

Nov. 2, 1943.

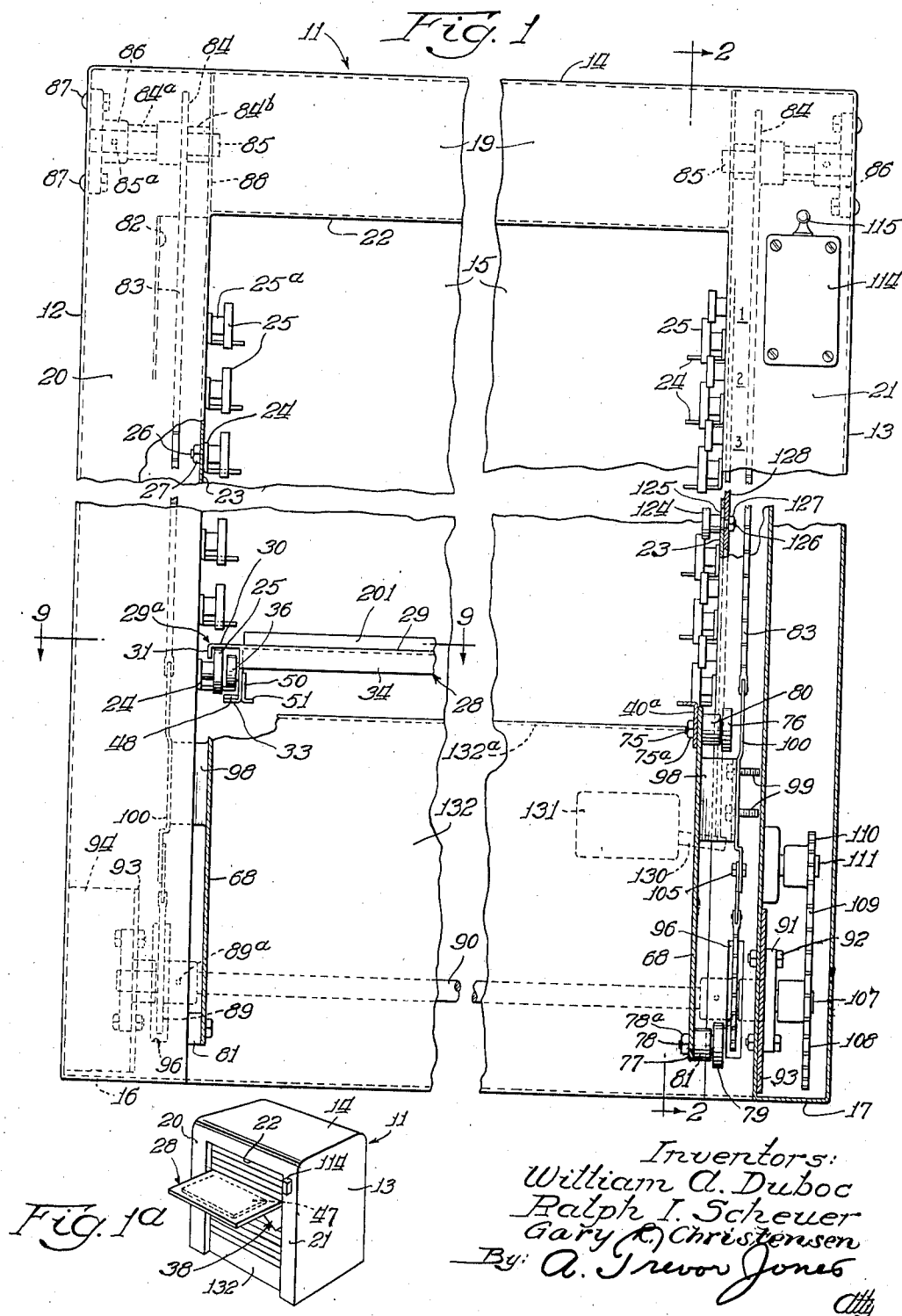
W. A. DUBOC ET AL

2,333,097

STORAGE CABINET AND MORE PARTICULARLY PRINTER'S FORM STORAGE CABINET

Filed July 14, 1941

4 Sheets-Sheet 1



Nov. 2, 1943.

