

March 5, 1946.

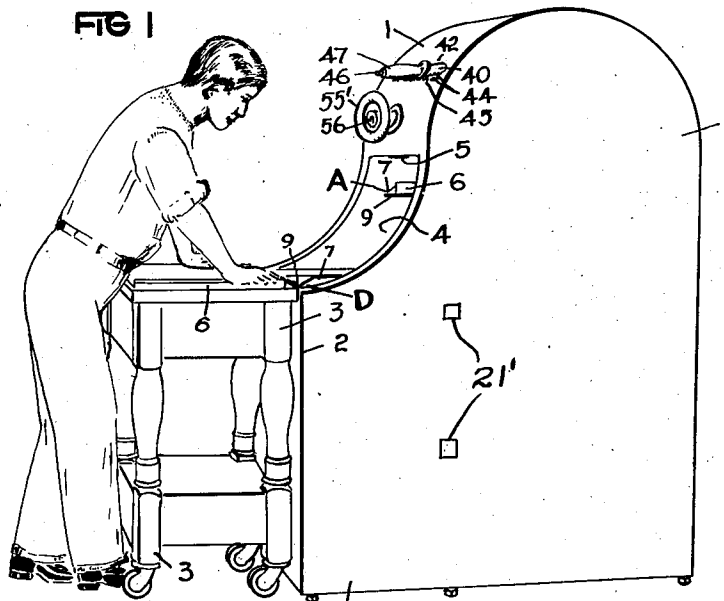
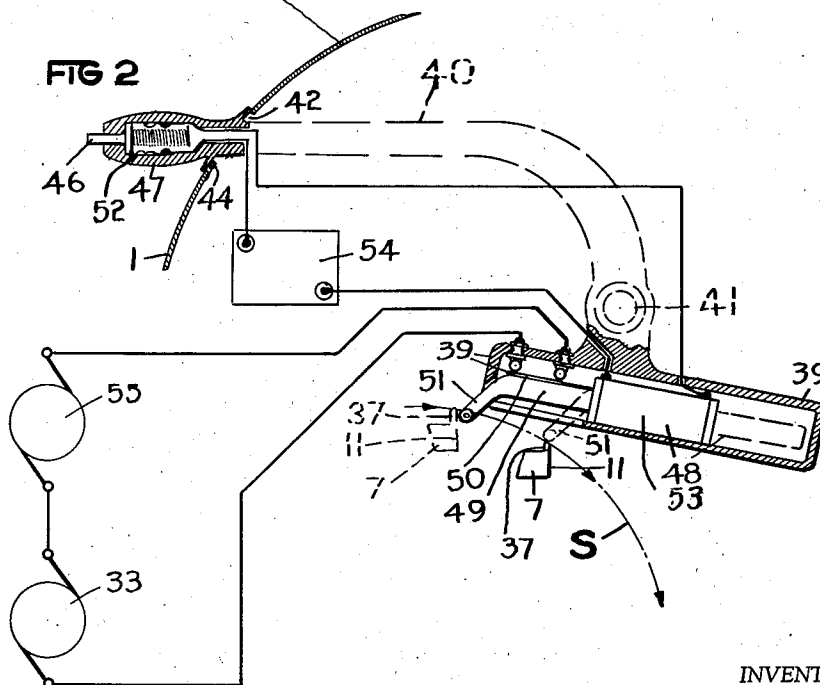
A. W. COCHRAN

