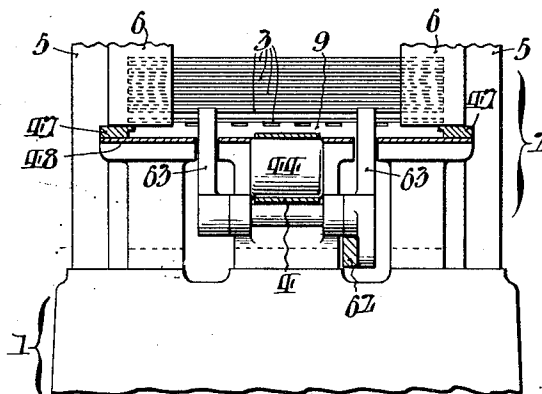


FIG. 7



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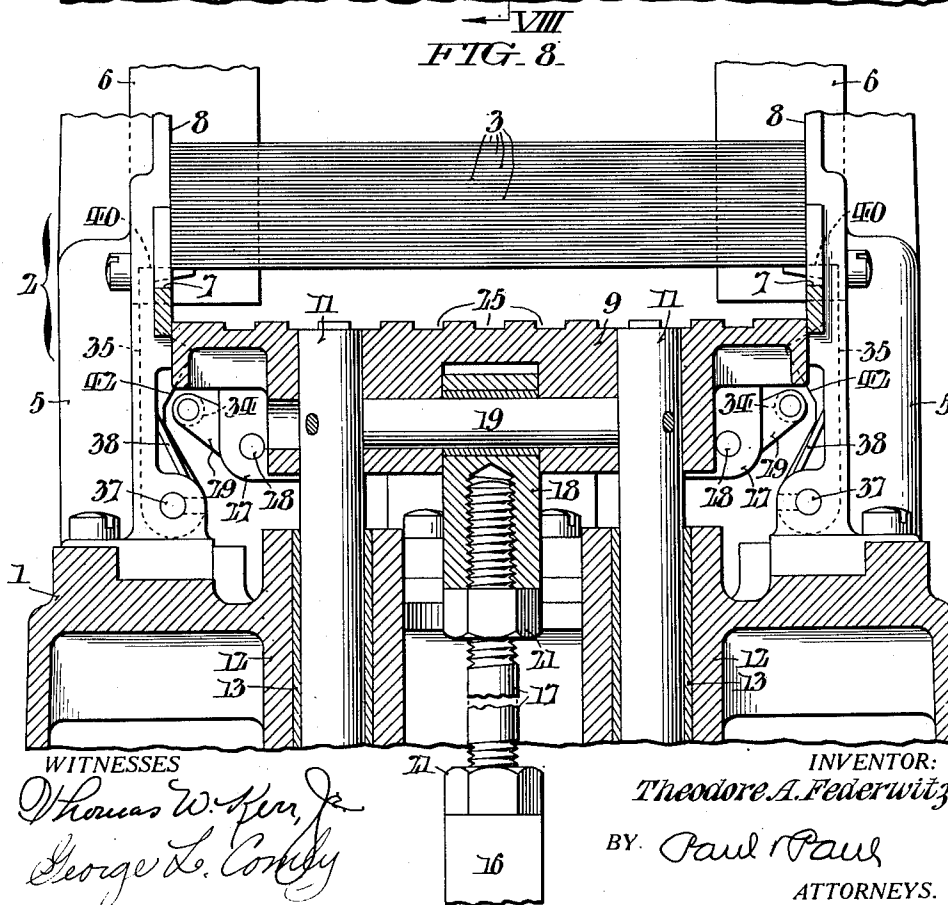
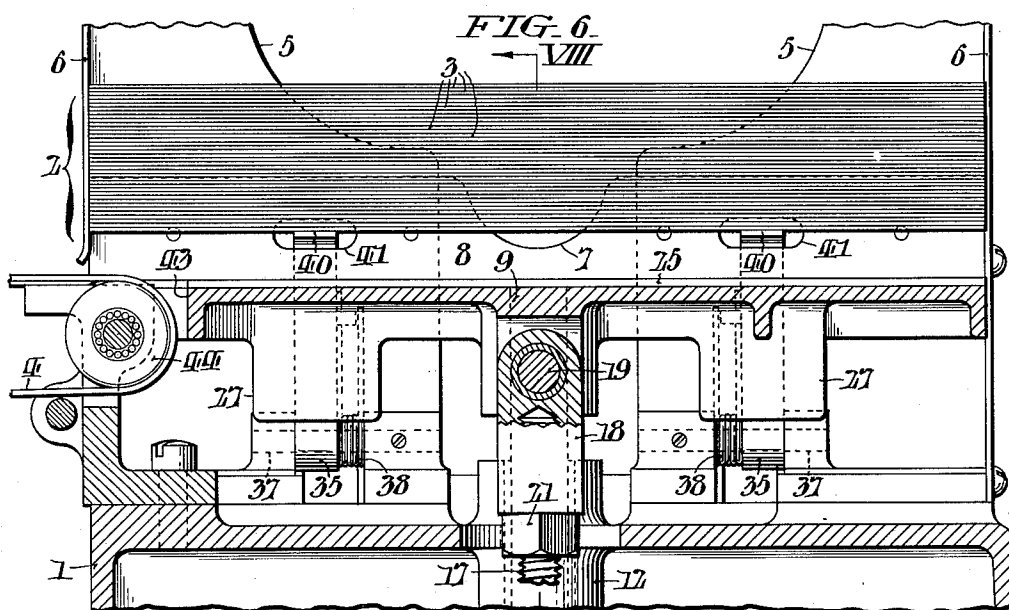
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