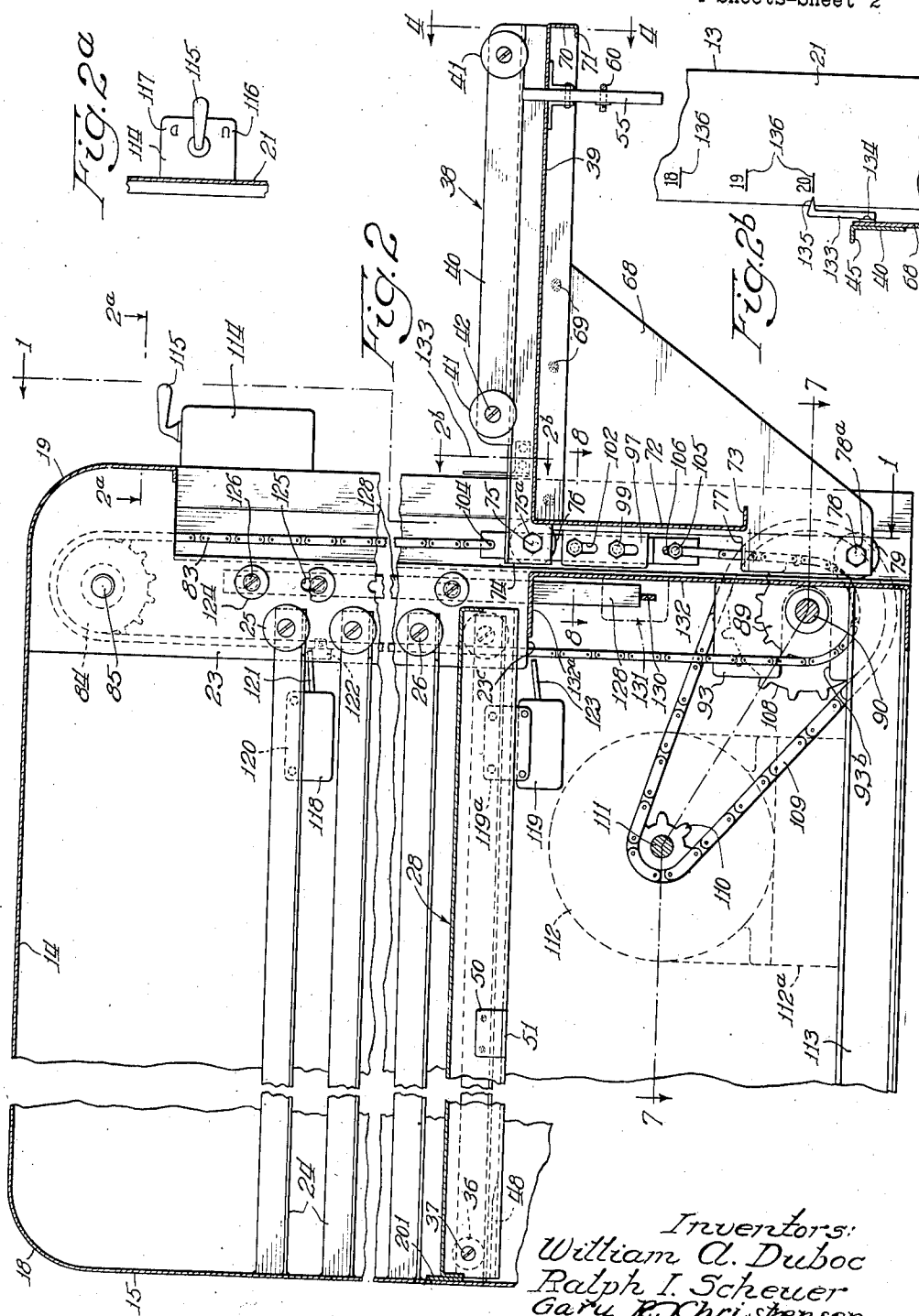
W. A. DUBOC ET AL

2,333,097

STORAGE CABINET AND MORE PARTICULARLY PRINTER'S FORM STORAGE CABINET

Filed July 14, 1941

4 Sheets-Sheet 2



Inventors:
 William A. Duboc
 Ralph I. Scheuer
 Gary R. Christensen
 By: A. Trevor Jones

Nov. 2, 1943.

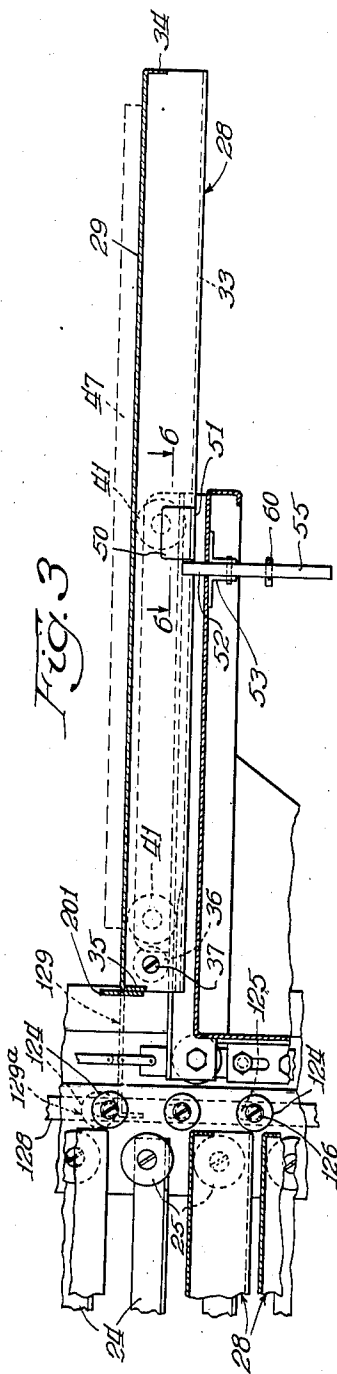
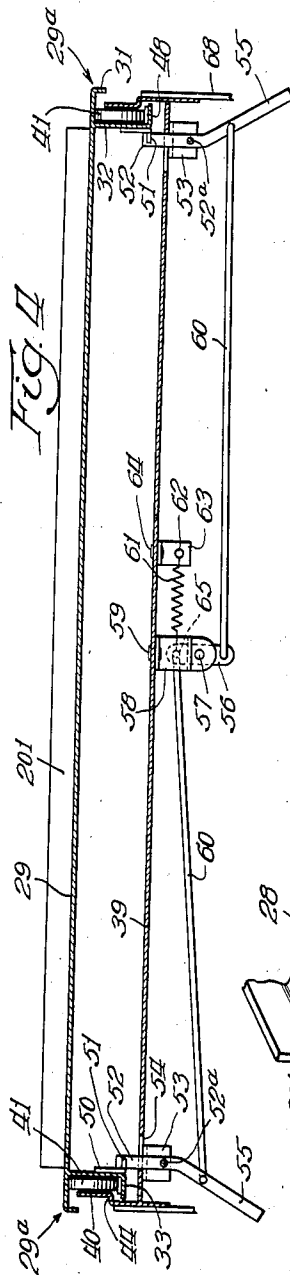
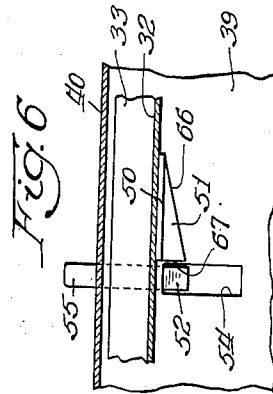
W. A. DUBOC ET AL

