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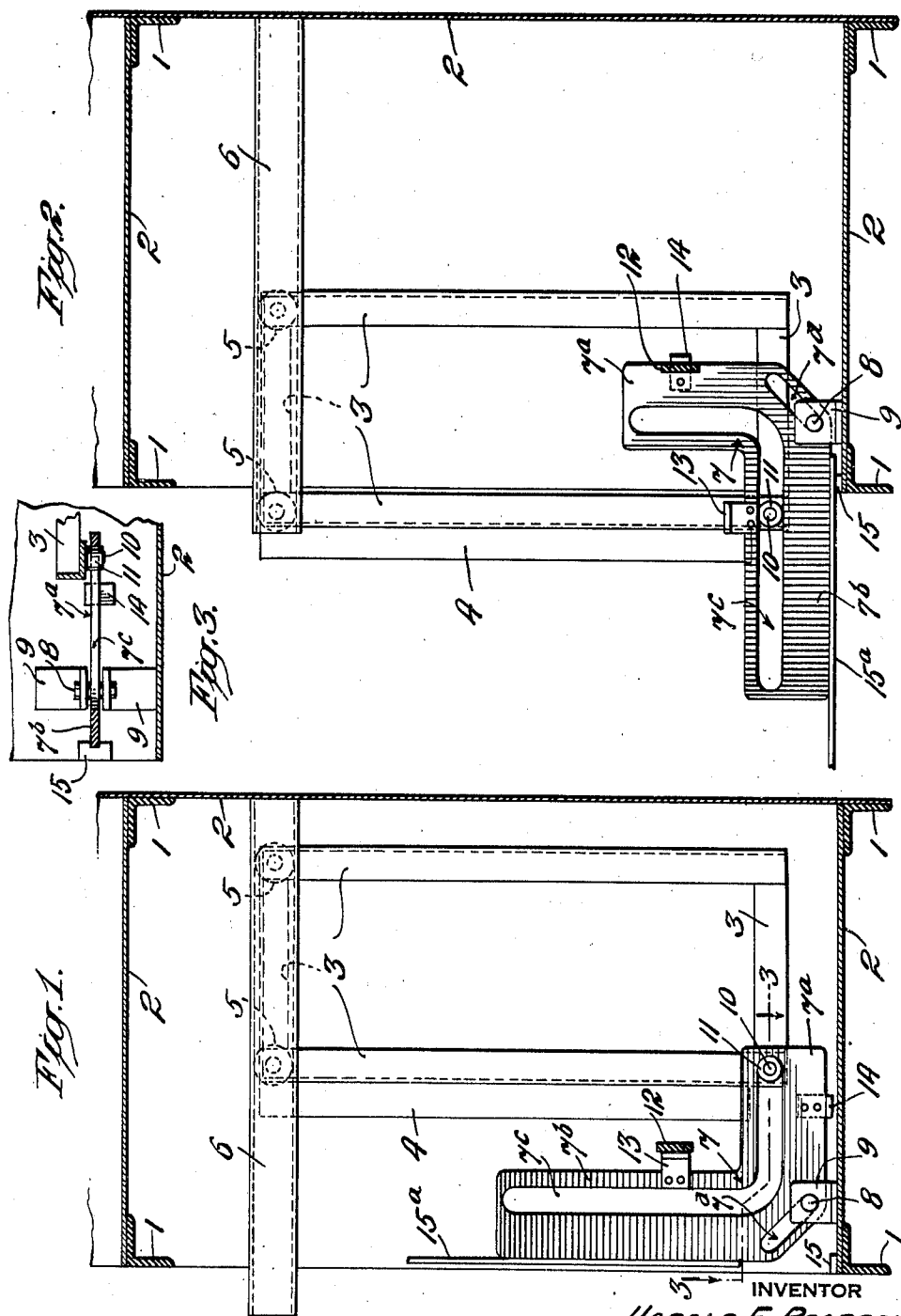
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DRAW-OUT MECHANISM