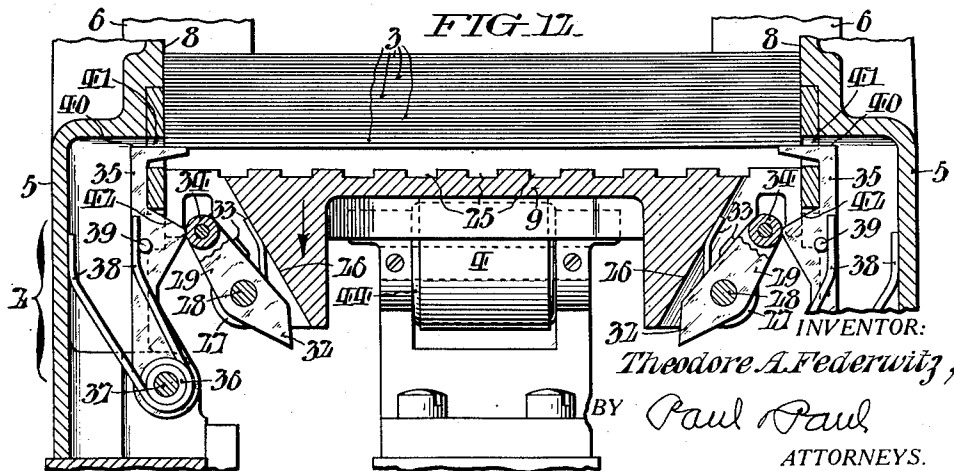
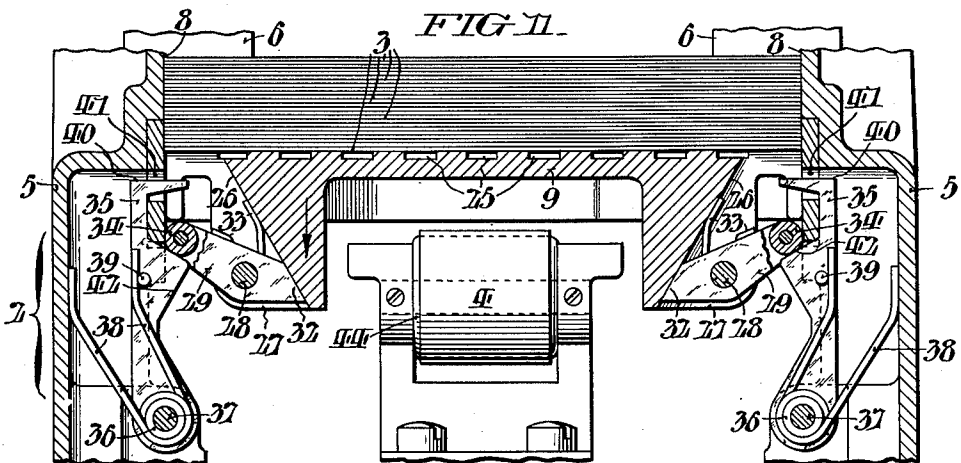
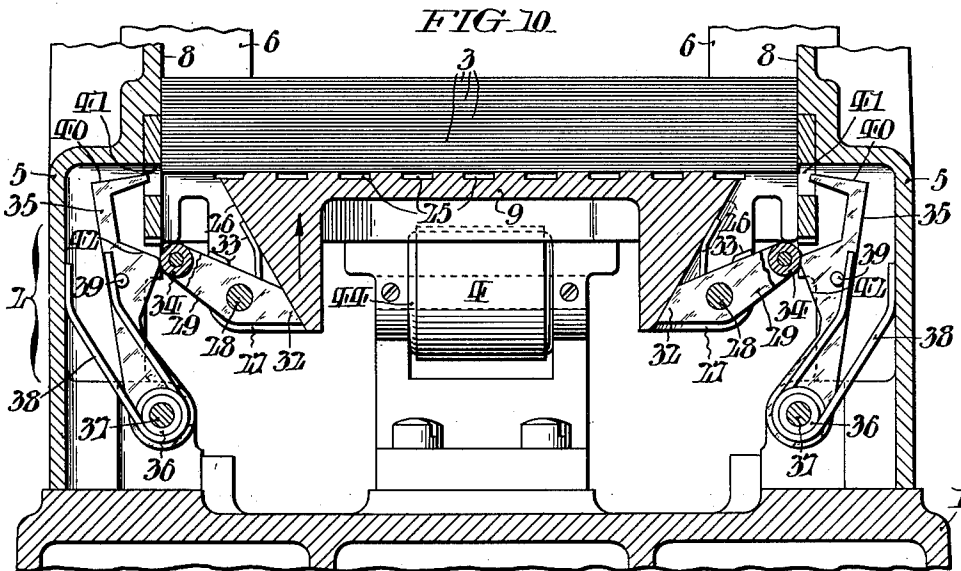
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STACKING DEVICE FOR CARDS OR THE LIKE