2,333,097

STORAGE CABINET AND MORE PARTICULARLY PRINTER'S FORM STORAGE CABINET

Filed July 14, 1941

4 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,333,097

STORAGE CABINET, AND MORE PARTICULARLY PRINTER'S FORM STORAGE CABINET

William A. Duboc, Ralph I. Scheuer, and Gary R. Christensen, Two Rivers, Wis., assignors to Hamilton Manufacturing Company, Two Rivers, Wis., a corporation of Wisconsin

Application July 14, 1941, Serial No. 402,388

11 Claims. (Cl. 214—97)

This invention relates to storage cabinets more particularly of the class employed by printers for temporarily storing their page forms or the like.

As is well known, after a form has been set up for a given page to be printed including the type, cuts, etc., and surrounded by a chase or frame, the whole must be temporarily stored until ready to be run on the press. Such forms frequently weigh as much as one hundred and thirty-five pounds or thereabouts, so that they are cumbersome to handle. A cabinet to temporarily store such forms has usually had a vertical series of shelves, each shelf receiving one of the forms, which are generally transported to the cabinet on a truck or other conveyance, the problem ensuing of transferring the form from the truck to a shelf of the cabinet. Since the truck has a fixed height, this problem is accentuated when the shelf of the cabinet in which the particular form is to be received is materially above or below the level of the truck.

It has been proposed to have a cabinet which could be raised or lowered to bring a particular shelf into the horizontal plane of the form as it is carried by the truck, but such a cabinet is restricted in height to the height of the truck, in addition to the objection that it requires heavy fixtures and equipment to raise an entire cabinet of this kind. As an alternative, it has been suggested that the cabinet could have an elevator shelf, vertically movable at its front, of an area sufficient to receive the form and the form transferred to this vertically movable shelf to be then transferred therefrom to the final shelf or letter-board of the cabinet. Such a device, however, has proved inadequate to meet the problem, since it requires two transfers, one from the truck to the vertically movable shelf and then another transfer from the vertically movable shelf to the final letter-board, frequently disturbing the form and requiring rearrangement of the type matter.

The present invention aims to provide an improved cabinet of this kind which obviates both of these hitherto encountered difficulties and makes possible by a single transfer the storage of the page form in a cabinet unlimited in height by the height of the transfer truck, so that a large number of such forms may be stored in one cabinet and so that the operation of the device will be rendered rapid and safe, with a minimum of effort or care on the part of the operator.

It is a further object of the invention to embody such a device in an attractive cabinet, rel-

atively simple and economical in construction, with a minimum of parts, and yet strong and durable, and in which the power for its operation is supplied by an electric motor mounted out of sight within the cabinet, whereby the cabinet will occupy a minimum of floor space while affording a maximum storage capacity and may be placed in immediate position for operation merely by plugging in a cord to an ordinary electric wall socket, the whole thus providing a compact unitary structure of pleasing appearance.

Other objects and advantages will be apparent from the following description, taken together with the accompanying drawings, in which—

Figure 1a is a small perspective view of a cabinet embodying the present invention;

Figure 1 is a front elevational view of the cabinet of Fig. 1a on a larger scale with parts omitted, and being a staggered section in part taken on the line 1—1 of Fig. 2 with other parts broken away for purposes of description;

Figure 2 is a view taken on the line 2—2 of Fig. 1, and being a section from front to rear of the device as a whole;

Figure 2a is a plan view of the top of the control box shown in Fig. 2 and being a fragmentary section taken on the line 2a—2a of Fig. 2;

Figure 2b is an elevational view of the indicia and indicator for the elevator shelf and being a fragmentary section taken on the line 2b—2b of Fig. 2;

Figure 3 is a fragmentary vertical sectional view from front to rear of the device showing a portion of the structure shown in Fig. 2 but with the parts in alternative position and showing in dotted lines other possible positions of parts;

Figure 4 is a fragmentary front elevational view partially in section taken on the line 4—4 of Fig. 2;

Figure 5 is a fragmentary perspective view of parts shown in Figs. 1, 2, 3 and 4 on a larger scale;

Figure 6 is a fragmentary plan section taken on the line 6—6 of Fig. 3 on a larger scale;

Figure 7 is a fragmentary staggered plan section taken on the line 7—7 of Fig. 2;

Figure 8 is a fragmentary plan section on the line 8—8 of Fig. 2, on a larger scale;

Figure 9 is a fragmentary plan section taken on the line 9—9 of Fig. 1, but with the letter-board omitted; and

Figure 10 is a reduced plan view of the letter-board with a position of a form thereon indicated. Referring in detail to the illustrative construc-

tion shown in the drawings, the numeral 11 indicates the cabinet as a whole, which may be conveniently made of sheet metal, having the side walls 12 and 13 and top wall 14 and rear wall 15. The side walls 12 and 13 desirably merge into a base portion as at 16 and 17, respectively, at each side of the cabinet, and the panel for the top wall 14 also desirably merges as by rounded contours 18 and 19 into the rear and front of the cabinet respectively to enhance its appearance. Below the upper facade portion 19 of the cabinet and between the side facade portions 20 and 21, the front of the cabinet is recessed as at 22. The side facade portions 20 and 21 are bent inwardly as at 23 (Figs. 7 and 9) to further define the recess 22 and to provide working spaces between the inner walls 23 and the outer side walls of the cabinet 12 and 13 for purposes more in detail presently pointed out.