Filed Oct. 23, 1941

2 Sheets-Sheet 1



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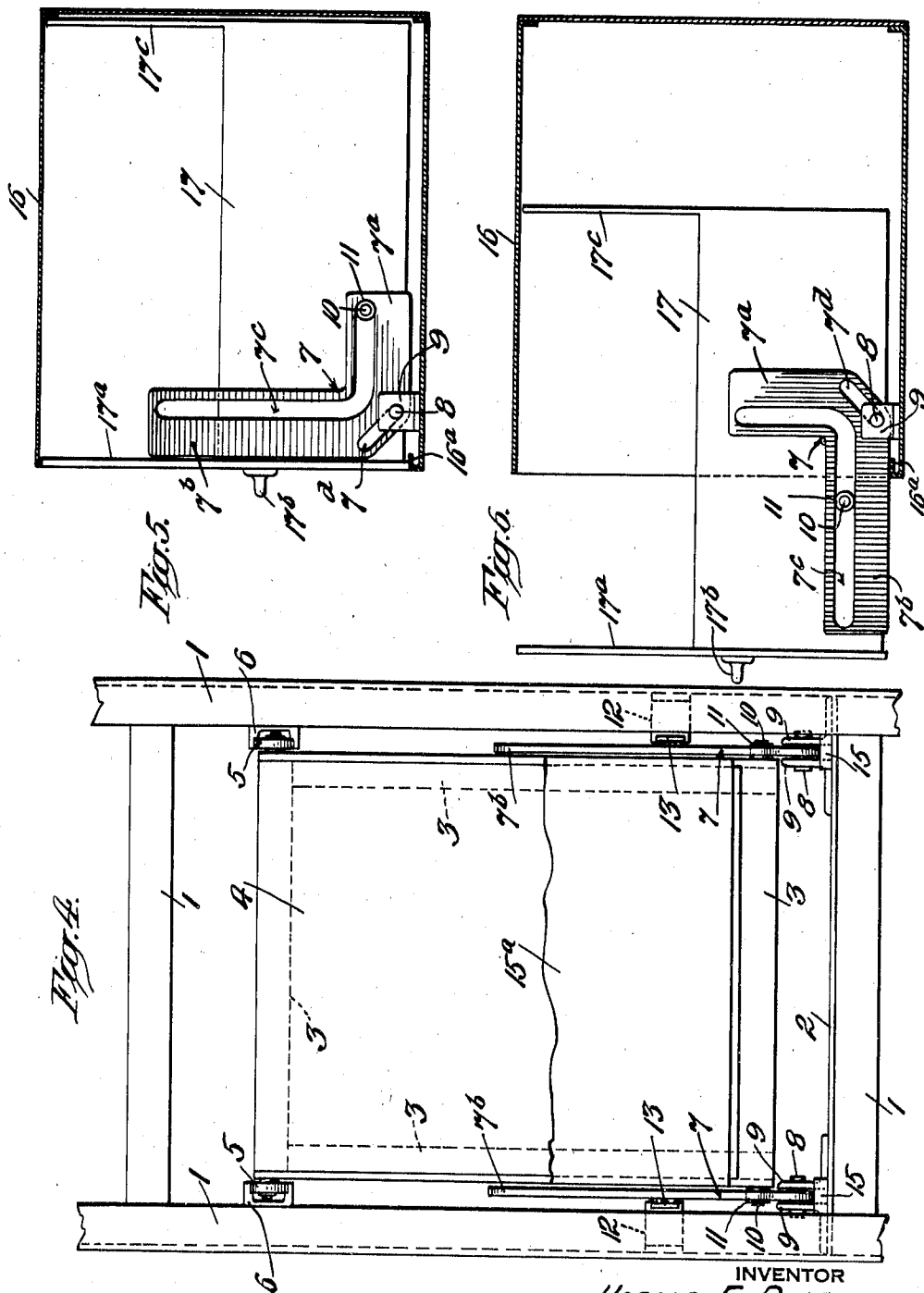
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DRAWOUT MECHANISM

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Application October 23, 1941, Serial No. 416,195

4 Claims. (Cl. 45-77)

This invention is applicable to various uses where a unit is normally positioned within a housing and adapted to be withdrawn therefrom for access to the unit. The invention is applicable to drawout units having circuit breakers 5 mounted thereon, also to units having various other devices mounted thereon or carried thereby such as relays, instruments and the like. It is likewise applicable to drawers of filing cabinets and to various other devices of the same general character.

The main object of the invention is to provide a simple form of structure generally applicable to various uses and which may be conveniently and economically manufactured. Another object is 15 to provide a sturdy structure which will be durable under long continued use. Other objects and advantages will be understood from the following description and accompanying drawings showing certain embodiments and applications 20 of the invention.