Filed Sept. 4, 1948

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,595,346

STACKING DEVICE FOR CARDS OR THE LIKE

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Application September 4, 1948, Serial No. 47,834

8 Claims. (Cl. 271—87)

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This invention relates to a stacking device and more particularly to a device adapted to receive individual cards or the like, one at a time, and to cause them to be automatically stacked in vertical alignment, each new card being introduced below the preceding cards so that the order of the cards from top to bottom in the stacked pile is the same order as that in which the cards are fed to the stacking device. This device, although capable of a variety of uses, has special utility when used in association with a data writing machine, such as an addressing machine. With such use of the stacking device master cards arranged in appropriate order for filing are progressed singly through an addressing machine, and as an incident to such progression names, addresses and other data appearing on the master cards are transferred to and imprinted upon a receiving sheet, subsequently used for mailing purposes. Upon the discharge of the master cards from the addressing machine it is obviously desirable that the cards be re-stacked in exactly the same order as they were stacked when brought to the machine. The device of my present invention is well suited to perform such an operation, or any analogous stacking operation, wherein cards or like objects are progressively fed to the bottom of a receptacle, each card entering below the preceding card.

The principal object of my invention is to provide a stacking device of the character indicated which is capable of automatically, efficiently and rapidly handling the objects to be stacked.

Other objects and advantages of the invention, including those derived from simplicity and economy as to manufacture and operation, will become more fully apparent from the description of one embodiment of the invention set forth hereinafter, having reference to the accompanying drawings whereof:

Fig. 1 represents a side elevation, with certain parts broken away to reveal interior details, of a stacking device of this invention;

Fig. 2 represents a front view of the same;

Fig. 3 represents a rear view of the same;

Fig. 4 represents an enlarged horizontal cross-section of the same taken as indicated by the arrows IV—IV of Fig. 1.

Fig. 5 is a fragmentary longitudinal vertical section taken as indicated by the arrows V—V of Fig. 4 with parts shown in the positions they occupy as the table is rising.