Disclosed in the recess 22 are a plurality of differently elevated locations or levels here determined by pairs of angle members 24, the horizontal flanges of which are for a given pair horizontally aligned, and the vertical flanges of each aligned one with another of the various pairs, and may be secured as by welding to the interior walls 23 as best shown in Figs. 1 and 9, and to the rear wall 15 as best shown in Figs. 2 and 7. It will be seen that the horizontal flanges of the angle members 24 are discontinued adjacent the front of the cabinet, short of the terminations of the vertical flanges. To these ends of the vertical flanges are axled rotatable bearing members 25, the axles 26 therefor, as best shown in Fig. 1, passing through the vertical flange of the angle member 24 and through the inner wall part 23 to which the axle is clamped as by nut 27 threaded thereonto.

In accordance with the present invention, a horizontally movable shelf is receivable in the cabinet at each said elevation, said shelf being represented, in this instance, by what is known in the printing trade as a letter-board 28, only one of which is shown in the majority of the figures of the drawings, but a vertical series of which is indicated by the reduced view, Fig. 1a. The letter-board comprises a platform 29 and a pair of channeled sides, these channeled sides 29a being each made up of a lateral overhang 30 (Fig. 5), the margins of which are turned into a depending flange 31, and an upright 32 which is out-turned at its bottom to form a lateral underhang 33. Reinforcement of the letter-board as just described is effected by bending the platform 29 downwardly at front and rear as at 34 and 35, Fig. 3. Each of the uprights 32 has mounted thereon at the rear of the letter-board a roller 36 on an axle 37.

As will be best seen from Fig. 1, the channeled sides 29a of the letter-board receive the angle members 24 with their rotatable bearing members 25 so that in horizontal sliding movement of the letter-board 28 inwardly and outwardly of the cabinet the overhang 30 at each side of the letter-board rides on the rotatable bearing member 25 at that side of the cabinet, the depending flanges 31 limiting lateral movement of the letter-board as by frictionally embracing the rotatable bearing members 25. Spacer washers 25a locate the rotatable bearing members 25 for a given elevation at just the distance apart to be embraced by the depending flanges 31 of the letter-board. The rollers 36 at the rear of the letter-board ride on the horizontal flanges of the angle members 24 during this movement, the

underhang 33 of the letter-board channeled sides 29a being spaced downwardly of the roller 36 sufficiently to receive the horizontal flange of the angle member 24 therebetween. It will be noted from Fig. 1 that the width of the channeled side 29a is such that the roller 36 on the letter-board is inwardly offset from the rotatable bearing member 25 on the cabinet so that the letter-board may be entirely withdrawn from the cabinet, these two rotatable members 25 and 36 passing by each other without abutting.

Further in accordance with the present invention, an elevator shelf 38 is carried by the cabinet and vertically adjustable adjacent each letter-board for sliding movement of any letter-board onto the elevator shelf. The elevator shelf 38 comprises in this instance, a horizontal plate 39 (Fig. 9) to the sides of which are secured supports 40 for anti-friction members 41, two adjacent the front margin and two adjacent the rear margin of the elevator shelf, and journaled on axles 42, secured as by nuts 43 so that the anti-friction members 41 project slightly above their supports 40, as best shown in Fig. 2. The supports 40 are offset slightly inwardly as at 44, and the anti-friction members 41 are on the inner faces of the supports 40 so as to be aligned, from front to rear of the cabinet, with the rollers 36 on the letter-board 28. At their inward margins the supports 40 have their upper edges bent horizontally as at 45, these parts being partially severed as at 46 to permit this.

Thus, when the elevator shelf 38, which is supported vertically adjustable on the cabinet as presently described, is placed in front of one of the letter-boards 28 and on the proper level therewith, as for example, shown in Figs. 2, 3 and 4, the letter-board may be slid horizontally forward onto the elevator shelf 38 and entirely withdrawn from the cabinet so that the elevator shelf 38 may then be lowered or raised as the need may be, to the level of a transfer truck (not shown), and a chase as suggested by the broken lines 47 may be transferred from the truck onto the letter-board 28, now carried by the elevator shelf 38, as best shown in Fig. 3. The elevator shelf may thereupon be returned to the level from which the letter-board was withdrawn and the letter-board slid back from the elevator shelf, with the chase 47 still thereon, into the cabinet for storage.

In these sliding movements of the letter-board and referring in detail to one side of the structure, it being understood that the other side is similar, the underhang 33 of the letter-board, in the movement of the latter out of the cabinet, moves beneath the horizontally bent portion 45 of the elevator shelf and the inward offset 44 thereof so that the overhang 30 of the letter-board rides onto the anti-friction members 41 on the elevator shelf, it being remembered that the bent down front margin 34 of the letter-board terminates short of the channeled sides 29a of the latter, as best shown in Fig. 1, so as not to interfere with these channeled sides riding onto and receiving therein the upper margins of the supports 40 of the elevator shelf, as best shown in Fig. 4.

Thus, the angle members 24 of the cabinet and the supports 40 on the elevator shelf constitute tracks and the channeled sides 29a of the letter-boards constitute runners, mating for movements of the letter-boards. The telescoping interengagement of the letter-board and elevator shelf permits the elevator shelf to be of substantially

less area than the letterboard, to conserve floor space, while at the same time securely supporting the letter-board thereon in cantilever arrangement with the letter-board projecting beyond the elevator shelf when it is fully withdrawn from the cabinet onto the elevator shelf.