2,395,961

AUTOMATIC TYPE FORM CABINET

Filed Nov. 10, 1942

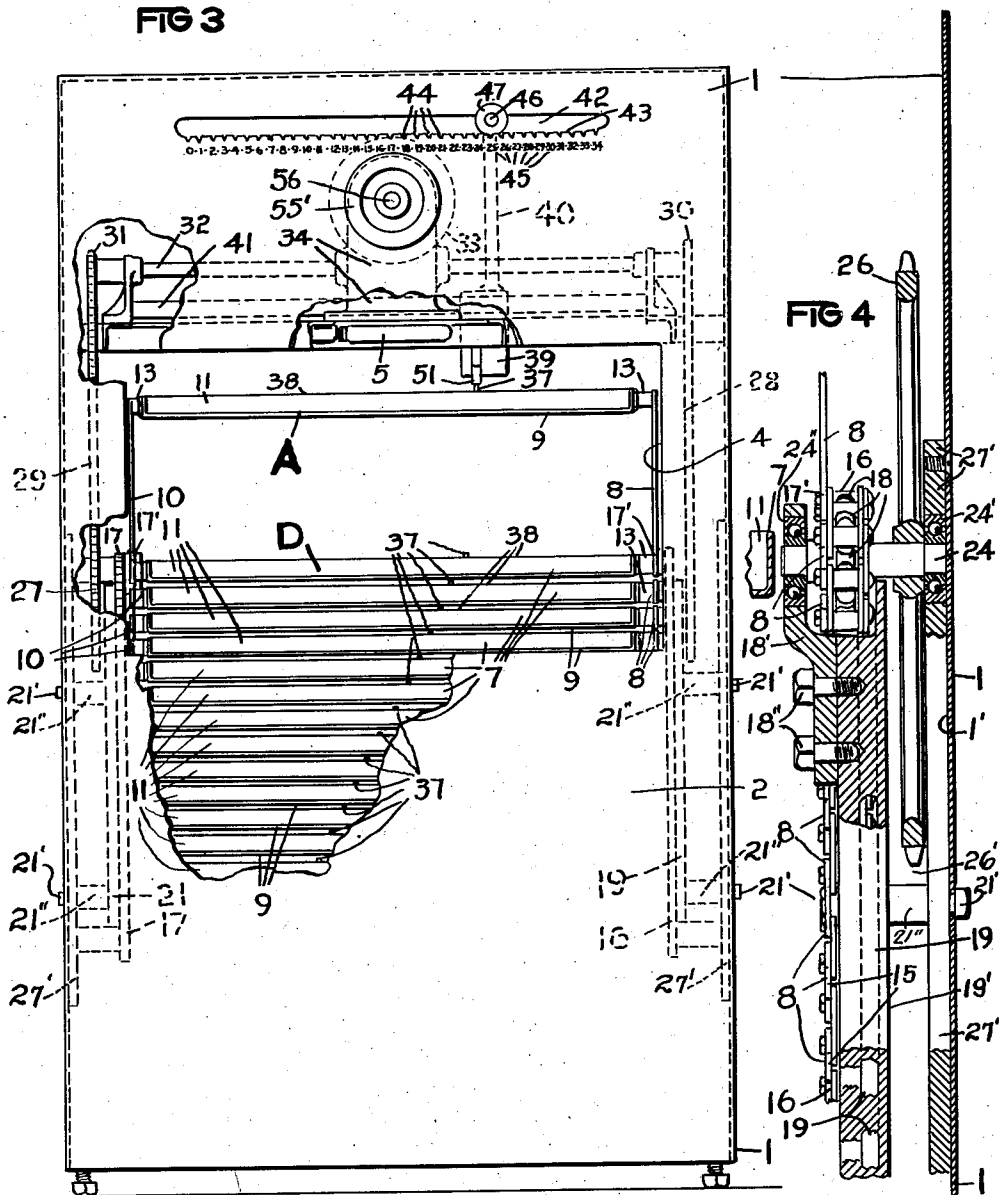
3 Sheets-Sheet 1



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FIG 3

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