Fig. 1 is a sectional view of a housing containing a drawout unit with my improvement applied thereto and shown in side elevation; Fig. 2 is a similar view showing the unit partly withdrawn; Fig. 3 is a horizontal section on the line 3-3 of Fig. 1 showing a portion of the mechanism at one side of the unit; Fig. 4 is a front elevation of the housing and unit in its inner position; Fig. 5 is a side view partly in section showing the invention applied to a filing cabinet; and Fig. 6 is a similar view showing the drawer of the cabinet partly withdrawn.

Referring to Figs. 1 to 4, the invention is shown applied to a drawout unit of a circuit breaker switchboard. Such switchboards are formed of a steel framework and provided with various compartments side by side and also one about the other. In each compartment is housed a movable unit which may support one or more circuit breakers, relays, instruments or other electrical devices. Such devices require inspection from time to time and occasional repair or replacement of parts. In the case of circuit breakers, the units are withdrawn from the operating position to an intermediate test position for checking its performance and also to a fully withdrawn position when conditions require it.

In Figs. 1 to 4 a portion of the frame of a switchboard is shown formed of supporting angle irons 1 and partitions 2 which provide a number of compartments for receiving the various removable units. The movable unit of one compartment is shown as made of a framework of angle irons 3 which supports a panel board 4 on 55

the front of the framework. This panel supports the circuit breaker and controlling relays or other apparatus on its front with various connections extending through the panel and removably engaging fixed terminals and connections in the rear of the compartment supported by the main frame. As such parts are well known and form no part of the present invention, they are not particularly shown.

The frame of the movable unit is provided at its top portion and on each side with a pair of outwardly extending rollers 5 which engage the interior of channel bars 6. These bars are fixedly supported by the main frame of the switchboard and serve as supporting guides for the movable unit as it is moved outwardly or rearwardly in its compartment.

At each side of the compartment and at its lower front portions is an angularly shaped element 7 having one portion 7a and another portion 7b extending at right-angles to each other. The element is provided with a slot 7c having portions at right-angles to each other and extending along the length of the angularly related portions 7a and 7b. The element 7 is also provided with another slot 7d extending in a diagonal direction at the knee of the element 7 and displaced somewhat from the slot 7c. As particularly shown in Fig. 3, the slot 7d is freely engaged by a roller or cross-pin 8 which is rotatably mounted between a pair of plates 9 spaced apart from each other and fixedly supported on the lower partition 2 of the main frame. The element 7 is rotatable on the pin 8 and is also slidable on this pin during a portion of the movement of the unit when moved outwardly or inwardly. A pin 10 is fixed to the lower front portion of the frame of the movable unit at each side thereof. These pins extend outwardly and form a fixed bearing for the respective rollers 11 which engage the slots 7c.

Fig. 1 shows the position of the parts when the unit is in its innermost position. The rollers 11 are then at the ends of their respective slots 7c in the portions 7a of the two elements 7. The pins 8 are then at the ends of their respective slots 7d; and the longer legs 7b are extending upwardly and the shorter legs 7a are extending horizontally towards the rear of the compartment. A pair of stops 12 are fixed to the main frame at opposite sides of the movable unit and extend inwardly so as to be engaged by projections 13 fixed to the portions 7b when the parts are in the position shown in Fig. 1. At this time the movable unit is not only supported by the

rollers 5 and the guide rails 6 but also by the rollers 11 and the elements 7, the stops 12 serving to maintain them rigidly in the position shown.

When the movable unit, or drawout unit, is moved outwardly from its compartment by any suitable means, not shown, the unit moves along the rails 6 and the rollers 11 slide or pass forwardly along the lower straight portion of the slots 7c. When the rollers reach the curved bend of the slots 7c, they give the elements 7 a rotatable movement about the pins 8 and as the rollers 11 pass along the bend of the slots 7c, the elements 7 not only turn about the pins 8 but also slide along the pins by the provision of the slots 7d. This movement results in the longer legs 7b assuming a horizontal position while the shorter legs 7a assume a vertical position and the pins 8 are then located in the opposite ends of the slots 7d. This new position of the parts is shown in Fig. 2 and it should be noted that the radius of the curved portions of the slots 7c is made such as to permit this angular movement of the elements 7. At the time of completion of this rotatable movement, the stops 12 are engaged by projections 14 which are fixed to the portions 7a and then serve to support the elements 7 in their new position in conjunction with the pins 8. Supporting blocks 15 may also be provided on the main frame so as to be engaged by the lower edges of the portions 7b when the parts are in the position shown in Fig. 2. This position may serve as an intermediate test position for the circuit breaker and other controlling devices carried by the panel 4 of the movable unit. This unit may readily be moved forwardly from the position shown in Fig. 2 during which movement the rollers 11 will travel along the front portions of the slots 7c; and in the outermost position of the unit the rollers 11 will be positioned at the front ends of the slots 7c thereby serving to support the front portion of the unit while the rear rollers 5 will serve to support the rear portion of the unit. The unit is then readily accessible for any necessary adjustments or repairs of the parts on both the front and back of the panel 4.