In order to prevent canting of the letter-board on the elevator shelf, the underhang 33 of the board may have secured thereto on its upper face and adjacent its inner end a filler 48 (Fig. 5) tapered as at 49 so that the rear anti-friction member 41 of the elevator shelf will ride up thereonto so as to be somewhat wedged between the overhang 30 and the underhang 33. At the same time, the roller 36 will abut from front to rear the inner antifriction member 41 and thus limit outward movement of the letter-board on the elevator shelf, as indicated in Fig. 3.

To releasably fix the letter-board from inward movement on the elevator shelf when the letter-board has been withdrawn to its limit, detent means may be provided here represented by a plate 50 welded to the inner face of the upright 32 of the letter-board, say intermediate its length, and having a triangular flange 51 providing a ward for a latch 52 carried by and adjacent the front of the elevator shelf 38.

The latch 52 may be pivotally carried as at 52a by bracket 53 welded to the under side of the plate 39 of the elevator shelf, the upper end of the latch projecting through a laterally elongated slot 54 in the plate 39, and the lower end of the latch 52 being deflected laterally and outwardly continued to form a handle 55 accessible to the fingers of the operator, at the side of the elevator shelf. There may be two of such latches, as shown.

In order to permit actuation of one of the handles 55 to cause release of the latch at each side of the structure, a crank lever 56 is pivoted as at 57 on a bracket 58 fastened as at 59 centrally of the under face of the plate 39, and to the opposite ends of this crank lever 56 are attached rods 60 articulated therewith and each with one of the handles 55. Thus, when one of the handles 55 is pulled laterally outwardly by the operator, the other is mechanically moved likewise. To normally bias the handles inwardly to locking position a tension coil spring 61 may be anchored as at 62 to a bracket 63 also fixed as at 64 on the under face of the plate 39 adjacent the bracket 58, the free end of the spring being attached as at 65 to the upper arm of the crank lever 56. When the letter-board 28 is moved to its outer limit on the elevator shelf 38, the latch 52 will be cammed outwardly by the tapered surface 66 (Fig. 6) of the ward 51 against the pull of the spring 61, until the ward passes by the latch, which latter thereupon snaps back under the pull of the spring 61 into abutment with the straight face 67 of the ward.

Looking now more in detail at the illustrative construction here shown for supporting the elevator shelf 38, and turning again first to Figs. 2 and 9, a three-sided plate 68 is secured at each side of the elevator shelf 38 as by spot-welding at 69 to the antifriction support members 40 of the elevator shelf at the inner end of the shelf to reinforce the latter in a cantilever mounting therefor. To further strengthen the elevator shelf the plate 39 thereof may be continued downwardly as at 70 and then bent upon itself as at 71 at its front end and at its rear may be continued downwardly as at 72 and again bent upon itself as at 73, the portions 72 and 73 being secured to the

three-cornered plates 68 and cooperating with the latter to effect a strong beam structure for the elevator shelf in association with the cantilever mounting next described.

For purposes of this cantilever mounting, the supports 40 are extended rearwardly of the plate 39 as at 40a (Fig. 9), and the three-sided plates 68 are also desirably continued rearwardly at their upper ends as at 74, and to these rearward extensions are rotatably secured as on axles 75 passing through both parts 40a and 74, and clamped by nuts 75a, wheels 76. To lower rearward extensions 77 of the triangular plate 68 as on axles 78 are clamped, by nuts 78a, wheels 79. The wheels 76 and 79 are offset laterally outwardly of the elevator shelf 38, as best shown in Figs. 7 and 9, the axles 75 and 78 being extended for this purpose and carrying spacer washers 80 and 81, respectively, so as to be received in vertically extending oppositely inwardly facing grooves 82 formed at each inner side of the front of the cabinet, as by being bent from the inner walls 23 thereof, as shown in the drawings, these grooves 82 thus providing tracks in which the wheels 76 and 79 of the elevator shelf travel in the vertical movement of the latter as actuated by the endless conveyors next described, which represent elevator conveyor means parts.

Such endless conveyors are here shown in the form of chains 83, one at each side of the cabinet and disposed in the spaces provided between the outer side walls and the inner walls 23 respectively. At the top of the cabinet each chain 83 passes over a sprocket 84 and then at its front runs downwardly into the groove 82, the walls 23 and grooves 82 being discontinued just below the sprockets 84 so that the chain may pass into the upper end of the groove. Each sprocket 84 may turn freely on an arbor 85 pinned as at 85a at its outer end in a bracket 86 bolted as at 87 to the outer wall of the cabinet, the arbor 85 being supported at its inner end by the inner wall 88 somewhat vertically aligned with the inner wall 23. Filler sleeves 84a and 84b interposed on the arbor 85 at each end of the sprocket 84 maintain it in proper axial rotatable position on the arbor 85.

At the base of the cabinet, each of the chains 83 passes over a sprocket 89 pinned as at 89a on a shaft 90 which is here a single shaft for both sprockets extending across the cabinet and journaled at its outer ends in bearing brackets 91 secured as by bolts 92 to plates 93 at each side of the cabinet, which plates are bent as at 94 (Figs. 7 and 9) to lap and be welded to the inner faces of the front side facade portions 20 and 21 respectively, the main parts of the plates 93 which carry the bearing brackets 91 also being welded as at 95 to the front-to-rear extending walls of the grooves 82 in the plates 23. Part 93 may be cut away as at 93b for passage of the shaft 90 and hub of bearing 91. The sprockets 89 project through slots 96 in the walls of the grooves 82 so as to dispose one run of each of the chains 83 in a groove 82 in position to be supportingly connected to the elevator shelf 38, as next described.