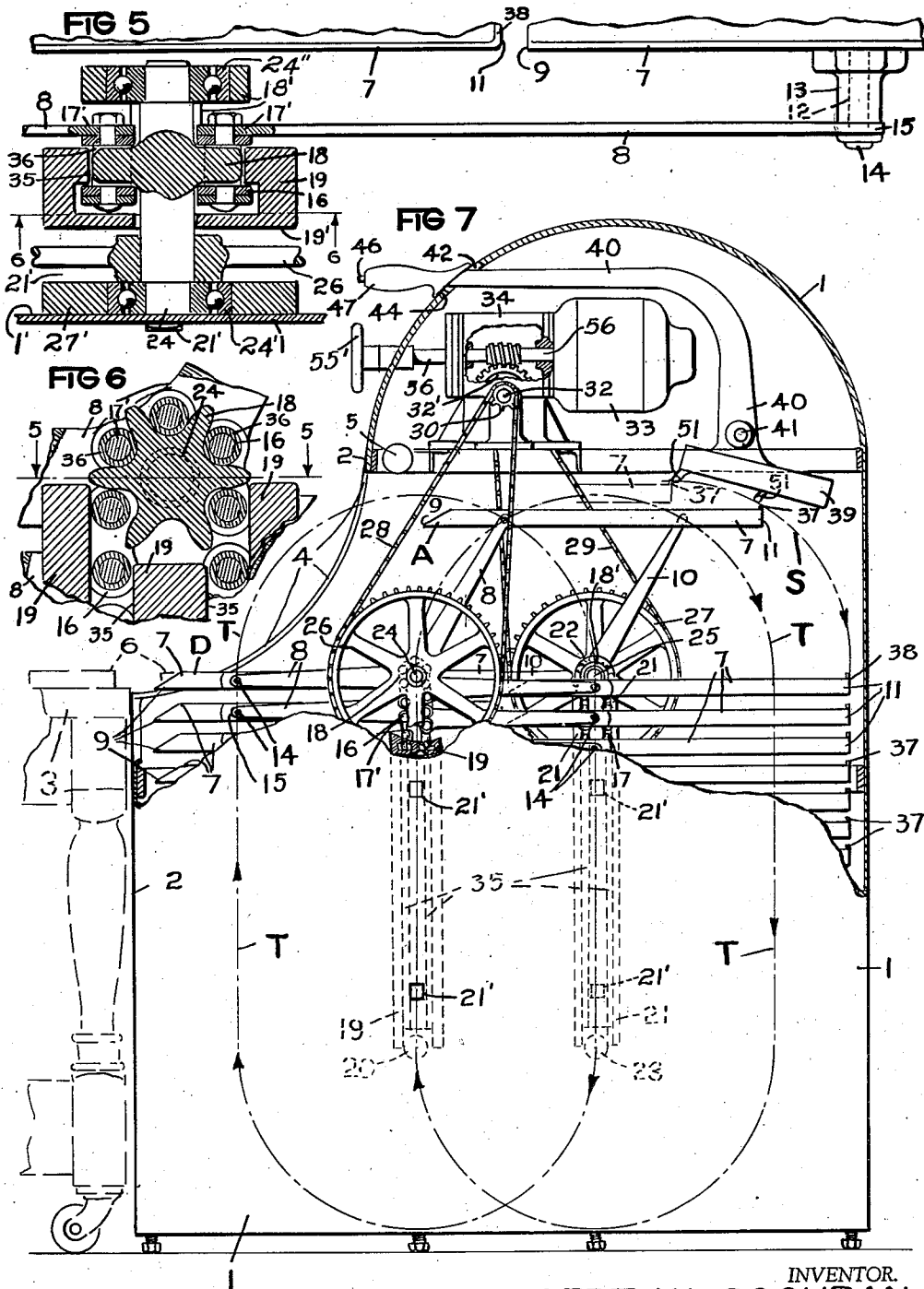
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UNITED STATES PATENT OFFICE

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AUTOMATIC TYPE FORM CABINET

Albert W. Cochran, New York, N. Y.