Fig. 6 represents an enlarged vertical longitudinal cross section of parts of the device taken as indicated by the arrows VI—VI of Figs. 3 and 4;

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Fig. 7 represents a fragmentary vertical sectional view taken as indicated by the arrows VII—VII of Fig. 5;

Figs. 8 and 9 represent enlarged vertical transverse cross-sections of parts of the device taken as indicated respectively by the arrows VIII—VIII of Figs. 1 and 6 and IX—IX of Figs. 1 and 4;

Figs. 10, 11 and 12 represent vertical transverse cross-sections, generally similar to Fig. 9, but showing the table and the various mechanical parts associated with it in different positions to illustrate the sequence of movements involved;

Fig. 13 represents a perspective view of one of the fingers used for supporting the cards in elevated position within the receptacle to which they are admitted; and

Fig. 14 represents a perspective view of one of the swinging cams used for actuating the aforementioned fingers.

With special reference to Figs. 1 to 3 the embodiment of the invention shown in the drawings comprises a pedestal 1 which may be mounted on a floor or foundation and which supports a receptacle 2 in which cards 3 are adapted to be stacked, one on top of another, in vertical alignment. In the illustrated example the cards 3 are transported to the receptacle 2 by a feeding mechanism in the form of an endless belt 4. It may be assumed that this belt 4 receives the cards, one at a time, as they are discharged from a data writing machine such as the machine described and claimed in my co-pending application for Letters Patent, Serial No. 52,932, filed October 5, 1948.

The stacking receptacle 2 is open at one end near the bottom, this being the end into which the cards are admitted from the belt 4. By means of upright guide brackets 5, each including an end plate 6 so as to define a right-angular corner the cards within the receptacle are maintained in vertical alignment. Between the four upstanding guide brackets 5 the receptacle is desirably open and at each side includes a relatively deep opening 7 so that the operator may with his fingers readily grasp the entire stack of cards in the receptacle and remove it by lifting it clear of the upper ends of the guide brackets 5.

Disposed within the receptacle 2 and fitting between the side walls 8 thereof is a table 9 which is movable up and down within predetermined adjustable limits. The table 9 has depending therefrom, see Figs. 3 and 8, a pair of cylindrical posts 11 which fit within annular bearings 12 having lubricated bushings 13, and thus is guided in its vertical travel. Reciprocation of the table 9

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is effected by means of arm 15, see Fig. 1, pivotally joined to a fitting 16 on the lower end of a threaded connecting rod 17. At its upper end the connecting rod 17 has a similar fitting 18 pivotally connected to a pin 19 at the underside of the table. In an obvious manner rocking of the lever arm 15, which is accomplished in timed relation to the discharge of cards to the belt 4, causes the table 9 to be moved up and down and to receive a card from the belt while in its lowered position. Adjustment of the upper and lower limits of movement of the table 9 is effected by means of nuts 21 engaging the upper and lower threaded ends of the connecting rod 17 and the fittings 16 and 18 to which it is joined.

As best shown in Figs. 1 and 5, the lever arm 15 is fixed to a rotatable shaft 50 and is rigidly joined through the shaft 50, to a crank arm 51 having at its free end a roller 52 which engages a cam surface 53 formed internally on a flanged disk 54 mounted on a shaft 55. Shaft 55 is journaled in brackets 56 bolted to the front of the pedestal 1. The cam surface 53 together with a similar interior surface 49, forming a closed cam track, are so configured that rotation of the shaft 55 causes the table 9 to be reciprocated and to dwell momentarily at certain points in its movement. It may be assumed that shaft 55 is driven by mechanism (not shown) associated with the data writing machine from which cards are discharged to the stacking device, and that the movement of the table 9 may thus be timed in relation to the feeding of the cards to the endless belt 4.

On the shaft 55 there is mounted a disk 57 having a cam surface 58 at its periphery which engages a roller 59 on a lever arm 61 fulcrumed to swing freely about shaft 50. The lever arm 61 is pivotally connected to a link 62 which in turn actuates pivoted levers 63 which act as pushers for insuring that each card is properly fed to the receptacle 2. A spring 64 maintains the roller 59 in engagement with cam surface 58.

On the shaft 55 there is also mounted a disk 65 having a cam surface 66 which engages a roller 67 on a lever arm 68. The lever arm 68 is fulcrumed on a shaft 69, which is journaled in the brackets 56, and carries a projecting pin 70 which engages an arm 60 which actuates a pair of stop fingers 71. A spring 72 maintains the roller 67 in engagement with cam surface 66. The stop fingers 71 are fixed on a shaft 73 and urged by a spring 74 to a position where they obstruct the movement of cards towards the receptacle 2. When the raised portion of cam surface 66 strikes the roller 67, lever arm 68 is swung upwardly and stop fingers 71 are then swung downwardly, against the pressure of spring 74, as shown in dot-and-dash lines in Fig. 1, to a position where they no longer obstruct movement of the cards 3.