As here shown, and referring particularly to Figs. 2 and 8, the three-sided reinforcement pieces 68 of the elevator shelf have additional rearward extensions 97 vertically intermediate their extensions 74 and 77 but bent to be laterally outwardly offset therefrom as best shown at 98 (Fig. 8) to extend into the grooves 82 and to which are clamped as by screw-bolts 99, in each groove respectively, an elongated link 100 forming a part

of the chain 33. The screw-bolts 99 are extended substantially beyond the link 100 so as to ride as at 101 frictionally in the grooves 82 and further to prevent appreciable sidewise play of the elevator shelf 38, there being desirably at least two of the screw-bolts 99 at each side vertically spaced apart. As best shown in Fig. 2, the extension 97 may have vertically elongated slots 102 through which the screw-bolts 99 pass to permit adjustment of the elevator shelf for leveling purposes or the like on the chains, the links 100 having tapped holes 103 into which the screw-bolts 99 thread to securely clamp the elevator shelf to the chains. One end of each link 100 is pinned as at 104 to one end of one of the chains 83 and at its other end is bolted as at 105 to the other end of the chain, there being here again a vertically elongated slot 106 through which the bolt 105 passes to permit taking up slack in the chain.

To provide for motor operated means for moving the chains 83, the common shaft 90 for the lower sprockets 89 of the chains is extended at one side of the cabinet, as at 107 (see right-hand side of Fig. 1; also Figs. 2 and 7) to carry another sprocket wheel 108 preferably of larger diameter than the sprockets 89 and over which is entrained an endless driving chain 109 passing also over a relatively small sprocket 110 on the output shaft 111 of a self-contained speed reduction motor device 112, suitably supported as by a base 112a which may be mounted on girders 113 lying along the lower part of the cabinet. The sprockets 110, 108 and 89 also effect a speed reduction gearing for driving the chains 83 relatively slowly, which thus support the elevator shelf 38 movable vertically when the motor of the motor device 112 is caused to run.

It will be understood that the motor device 112 is of the conventional reversing type and that appropriate wiring is provided as is well known in the art and need not be here shown for connecting the motor device with the usual electric wall socket or other current outlet. In such wiring may be provided a manually controllable switch 114 having a hand switch lever 115 which is adjustable to three positions, one, say, as indicated at 116 (Fig. 2a) by the letter "U" determining the position of the hand switch lever 115 for upward movement of the elevator shelf 38, and another indicated at 117 by the letter "D" for downward movement of the elevator shelf. The intermediate position which the hand switch lever occupies as indicated in Fig. 2a may determine the "off" position of the switch for discontinuing the current to the motor device and thus bringing the elevator shelf 38 to a stop. In order to prevent overrun of the motor and consequently of the elevator shelf, the motor device is desirably provided with a magnetic brake which may be a part of the conventional self-contained device 112 purchasable on the market. Also, the motor device may be one adapted for alternating current or one adapted for direct current, as the needs of a particular installation may dictate.

The elevator shelf 38 may be advantageously moved either up or down on the cabinet at a rate of say approximately ten feet per minute which, if the cabinet is five feet high, would mean that the portion traveled by the elevator shelf in one direction would be covered in about twenty seconds, an interval short enough for expeditious use of the device while still slow enough to prevent jarring of the type and to permit accurate location of the elevator shelf at a particular level for a given letter-board. The hand

switch lever 115 is advantageously normally biased to "off" position by spring means (not shown) usual in such switches.

To the end that the current shall be automatically discontinued to the motor device 112 in spite of the position of the hand switch lever 115 of the switch 114 when the elevator shelf 38 reaches either the upper limit or the lower limit of its travel, a pair of limit switches 118 and 119 are provided as here shown. The physically uppermost limit switch 118 (which, however, controls the downward extreme movement of the elevator shelf) here may be mounted on a bracket 120 (Fig. 2) carried by one of the angle members 24, and may have a switch lever 121 which is normally spring biased to closed circuit position, as is well known in the art and need not be here further described.

Assuming that the hand switch lever 115 is placed at its "D" or down position, as indicated at 117 (Fig. 2a), the switch lever 121 is disposed in the path of a lug in the form of a collar 122 carried by the inner run of one of the chains 83, in this instance the chain 83 at the same side of the device at which the motor drive is located. Thus, when the elevator shelf reaches its extreme lowermost position as indicated in Fig. 2, the collar 122 will move the switch lever 121 to "off" position for the switch 118, which will discontinue the circuit through the motor device until the manually controllable switch lever 115 of the switch mechanism 114 is moved to its "U" or up position. Thereupon, the circuit will be made through the motor device for upward movement of the elevator shelf.

If it be desired to stop the elevator shelf opposite any one of the letter-boards 28, the switch lever 115 of the switch mechanism 114 is manually moved to neutral or stop position as indicated in Fig. 2a. If this be not done before the elevator shelf reaches the upper limit of its travel (assuming now the hand switch lever 115 is at "U" or up position as at 116) the collar 122 will move the switch lever 123 of the upper limit switch 119, which switch lever 123 also lies in the path of the collar 122. Since the switch lever 123 is also normally spring biased to closed position, it will be moved by the collar 122 temporarily to "off" position, thus discontinuing the circuit through the motor device 112 and preventing further upward movement of the elevator shelf 38. The switch 119 may be carried on a bracket 119a also supported by one of the angle members 24 below the angle member which supports the switch 118.