Application November 10, 1942, Serial No. 465,156

10 Claims. (Cl. 45—2)

My invention relates to a cabinet for filing and storing type forms and similar articles and particularly to the orderly filing and automatic delivery of such articles. Among the purposes and objects are to provide:

A file cabinet which stores and elevates to the delivery position, any particular selected one of a plurality of heavy articles stored in the cabinet.

A means of storing a plurality of heavy objects, any one of which is moved to the delivery position, or its predetermined receiver may be moved to the position for receiving the object by a selector.

A type form storage and delivery cabinet having a selecting means to bring any form or its receiver to the position for receiving or delivering, as predetermined by the operator.

A file cabinet for type forms which eliminates the necessity of storing the forms on the trucks.

A space saving storage device for type forms.

A storage device for type forms which delivers any selected one of a plurality of forms to a position where it may be altered or worked on.

A repository and vending device for heavy objects.

A storage cabinet for a plurality of type forms which maintains all forms level while handling and in storage.

A convenient device for storing type forms.

I accomplish these and other objects by the construction herein described and set forth and as shown in the accompanying drawings forming a part hereof, in which:

Fig. 1 is a perspective view showing the application of my device.

Fig. 2 is a wiring diagram.

Fig. 3 is a front elevation with parts of the housing broken away.

Fig. 4 is a sectional detail of one of the elevators.

Fig. 5 is a fragmentary plan and section at 5—5, Fig. 6.

Fig. 6 is a fragmentary elevation and section at 6—6, Fig. 5.

Fig. 7 is a side elevation in which the housing is broken away in places to show the interior.

Similar reference characters refer to similar parts throughout the several views of the drawings and in the specifications to follow.

My invention is particularly useful in the handling and storage of type forms such as are used in publications, books, etc., in which the pages are set up in a number of make readies or forms. These forms are heavy, and due to their weight,

are difficult to store, and a common method is to store the forms on trucks, which are heavy tables having a top slightly larger in length and breadth than the form which reposes on the top of the truck.

The truck is made mobile by casters on its four legs, and after the various operations, such as stereotyping, is stored and kept for a period of time for other editions or to facilitate changes or additions in the form.

It is not my purpose to elaborate herein on the art of printing and the numerous ways that the printer's truck and form are used, except to point out some of the advantages made possible by the use of my cabinet.

I am aware that the underlying principles of my invention, of which this disclosure is an embodiment, may be used for other purposes than the handling and storage of type forms.

The purpose of this disclosure is not to limit the scope of my invention or this my letters patent, as, after a study of the detailed construction herein set forth by those skilled in the art to which this invention pertains, modifications may be suggested to suit my device to the many uses for which it may be adapted.

This disclosure is to illustrate in detail a preferred form so that the underlying principles of my invention may be more readily understood, rather than to limit the invention to the details of the construction as set forth in the specifications and drawings.

When thirty-two forms are stored in thirty-two trucks, each occupying a floor space of about five square feet, as they measure $24\frac{1}{2}'' \times 28\frac{1}{2}''$, about 160 square feet or more, if space for working on the forms is provided, is required. My cabinet for the same number of forms, requires thirteen square feet of floor space. The trucks are available for active use, or less trucks may be provided.

By the use of my cabinet, any form is immediately available and not inaccessible as in the old system where some forms are, of necessity, at the center of a group. This feature of permanent availability is accomplished by setting an indicator and pressing a button, whereupon the particular form desired appears at the delivery position where it may be worked on or placed on a truck as desired. A convenient light is provided to make the change of the form easier. Thus, one light may replace many lights as thirty-two forms all may appear at a single position rather than at thirty-two positions.

The forms are covered from dust and the selec-

tion of each form is instantaneous instead of a waste of fifteen or twenty minutes by the old method.

Any of the forms are easily "killed" and the type dumped into a metal collecting truck directly from the particular form in the cabinet at a substantial saving in time.