The cards 3 as discharged from the data writing machine onto the endless belt 4 are progressed towards the receptacle 2 between guides 47, see Fig. 7, supported on a slotted plate 48, which prevent any lateral or vertical deviation of the cards in their path towards the receptacle. The cards 3 are momentarily halted by the stop fingers 71, but at the proper point in the rotation of shaft 55, when the table 9 is lowered and in a position ready to receive a card, the stop fingers are depressed, permitting the card to continue in its travel; at this point the pusher fingers are depressed. As each card enters the receptacle 2 its movement continues, by virtue of frictional

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engagement with the belt 4, until its leading edge strikes the rear wall of the receptacle. At this point the pusher fingers 63 swing upwardly behind the trailing edge, giving the card the final impetus to carry it to its ultimate position within the receptacle, and at the same time, by reason of the shape of cam surface 58, the pusher fingers 63 are caused to dwell momentarily adjacent the edge of the table preventing any rebound as the card strikes the rear wall.

Thus the cards are fed, not only in timed relation to the up and down movement of the table, but with positive insurance that they will enter the receptacle at the proper moment and without deviation from their proper path, and will be centered at the bottom of the receptacle in strict vertical alignment with all other cards stacked therein.

Preferably the table has a series of grooves 25 in its upper surface to minimize any tendency of the cards to adhere thereto. At each side of the table, as best shown in Figs. 4, 6 and 9 to 12, downwardly and inwardly inclined surfaces 26 are provided, and pairs of flanges 27 project outwardly from these surfaces. On each flange 27 is a pin 28 carrying a swinging cam 29, shown in detail in Fig. 14. One end of each cam 29 is bifurcated and rounded as indicated at 31, and the other end is bifurcated and pointed as indicated at 32. A spring 33 having one end bearing against a ledge of the cam and the other end bearing against the inclined surface 26 beneath the table 9 urges the rounded end of the cam to swing downwardly and away from the table. Such movement is limited, however, by the engagement of the pointed end 32 with the inclined surface 26. The rounded end 31 of each cam 29 carries a roller 34 which is adapted to engage a swinging finger 35.

At each side of the table 9 is mounted a pair of swinging fingers 35. Each finger 35 has at its lower end an annular bearing 36 which surrounds and engages a pivot pin 37 supported on the frame within which the table 9 moves. The fingers 35 are housed at the sides of the table and are urged to swing towards the table by springs 38 whereof one end engages the wall of the housing and the other end engages a stud 39 on the finger. At its free end each finger 35 has an inwardly projecting horizontal ledge 40 which is adapted to penetrate through an opening 41 in the side wall of the receptacle to support the stack of cards therein when the table 9 is lowered.

Between its free end and its point of connection with the pivot pin 37 each finger has a wedge-shaped cam surface 42 which is adapted to be engaged by the roller 34 of the adjacent cam 29. As the table 9 moves upwardly the rollers 34 at the ends of the cams 29 are caused to engage first one side and then the other of the wedge-shaped cam surfaces 42 with resulting movements of the fingers 35 through the various positions represented in Figs. 9 to 12. The springs 38 associated with the fingers 35 are somewhat stronger than the springs associated with the cams 29 so that upon the downward movement of the table 9 the fingers remain in the positions represented in Figs. 11 and 12.

At the front end of the table 9 adjacent to the belt 4 the table is cut away, as indicated at 43 in Fig. 4, to receive the belt and the idle roller 44 upon which it is mounted. Thus the belt 4, when actuated by the driving roller 45, serves to transport and positively advance each card 3, confined by guide plates 47, into the receptacle 2,

carrying it to a position where it engages the rear wall formed by the end plates 6. At each side the table 9 is also cut away, as indicated at 46, to form four recesses which accommodate the four fingers 35, there being sufficient clearance between these elements 50 that lowering and raising of the table does not obstruct the lateral swinging of the fingers.