Provision is here made, in accordance with the present invention, for safety switch mechanism which will automatically stop the motor device 112 at any time if one of the letter-boards 28 be only partially but not wholly removed from the cabinet, the purpose of this being to prevent a collision between such a partially withdrawn letter-board and the elevator shelf 38. To this end, there is normally disposed in the plane of horizontal travel of each letter-board at one side of the cabinet, in this instance again the same side as the motor drive, a roller 124. The axles of the rollers 124 each pass through a slightly vertically elongated slot 125 in the wall 23 at this side of the cabinet, and are all mounted as by axles 126 and nuts 127 on a common vertically movable shift bar 128. When the shift bar 128 is in its normal position moved thereto by gravity, the rollers 124 will occupy their lowermost posi-

tions at the bottom of the slots 125 to be in the path of the letter-boards.

If, now, one of the letter-boards be partially withdrawn from the cabinet, as indicated in dotted lines at 129 (Fig. 3), the roller 124 in the path of this particular letter-board will be elevated as at 129a, the rounded front edge of the letter-board and the rotatable character of the roller 124 camming the latter upwardly to ride on the upper surface of the letter-board and at the same time moving the shift bar 128 upwardly. At its lower end, the shift bar 128 normally rests by gravity on a switch lever 130 of the safety switch 131 which may be appropriately mounted on the inner face of an apron 132 having a bib 132a and which closes the lower front portion of the cabinet. Part 23 may be cut away as at 23c to accommodate switch 131. The switch lever 130 is moved to circuit closing position and normally kept there by the weight of the shift bar 128 pressing it downwardly as indicated in Figs. 1 and 2, but when the shift bar 128 is raised as already described and as indicated in dotted lines in Fig. 3 by movement of a letter-board therepast, the switch lever 130 of the safety switch 131 is spring biased to circuit opening position, thus discontinuing the circuit to the motor of the motor device 112 if one of the letter-boards is in partially withdrawn position. When, now, such a partially withdrawn letter-board is either slid back entirely into the cabinet or withdrawn entirely so as to rest completely on the elevator shelf 38 as shown in full lines in Fig. 3, the shift bar 128 is free to drop under the influence of gravity and to again close the circuit to the motor device through the switch 131, permitting this circuit to be under the control of the manually controllable switch 114 and the up and down limit switches 118 and 119.

In order to readily indicate the proper vertical adjustments of the elevator shelf, the latter may carry a finger or indicator 133 (Fig. 2b) secured as at 134 to the side of the elevator shelf closely adjacent the side facade 21 of the cabinet and having a pointer 135. The pointer 135 registers with vertically spaced lines 136 carried by the facade of the cabinet to indicate the elevation in the cabinet, each line 136 having one of a series of numbers or other indicia thereabove corresponding to the number of letter-board elevations in the cabinet. Such registry thus indicates when the elevator shelf is in vertical adjustment for withdrawal of a particular letter-board from the cabinet thereonto or return thereof to the cabinet.

As will be best seen from Figs. 3 and 10, the chase enclosed form as represented by the broken lines 47 rests completely on the letter-board 28 when transferred from the truck or other conveyance as already described, the letter-board advantageously having inscribed lines 200 along each side spaced inwardly from its outer edges signifying the area within which the chase may be disposed without interference with a channel 24 for the next higher letter-board. Also, the letter-board may have a stop strip 201 secured as by welding along its rear edge to prevent the chase or form from sliding rearwardly off of the letter-board, this stop strip also terminating short of the outer side edges of the letter-board so as not to interfere with an angle member 24 of a next higher letter-board and also so as not to interfere with the functioning of the safety switch roller 124 in cooperation with the letter-board, as already described.

It will be understood that the rollers, wheels,

anti-friction members, and rotatable bearings herein referred to may be provided with ball-bearings to further minimize friction.

Thus, the cabinet may have an enhanced plurality of elevations to receive forms, while at the same time minimizing the size of the motor and other operating equipment required. Furthermore, the cabinet takes up materially less floor space than would be necessary if the elevator shelf 38 were required to be of sufficient area itself to receive the chase enclosed form directly.

Not only is the present device of utility in transferring a form to and from the cabinet, but also if it be desired to inspect a form in the cabinet, without removing it, it may be withdrawn from the letter-board onto the elevator shelf and then returned to place.

So constructed and arranged, a compact, unitary, attractive and efficient cabinet is provided. It may not be essential, however, under every circumstance that all features of the invention be used conjointly, as it is conceivable that at times various combinations or sub-combinations here disclosed may be advantageously employed. Manifestly, the invention is not limited to details of construction here specifically shown for purposes of one illustrative embodiment, and such changes may be made as fall within the scope of the following claims without departing from the invention.

What is claimed is:

1. In a unitary printer's form storage cabinet, the combination with a series of letter-boards received in the cabinet in vertically aligned locations, conveyor means mounted on the front of the cabinet, an elevator shelf carried by the conveyor means, mating tracks and runners on the cabinet, letter-boards and elevator shelf whereby one of the letter-boards selectively may be slid from the cabinet onto said elevator shelf, may have its elevation changed, and may be then slid back into the cabinet, motor operated means housed in the cabinet for actuating said conveyor means to move said elevator shelf, limit switch mechanism for discontinuing the current to said motor operated means at the upper and lower limits of travel of said elevator shelf, safety switch mechanism for discontinuing the current to said motor operated means when a letter-board is partially but not wholly out of the cabinet, and an operator controllable switch for closing the current to said motor operated means to move the elevator shelf in the opposite direction from that in which its movement is stopped by said limit switch mechanism.

2. In a printer's form storage cabinet, the combination with a series of letter-boards received in the cabinet in vertically aligned locations, an endless conveyor at each side of the vertical series of letter-boards, an elevator shelf carried by the conveyors, mating tracks and runners on the cabinet, letter-boards and elevator shelf whereby one of the letter-boards selectively may be slid from the cabinet onto said elevator shelf, may have its elevation changed, and may be then slid back into the cabinet, motor operated means actuating said conveyors to move said elevator shelf, said mating tracks and runners including rollers upon which the letter-board travels, one pair of said rollers being carried by the letter-board and other rollers being carried by the cabinet and elevator shelf respectively, and limit switch mechanism actuated by said conveyor for controlling the motor operated means.