Referring to the drawings, the detailed construction of the preferred form of my invention may be understood. The cabinet is provided with a housing 1 which covers the working parts and the forms which are stored within it. At the front 2 of the cabinet and at and above the level of the truck 3, I have provided the opening 4, which is provided with the light 5 which illuminates the form 6, which may be disposed at the receiving and delivery position and, because the cabinet recedes at the opening 4, work on the form may be performed without its removal from the cabinet as may be seen by referring particularly to Fig. 7 of the drawings or to Fig. 1. In Fig. 1, the truck may be removed from the front of the cabinet where it is shown in position to receive or deliver a form to the cabinet.

Within the cabinet, I have provided the trays 7 on which the forms are placed and stored. The number and size of the trays may vary for the particular job for which my cabinet is designed, however, it is not necessary that the number and size of the forms must conform to the capacity of the trays and the capacity of the cabinet. The cabinet may be provided with sufficient trays to hold the total forms used for a publication, or several cabinets may be provided for a very large publication requiring more than the thirty-two trays usually used.

The trays are supported and carried by the arms 8 which are swingingly secured at one end near the front 9 on one side, and the arms 10 which are swingingly secured at one end to the trays near the rear 11 on the opposite side. Thus, each tray is supported by a pair of arms, the swinging connections of which are disposed diagonally and in general the tray is approximately balanced between these two diagonal supports. This diagonal supporting means prevents the tray from teetering and also holds the tray in a level position at all times.

The stiffness of each arm, together with the length of bearing 12 in the brackets 13 which are secured to the tray, combine to prevent rocking or teetering, as well as to support each tray in its level position even though the weight of the form placed on it may not be in perfect balance between the two diagonally disposed supports. All of the arms, brackets, and the pins 14 which are secured in the ends 15 of each arm and which are journaled in the bearings 12 are duplicates. The arms, however, are assembled right and left in relation to the trays which they support.

The arms 8 and 10 are secured at and replace a part of the links of the chains 16 and 17 at the ends 17'. Both chains are preferably of the roller type and the arms replace the links nearest the trays 7.

The chain 16 engages the teeth of the top sprocket 18 which is disposed at the top of the roller guide 19. The idler sprocket 20 is disposed at the bottom end of the guide 19. The chain 17 is similarly guided by the guide 21 at the top of which is disposed the sprocket 22 and at the bottom, the sprocket 23. Both chains 16 and 17, together with their respective arms which support the trays, are driven through their top sprockets 18 and 22 which are rotatably connected on the

shafts 24 and 25 to the drive sprockets 26 and 27 which receive the drive chains 28 and 29, which in turn engage the sprockets 30 and 31, both of which are secured to and revolved by the reduction drive shaft 32 which is revolved by the motor 33 through the reduction gear 34.

The guides 19 and 21 are so disposed that the sprockets 26 and 27 revolve in the spaces 26' between the backs 19' of the guides and the inner face 1' of the cabinet. The bolts 21' preferably pass through the guides, cabinet housing and the reinforcing bars 27' and the distance sleeves 21''. One end of each of the shafts 24 and 25 is supported in the bearing 24' held in the bars 27', and the opposite end is supported by the bearing 24'' held in the brackets 18' which are secured to the guides 19 and 21 by the screws 18''.

The cantilever stresses, due to the length of the arms 8 and 10, when not traveling over the sprockets, are prevented from kinking the links out of line by the roller guides 19 and 21, the slots 35 of which receive and engage the rollers 36' of the chains which travel up the slots toward the front side of the cabinet and down the slots which are disposed toward the back side of the cabinet.

The trays carried by the arms thus travel upwardly near the front side of the cabinet and downwardly near the back side of the cabinet and thus the trays move up and over to the back and down so that half of the trays are traveling upwardly while the other half are traveling downwardly.

The travel of the ends of the arms near the top and bottom of the cabinet is indicated by the travel dot and dash lines T.