The operation of the stacking device of this invention is as follows: Let it be assumed that the receptacle 2 of the stacking device is empty and that the data writing machine with which the device is associated is placed in operation with the result the master cards 3 are discharged from such machine on to the endless belt 4 in succession. Each time a card is introduced into the receptacle 2 the table 9 will occupy a position such as represented in Fig. 9. As the first card is thus introduced to the receptacle the swinging fingers 35 will be in a vertical position with their horizontal ledges 40 projecting into the receptacle through the openings 41. Thereupon as the table 9 is elevated by means of the rocking of the lever 14 the rollers 34 of cams 29 strike the wedge-shaped cam surfaces 42 of the fingers 35 and cause the fingers to be swung outwardly away from the table to positions as shown in Fig. 10. It will be noted that the cams 29, during this movement, have their inner pointed ends 32 in engagement with the inclined surfaces 26 beneath the table so that the cams positively actuate the fingers. As the table 9 reaches its upper limit of travel each cam roller 34 passes over the apex of the adjacent wedge-shaped cam surface 42, permitting the engaged finger 35 to swing inwardly under the influence of its spring 38. Thus the fingers reach the positions represented in Fig. 11. The first card introduced into the receptacle 2 has in the meanwhile been elevated by the table to a position above the level of the horizontal ledges 40 of the fingers 35.

After the table 9 has reached the upper limit of its travel it commences to descend. The card previously introduced drops to the level of the ledges 40 and is then held in elevated position in the manner shown in Fig. 12. Further descent of the table is accompanied by an inward movement of the cams 29 against the pressure of their springs 33. The fingers 35 remain in vertical position unaffected by the lowering of the table. When the table 9 reaches its lower limit of the travel it is ready to receive a new card, and upon the introduction of that card, the card or cards already received within the receptacle are held in elevated position by the ledges 40 as shown in Fig. 9. This operation is repeated and continued until the receptacle 2 is completely filled with cards whereupon the entire stack is removed from the receptacle by hand to make room for additional cards.

It will be observed that the fingers 35 are movable into and out of the receptacle in response to the downward and upward movements of the table 9, that the up-stroke of the table serves to elevate the card or cards within the receptacle, and that the horizontal ledges 40 of the fingers 35 serve to support the pile in elevated position during the down stroke of the table so that new cards may be admitted singly to the bottom of the pile at each lowering of the table. Hence the proper order of stacking is preserved at all times.

Although the stacking device of this invention has been described in detail with reference to one specific embodiment adapted for a particular

purpose, namely, the stacking of the cards within a receptacle associated with a data writing machine, it will be readily apparent to those skilled in the art that the device has many other uses and that the mechanical elements thereof, including particularly the card feeding mechanism, the swinging cams and fingers, may be considerably varied and that equivalent mechanism may be employed for accomplishing the same result. All such changes, including reversals of parts and the use of certain features of this invention without a corresponding use of other features, are considered to be within the spirit of the invention as defined in the annexed claims.

Having thus described my invention, I claim:

1. A stacking device comprising a receptacle for maintaining a pile of cards or the like in vertical alignment, a table movable up and down at the base of said receptacle, feeding mechanism for successively advancing individual cards and introducing them into the receptacle including a conveyor and a feeding pusher reciprocable above and below said conveyor in timed relationship to the movement of the table for engagement with the trailing edge of each card, means for reciprocating said feeder pusher for positive advancement of the card on said table, a cam element maintaining said feeding pusher adjacent the table for a limited period after advancement of the card to the table, and card supporting devices movable into and out of the receptacle incident to the movement of said table to support the cards and permit the introduction of a subsequent card at the bottom of the pile when the table is lowered.

2. A stacking device comprising a receptacle for maintaining a pile of cards or the like in vertical alignment, a table movable up and down at the base of said receptacle, feeding mechanism for successively advancing individual cards and introducing them into the receptacle at the base thereof, including an endless belt and a feeding pusher in the form of a pivotally mounted lever movable above said belt for engagement with the trailing edge of each card and positive advancement of the card on said table, cam means associated with said feeding pusher for causing said pusher to dwell momentarily adjacent said table to prevent rebound of the card from the table, and card supporting devices movable into and out of the receptacle incident to the up and down movement of said table to support the cards and permit the introduction of a subsequent card at the bottom of the pile when the table is lowered.

