

Sept. 22, 1953

C. B. LUNDSTROM
DISAPPEARING CABINET STRUCTURE

2,653,071

Filed March 22, 1949

2 Sheets-Sheet 1

Fig. 1

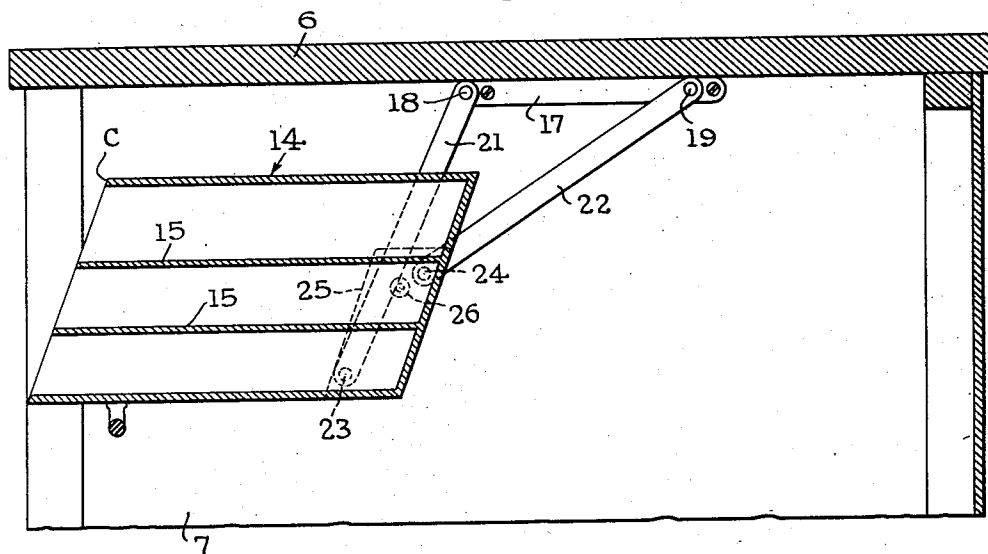
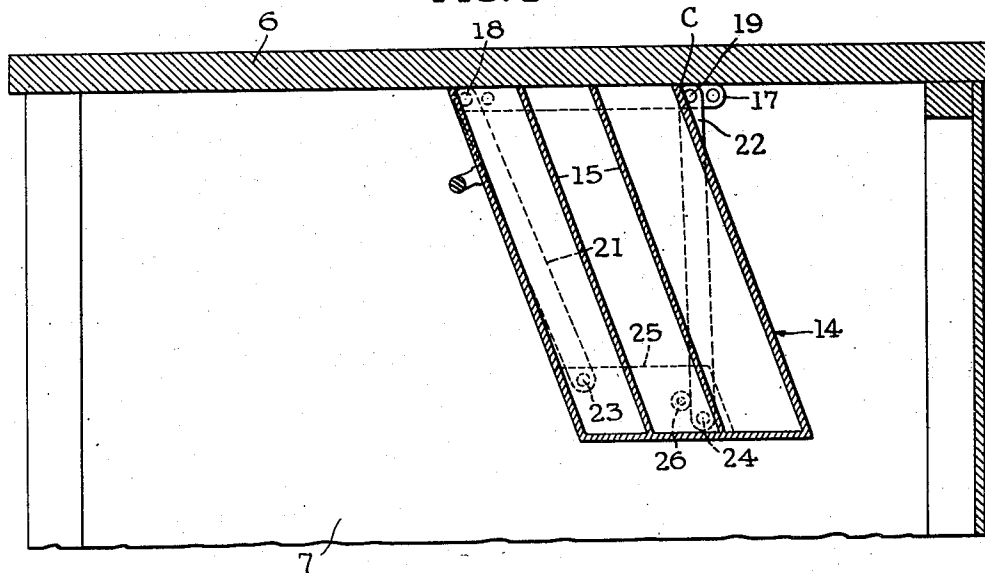


Fig. 2



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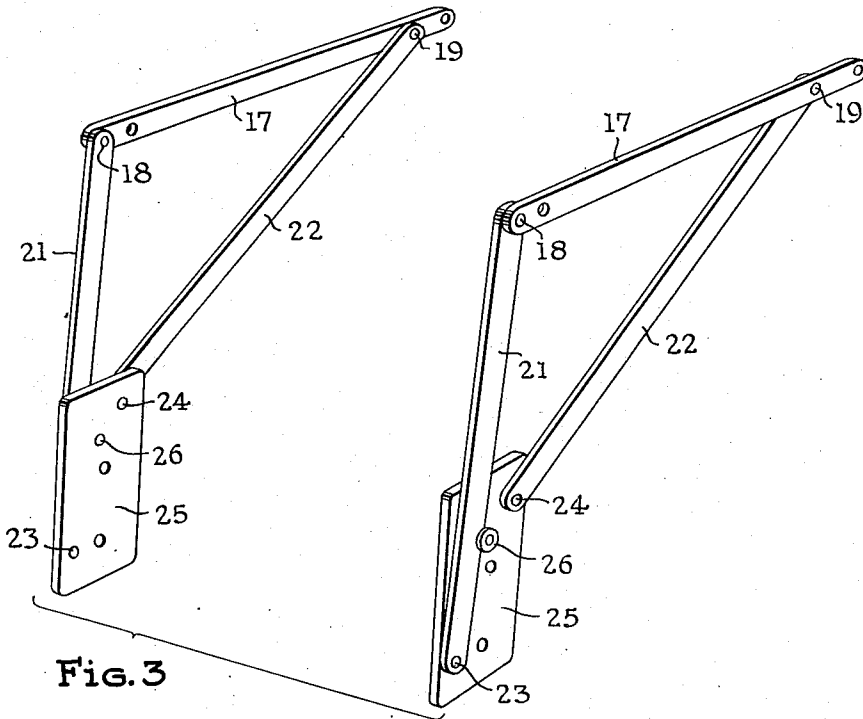