The detail of the sprockets, guides, and chain shown in Fig. 4 is identical on both sides of the cabinet with the exception that the chain and guides at the left side of the cabinet are disposed nearer the rear of the cabinet.

The travel of the trays and the parts which move and carry the trays, is controlled by the electric circuits and the disposition of the stop lugs 37 which are positioned at progressively spaced intervals laterally on the back top edge 38 of each tray so that each tray is capable of stopping the travel of the trays at a different time and thus the electric circuit is selectively broken by the stop switch 39 which is secured to and carried by the selector lever 40 which is swingingly and slidably mounted on the selector shaft 41. Since the selection lever 40 may slide on the shaft 41 as well as swing on the selector shaft 41, the selection of the particular tray to be stopped at the position D at which position the form, or other load, may be removed, inspected or placed on the tray for storage, the parts which cooperate with said lever in this selection may be better understood and are as follows:

The selector lever is preferably so formed as to extend upwardly, then forwardly over the motor 33 and through the slot 42 which is provided in the upper front part of the housing 1. The lower edge 43 of the slot 42 is provided with the notches 44 disposed to correspond with and in register with the disposition of the various stop lugs 37, whereby the numbers 45 progressively disposed at each notch, designate the tray to be selected and stopped automatically at the position conforming with the height of the top of the truck so that the particular form may be delivered by sliding the form from the tray to the top of the truck. Conversely, the form may be slid from the truck onto the particular tray which may represent the page to be printed from

the form. For example, the selection of a particular page, the type form of which may be stored in my cabinet, is accomplished as follows:

The selector lever is placed at notch twenty-five as indicated by the indicator number twenty-five, which corresponds to page twenty-five, and the type form for page twenty-five on the tray twenty-five will be moved to the discharge position D upon starting the motor 33 which is accomplished by pressing the starting button 46 positioned in the end of the handle 47 of the selector lever 40 and upon contact of an element of stop switch 39 with the stop lug on the preceding tray as it passes the stop switch 39, the tray and form twenty-five will be stopped at the delivery position D.

Each tray preceding the tray containing the form or type page to be delivered is thus stopped by the lug attached thereto when the selector lever is positioned to place the stop switch in the path of travel of that particular lug, the path of travel being shown in broken lines S in Fig. 7 of the drawings.

The electric circuits and switches may be better understood by referring to Fig. 2 of the drawings which illustrates a preferred wiring diagram. The particular type of switches and circuits may be of any well known construction commonly used for a similar purpose.

The stop switch 39 may have a solenoid 48, the plunger 49 of which may be provided with a contact bar 50 which completes the circuit to start the motor 33 when in the reset position shown. The plunger 49 is provided with a downwardly projecting finger 51 which is positioned in the path of travel of the stop lug shown in broken lines. The stop lug carries the finger and plunger to the position indicated in broken lines, whereupon the contact bar breaks the circuit, stopping the motor and the motion of the trays.

By pressing the starting button 46, the switch 52 completes the circuit to the coil 53 of the solenoid, moving the plunger 49 to the reset position, thereby starting the motor 33 and likewise the movement of the trays until again stopped by the stop lug selected; there being as many stop lugs as there are trays.

A battery 54 or other source of electric current may be provided to operate the solenoid coil 53 and a generator 55 or other source of electric power may supply the motor 33.

It is to be noted that as each tray passes upwardly from the front and over to the back, the stop lug at the back of the tray travels on a circular arc and upon contacting therewith the finger of the plunger of the solenoid when at the reset or operating position, is carried along by and with the stop lug until the lug passes out of contact with the finger; the finger travels in a straight line and the stop lug on a circular arc. The relation of the contact, stop lug and finger is so arranged as to bring the next following tray to the position D where the form may be removed or placed on the tray. The tray may be raised or lowered slightly if desired, by hand, and I have provided a hand wheel 55' mounted on the end of the shaft 56 driven by the motor 33. Thus, after the motor has stopped moving the trays, by turning the hand wheel backward or forward, the trays may be moved to raise or lower the tray at the delivery position D so that the form may slide on or off the top of the truck or on or off the tray without having to lift the form.