3. A stacking device comprising a receptacle for maintaining a pile of cards or the like in vertical alignment, a table movable up and down at the base of the receptacle, a feeding mechanism for successively advancing individual cards to a position on said table, a plurality of swinging cams on said table, a plurality of coacting swinging fingers on said receptacle, at opposite sides of the table, said fingers being adapted for outward swinging movement under the influence of the cams during the up stroke of the table and the cams being adapted for inward swinging movement under the influence of the fingers during the down stroke of the table while the stacked cards are supported by the fingers.

4. A stacking device comprising a receptacle for maintaining a pile of cards or the like in vertical alignment, a table movable up and down at the base of the receptacle, a feeding mechanism for successively advancing individual cards to a position on top of said table, a plurality of

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swinging cams pivoted on said table with means for restricting the outward pivotal movement of said cams, and a plurality of swinging fingers pivoted on said receptacle, each finger having a wedge shaped cam surface including a lower cam following section for coaction with one of said cams on the table to swing the finger outwardly during the up stroke of said table and an upper cam section to permit the inward swinging of said finger subsequent to its outward swinging during the up stroke of said table and to swing said cam inwardly during the down stroke of said table while the stacked cards are supported by the fingers.

5. A stacking device comprising a receptacle for maintaining a pile of cards or the like in vertical alignment, a table movable up and down at the base of said receptacle, a feeding mechanism for successively advancing individual cards to a position on top of said table and within said receptacle, a plurality of swinging fingers pivotally connected at opposite sides of the receptacle for swinging movement toward and away from said table, said fingers having horizontal ledges at their free upper ends and wedge shaped cam surfaces disposed between their free ends and their pivot points, and a plurality of swinging cams pivotally attached to said table having cam surfaces in operative contact with the corresponding cam surfaces of the swinging fingers while the table is moving up and down.

6. A stacking device comprising a receptacle for maintaining a pile of cards or like articles in vertical alignment, a table movable up and down at the base of said receptacle, feeding mechanism for successively advancing articles to a position on said table, a plurality of swinging cams pivotally attached to said table, a plurality of cam mounting springs operatively engaging said cams to urge the outward movement thereof, restrictive means limiting the outward movement of said cams, a plurality of swinging fingers pivotally attached to said receptacle for contact with said cams while the table is moving up and down, a plurality of finger mounting springs operatively engaging said fingers to urge the inward pivotal movement thereof, and restrictive means limiting the inward movement of said fingers, each finger having a wedge shaped cam surface including a lower cam following surface for engagement with the cam to swing the finger outwardly under the influence of the cam during the up stroke of the table, and an upper cam surface to permit the inward swinging of said finger under the influence of the finger mounting spring subsequent to the outward swinging during the up stroke of the table and to swing the cam inwardly against the force of the cam mounting spring during the downward stroke of the table, the finger mounting spring being stronger than the cam mounting spring.

7. A stacking device comprising a receptacle

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for stacked cards or like articles, a table movable up and down in said receptacle, an article supporting finger pivotally mounted for swinging movement to and from article supporting position in said receptacle, said finger having an article supporting element disposed at a level intermediate the uppermost and lowermost levels assumed by the table as it moves up and down in the receptacle, means for feeding articles to the table below the level of said article supporting element, a swinging cam pivotally mounted on said table for coaction with the swinging finger to swing said finger out of said article supporting position under the influence of the cam during the up stroke of said table, and said swinging finger having an indented surface also coacting with said cam to permit said finger to swing to article supporting position when the table is above said finger, and to remain in article supporting position during the down stroke of the table.

8. A stacking device comprising a receptacle for stacked articles such as cards or the like, a table reciprocable up and down in said receptacle, article supporting means including an article supporting finger mounted on said receptacle for swinging movement into and out of article supporting position thereon, a swinging cam pivotally mounted on said table for operative contact with said swinging finger, said finger being disposed at a level intermediate the uppermost and lowermost levels assumed by the table as it moves up and down in the receptacle, said table being adapted for reception of the articles to be stacked at a level below the level of said finger, cam follower means on said article supporting finger disposed in the path of movement of said cam for swinging movement out of article supporting position during the up stroke of the table when the table is below the level of the finger, means for returning said finger to article supporting position when the table is above the finger, and cam means on said finger constructed and arranged to swing said swinging cam away from said finger while the finger is in article supporting position, during the down stroke of the table.

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