3. In a printer's form storage cabinet, the com-

ination with a series of letter-boards received in the cabinet in vertically aligned locations, conveyor means, an elevator shelf carried by the conveyor means, mating tracks and runners on the cabinet, letter-boards and elevator shelf whereby one of the letter-boards selectively may be slid from the cabinet onto said elevator shelf, may have its elevation changed, and may be then slid back into the cabinet, motor operated means actuating said conveyor means to move said elevator shelf, said mating tracks and runners including rollers upon which the letter-board travels, one pair of said rollers being carried by the letter-board and other rollers being carried by the cabinet and elevator shelf respectively.

4. In a printer's form storage cabinet, the combination with a letter-board movable in and out of the cabinet having an outwardly facing channel member at each side, of an elevator shelf mounted on the cabinet at the front thereof having a part horizontally telescoping with each of said channel members, anti-friction members mounted on said parts on which said letter-board rides, and a wedge member in each of said channel members to take up the play between said channel members and a pair of said anti-friction members when the letter-board is at the outer limit of its horizontal travel.

5. In a printer's form storage cabinet, the combination with a letter-board movable in and out of the cabinet having an outwardly facing channel member at each side, of an elevator shelf mounted on the cabinet at the front thereof having a part horizontally telescoping with each of said channel members, anti-friction members mounted on said parts on which said letter-board rides, a wedge member in each of said channel members to take up the play between said channel members and a pair of said anti-friction members when the letter-board is at the outer limit of its horizontal travel, a roller mounted in each channel member to abut one of the anti-friction members on the elevator shelf when the letter-board is at the outer limit of its horizontal travel, a ward on the letter-board, a releasable detent on the elevator shelf engageable with said ward to restrict rearward movement of the letter-board, and a spring biasing said detent to locking engagement with the ward.

6. In a printer's form storage cabinet, the combination with a letter-board movable in and out of the cabinet having an outwardly facing channel member at each side, of an elevator shelf mounted on the cabinet at the front thereof having a part horizontally telescoping with each of said channel members, anti-friction members mounted on said parts on which said letter-board rides, and a roller mounted in each channel member to abut one of the anti-friction members on the elevator shelf when the letter-board is at the outer limit of its horizontal travel.

7. In a storage cabinet having a plurality of vertically aligned horizontally movable shelves and a vertically movable elevator shelf mounted on the cabinet adjacent said horizontally movable shelves, the horizontally movable shelves being selectively withdrawable from the cabinet to rest on said elevator shelf, the combination with motor operated means for moving the elevator shelf, of a vertically movable shift bar carried by the cabinet adjacent the path of travel of the shelves, a roller carried by the shift bar in the path of each horizontally movable shelf and engageable by a horizontally movable shelf

for moving the bar vertically when one of said horizontally movable shelves is partially but not wholly withdrawn from the cabinet, and a safety switch actuated by movement of said bar for stopping the motor operated means, said bar being returnable by gravity to non-actuating position when said one of said horizontally movable shelves is wholly in or wholly out of the cabinet.

8. In a storage cabinet having a plurality of vertically aligned horizontally movable shelves and a vertically movable elevator shelf mounted on the cabinet adjacent said horizontally movable shelves, the horizontally movable shelves being selectively withdrawable from the cabinet to rest on said elevator shelf, the combination with motor operated means for moving the elevator shelf, of a vertically movable shift bar carried by the cabinet adjacent the path of travel of the shelves, interengaging cam means between each horizontally movable shelf and the shift bar for moving the bar vertically when one of said horizontally movable shelves is partially but not wholly withdrawn from the cabinet, and a safety switch actuated by movement of said bar for stopping the motor operated means, said bar being returnable by gravity to non-actuating position when said one of said horizontally movable shelves is wholly in or wholly out of the cabinet.

9. In a storage cabinet having a plurality of vertically aligned horizontally movable shelves and a vertically movable elevator shelf mounted on the cabinet adjacent said horizontally movable shelves, the horizontally movable shelves being selectively withdrawable from the cabinet to rest on said elevator shelf, the combination with driving means for moving the elevator shelf, of safety means carried by the cabinet adjacent the path of travel of the shelves for stopping the driving means when one of said horizontally movable shelves is partially but not wholly withdrawn from the cabinet.

10. In a printer's form storage cabinet, the combination with a letter-board movable in and out of the cabinet having an outwardly facing channel member at each side, of an elevator shelf mounted on the cabinet at the front thereof having a part horizontally telescoping with each of said channel members, anti-friction members mounted on said parts on which said letter-board rides, a roller mounted in each channel member to abut one of the anti-friction members on the elevator shelf when the letter-board is at the outer limit of its horizontal travel, and releasable interengaging means on the letter-board and elevator shelf to restrict rearward movement of the letter-board.

11. In a printer's form storage cabinet, the combination with a letter-board movable in and out of the cabinet having an outwardly facing channel member at each side, of an elevator shelf of substantially less area than the letter-board mounted on the cabinet at the front thereof having a part horizontally telescoping with each of said channel members whereby the letter-board is supported on the elevator shelf in cantilever arrangement when the letter-board is fully withdrawn from the cabinet onto the elevator shelf, with the letter-board projecting beyond the elevator shelf.

WILLIAM A. DUBOC.
RALPH I. SCHEUER.
GARY R. CHRISTENSEN.