The reduction gear 34 may comprise the worm 56' secured to the shaft 56 and the worm wheel

32' which meshes with the worm and which is secured to the shaft 32 and thus any movement of the shaft 56 moves the shaft 32, chains and the shafts or studs 24 and 25, as well as the trays, as hereinbefore described.

By modifications in respect to some of the details, the direction of movement of the trays may be reversed and the stopping means may be modified to deliver the desired tray at the delivery position.

It is noted that the trays while traveling vertically upward at the front of the cabinet and also while traveling vertically downwardly at the rear of the cabinet, are spaced closely together and that the tray at the top of the vertical upward travel at the front, the delivery position D, is spaced closed to the tray below while the tray above is a much greater distance above at A, as well as to the rear, thus being out of the way over the tray at the delivery position D. This desirable characteristic, permits work to be done on the form at the delivery position, as well as provides the handling and inspection space above the tray.

The length and disposition of the arms governs the height of the working space. The pitch of the arms on the chains governs the space between the trays while in storage and throughout their vertical travel, permitting the maximum number to be stored in the minimum space.

The cantilever stresses caused by the length of the arms and the weight of the trays and articles on the trays which are supported at the free ends of the arms, is relatively great when the arms are extended in substantially a horizontal position; which occurs while the trays are traveling vertically. The chains and the rollers are guided in vertical alignment by the guides which receive the rollers in their vertical travel. At the end of the vertical travel, the sprocket teeth serve to overcome the cantilever stresses while the trays travel up over and down to the position where the rollers again engage the guides.

The sprockets are positioned at each end of the guides.

I have not attempted to illustrate or describe numerous modified constructions capable of being substituted for my preferred construction as herein disclosed embodying my invention set forth in the appended claims.

I claim:

1. In a file cabinet, a plurality of trays and conveying means for carrying said trays upwardly at one side and downwardly at the opposite side of said cabinet, whereby any one of said trays may be stopped at a predetermined position for the placing or removal of articles on said tray, said conveying means holding said trays level throughout their travel, said conveying means comprising arms in pairs and means thereon swingingly mounting and supporting said trays, one of said supporting means supporting said tray on one side forward of the center of gravity and the other of said supporting means supporting said tray on the opposite side back of the center of gravity to hold said tray in a horizontal position throughout its travel.

2. In a file cabinet, a plurality of trays and conveying means for carrying said trays upwardly at one side and downwardly at the opposite side of said cabinet, whereby any one of said trays may be stopped at a predetermined position for the placing or removal of articles on said tray, and electric driving means for said conveying means, and selection electric stop

means for said trays for stopping any one of said plurality of trays at said predetermined position, and hand means independent of said electric driving means for moving said trays in either direction, said hand means being positioned on the front of said cabinet adjacent said tray stopped at said predetermined position.

3. In a file cabinet having therein a plurality of movable trays, and a delivery opening for said trays, each tray having a stop lug disposed at a different position in relation to the lug on each of the other trays, said cabinet having electric motor operated conveying means for carrying said trays downwardly at one side of the cabinet and upwardly at the opposite side, whereby any one of said trays may be brought to a loading position at said delivery opening, a slidable selector means having means for engaging any of said stop lugs and a switch for said motor carried by said selector means, said switch being operated by said engaging means when engaged by a stop lug, whereby any one of said trays may be selected and stopped at said loading position.

4. In a file cabinet having therein a plurality of movable trays, and an opening for delivering said trays, each tray having a stop lug disposed at a different position in relation to the lug on each of the other trays, said cabinet having electric motor operated conveying means for carrying said trays downwardly at one side of the cabinet and upwardly at the opposite side, whereby any one of said trays may be brought to a loading position at said delivery opening, a slidable selector means having means for engaging any of said stop lugs and a switch for said motor carried by said selector means, said switch being operated by said engaging means when engaged by a stop lug, whereby any one of said trays may be selected and stopped at said loading position, and starting means on said selector means to start said conveying means.