When it is desired to return the unit to its normal operating position, the reverse action of the guiding and supporting elements 7 takes place. The rearward movement first causes the rollers 11 to pass along the slots 7c until the curved portions of the slots is reached at which time the elements 7 are turned angularly and the pins 8 then assume a position at the opposite ends of the slots 7d. The elements 7 then assume the position shown in Fig. 1 and the continued movement of the unit will result in the rollers 11 assuming a position at the ends of the slots 7c at which time the unit is in its innermost position.

It is apparent that the elements 7 and their cooperating parts serve as guides and supports for the movable unit in all positions thereof by a simple form of structure which may be economically manufactured and conveniently assembled. The elements 7 during the rearward movement of the unit, are withdrawn within the compartment and thereby avoid the necessity of any outwardly projecting parts when the unit is in its operative position. In some cases a cover plate 15a may be secured to the outer edges of the portions 7b of the guiding and supporting elements so that when the unit is in its innermost position the plate 15a will serve as a cover plate for protection of the apparatus carried by

the panel 4. The plate 15a is shown broken away in Figs. 1 to 4 and it may be extended to any amount desired.

In Figs. 5 and 6, the parts corresponding to those already described are similarly numbered. Here a filing cabinet unit is indicated having the usual casing 16 forming the compartment in which the drawer 17 is adapted to be closed within the compartment and withdrawn from the compartment for access to the files or other contents. The front of the drawer 17a, or movable unit, is shown as having a handle 17b and the drawer is likewise provided with a rear upwardly extending portion 17c which extends to the top of the compartment. Fig. 5 shows the drawer in the closed position with the front of the drawer resting upon an intumed edge 16a of the compartment, the position of the other parts corresponding to those already described with reference to Fig. 1. When the drawer is withdrawn, the movement is the same as that already described with reference to the previously described figures. Fig. 6 shows the position of the parts after the elements 7 have been turned from the position shown in Fig. 5 to the position shown in Fig. 6. In this position the portions 7b of the elements rest upon the intumed edge 16a of the compartment. The drawer may be further withdrawn from the position shown in Fig. 6 until the rollers 11 reach the front ends of the slots 7c at which time the drawer will be in its fully withdrawn position for access to its contents. When the drawer is moved inwardly the reverse action takes place.

Various other applications of the invention may be made, as well as various modifications for adaptation to particular uses without departing from the scope of the invention. Instead of providing rollers engaging the slots in the rotatable elements, bearing pins or projections from the drawout unit may be used to slidably engage the slots; also instead of providing slots within the rotatable elements, the rollers or bearing pins may slidably engage the edges of the rotatable elements, the limiting positions being defined by turned up edges at the ends of the elements. In other words open sided slots may sometimes be utilized and various other changes made to suit particular requirements.

I claim:

1. The combination of a supporting compartment, a drawout unit, a guiding and supporting element having a slot, said slot having portions at an angle to each other, a projection connected to the drawout unit and slidably engaging said slot, said element having a second slot, and an element slidably engaging said second slot and connected with the supporting compartment.

2. The combination of a supporting compartment, a drawout unit, a guiding and supporting element having guiding paths at an angle to each other, means carried by said unit engaging said element along said paths and slidable thereon, and connecting means between said element and said compartment and supported by said compartment, said connecting means comprising a pivotal and slidable connection.

3. The combination of a supporting compartment, a drawout unit, a guiding and supporting element having guiding paths at an angle to each other and also having an additional guiding path, means supported by said compartment and engaging said additional guiding path for rotatably and slidably supporting said element, and means carried by said unit engaging said element

along said paths at an angle to each other and slidable thereon.

4. The combination of a supporting compartment, a drawout unit, guiding and supporting elements on opposite sides of said unit respectively and each having guiding paths at an angle to each other, means carried by said unit and

engaging said paths of the respective elements and slidable thereon, and connecting means between said elements respectively and said compartment and supported by said compartment, said connecting means each comprising a pivotal and slidable connection.

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