5. In a file cabinet having therein a plurality of movable trays and a delivery opening for said trays, each tray having a stop lug disposed at a different position in relation to the lug on each of the other trays, said cabinet having electric motor operated conveying means for carrying said trays downwardly at one side of the cabinet and upwardly at the opposite side, whereby any one of said trays may be brought to a predetermined loading position at said delivery opening, a slidable selector means having means for engaging any of said stop lugs and a switch for said motor carried by said selector means, said switch being operated by said engaging means when engaged by a stop lug, whereby any one of said trays may be selected and stopped at said loading position, said engaging means comprising a finger slidable in said selector means for operating said switch.

6. In a file cabinet having therein a plurality of movable trays and supporting and conveying means therefor, each tray having a stop lug disposed at a different relative position thereon, and means for cooperating with the stop lug of any selected tray to stop said tray at a loading or unloading position, selector means slidable in said cabinet and carrying said cooperating means, said cooperating means comprising a switch carried by and slidable with said selector means.

7. In a storage and automatic delivery cabinet having a delivery opening, a motor driven pair of chains and sprockets mounted in said cabinet for said chains, and a plurality of pairs of supporting arms, one of each of said pairs of arms

being secured to one of said chains and the other of each of said pairs of arms being secured to the other of said chains, a plurality of trays each supported by one of said pairs of arms and carried upwardly, over and down within said cabinet by said pair of chains, the supporting connection of each arm at one side of each of said trays and the chain carrying said arm being disposed toward the front and the other supporting connection and arm at the other side of each tray and the chain carrying said arm being disposed toward the back to carry the trays in a horizontal position throughout their travel up, over and down within the cabinet.

8. In a storage and automatic delivery cabinet, having a delivery opening, a motor driven pair of chains and a plurality of pairs of supporting arms, one of each of said pairs of arms being secured to one of said chains and the other of each of said pairs of supporting arms being secured to the other of said chains, a plurality of trays each supported by one of said pairs of arms and carried upwardly, over and down within said cabinet by said pair of chains, the supporting connection of each arm at one side of each of said trays and the chain carrying said arm being disposed toward the front and the other supporting connection and arm at the other side of each tray and the chain carrying said arm being disposed toward the back to carry the trays in a horizontal position throughout their travel up, over and down within the cabinet, said supporting connection for said arms having pivot pins disposed diagonally on each of the trays to swingingly engage said arms, said chains being mounted to travel over sprockets and said sprockets being disposed apart in relation to the front and back substantially one-half the distance traveled by any one of said pins from front to back.

9. In a cabinet having therein movable trays, and a delivery opening for said trays, conveying and driving means for said trays, said conveying and driving means having diagonal connections with said trays whereby said trays are held substantially level during their vertical travel up and down and during their travel from up to down and from down to up in said cabinet, said conveying means being so disposed and proportioned that the front of the trays traveling down pass close to the back of the trays traveling up, said conveying means comprising a pair of continuous chains and wheels over which said chains travel, one of said chains of said pair of chains being disposed relatively nearer the front of said cabinet than the other of said chains.

10. In a storage cabinet having a delivery opening at the discharge position, a plurality of trays on which articles may be conveyed and stored, a pair of chains having driving and supporting means and means for supporting said trays, said trays being carried by said chains to travel within said cabinet to a discharge position and stopping means for stopping any of said trays at the discharge position, said stopping means comprising a stop switch to halt said driving means, a selector and switch operator secured to said switch and means slidably mounting said selector and switch to slide transversely in said cabinet and a stop disposed on each of said trays at a different position and in the path of travel of said switch operator to engage said operator and stop any one of said trays at said discharge position.

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