FIG. 3

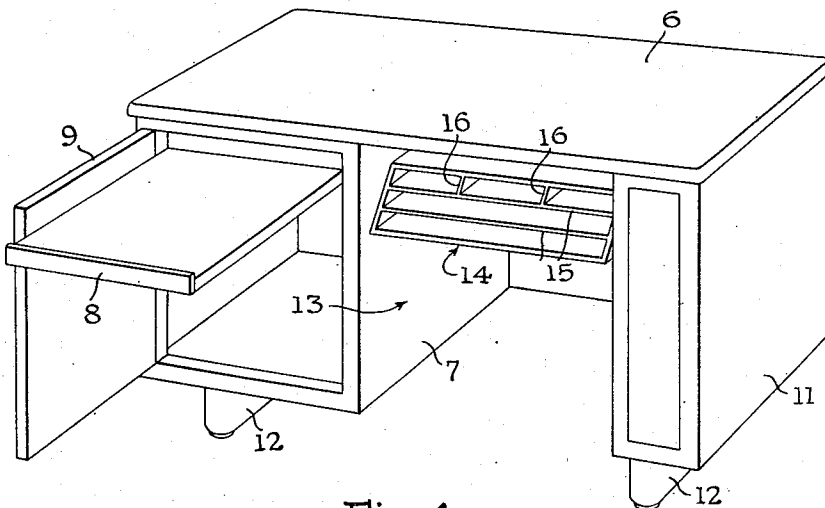


FIG. 4

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DISAPPEARING CABINET STRUCTURE

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2 Claims. (Cl. 312—325)

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This invention relates to stationary cabinets for typewriter desks, and offers an improvement on the device disclosed in my prior application Serial No. 713,144, filed November 29, 1946, and now abandoned.

Where office space is expensive there is a growing tendency to use single-pedestal typewriter desks in which the disappearing platform for the typewriter uses the entire space in the pedestal. This leaves no pedestal space for stationery, forms, envelopes and the like.

The prior application discloses and claims a stationery receptacle in the form of a sort of tray supported on links, and movable between a position at the rear of the knee-hole, and a position at the front of the knee-hole. The tray is set in the first position when the typewriter is not in use, and in the second position when the typewriter is in use. This last is practicable because the operator sits side to the desk when typing.

The present invention offers a greatly improved supporting linkage for the stationery receptacle; one which requires no springs, does not impose undesirable limitations on the form of the receptacle, and is easy to install.

These results are secured by using at each side of the receptacle two suspending links which are unequal in length, are pivoted to the desk on axes which are quite widely spaced horizontally, and are pivoted to the receptacle on axes which are much less widely spaced horizontally. In the rearward position of the receptacle these relatively closely spaced pivots are near the bottom of the receptacle and consequently below the center of gravity thereof. The links converge downward and the rear link is substantially vertical (see Fig. 2). As a consequence the receptacle has a tumbling or forward rotary motion, as it moves forward, in which it turns nearly 70° and moves from a position in which its shelves are only moderately inclined from the vertical to one in which its shelves are approximately horizontal.

In the retracted position and until the receptacle approaches the forward position the links exercise the sole control. In the forward position control would be lost except for the presence of a stop on the receptacle, which by engaging the forward link, locks the suspension under the weight of the receptacle, which then projects forward from its supports and causes the links to sustain the receptacle rigidly, as shown in Fig. 1. However, a lifting force applied to the front edge of the receptacle will cause it to retract.

The receptacle when mounted according to the

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present invention can be made relatively small and can be supported by links of moderate length, and still move into the knee-hole far enough to be out of the way when retracted. This possibility is in part the result of the considerable rotary movement during retraction.

The receptacle is a compact pigeon-holed unit of considerable depth when in its forward position, whereas the receptacle of the prior application was necessarily more shallow, and particularly shallow at its forward margin.

Thus despite the fact that both mechanisms use two pairs of suspending links, the motion characteristics are quite different and the gravity self-locking feature afforded by the final forward tumbling motion of the receptacle offers a decided improvement over the earlier arrangement.

One practicable embodiment of the invention is illustrated in the accompanying drawing, in which:

Figs. 1 and 2 are sections through the knee-hole of a desk having a stationary receptacle mounted according to the present invention; the two views showing the receptacle in its forward and in its retracted positions, respectively.

Fig. 3 is a perspective view of the two linkages used to support one receptacle both in the forward position of Fig. 1.

Fig. 4 is a perspective view of a desk having the invention applied. The instrument base is shown projected and the stationery receptacle is shown in its forward position.

In Fig. 4 which shows a typical desk with the invention applied the desk top is shown at 6. The pedestal 7 serves as the "disappearing instrument cabinet" and supports the movable instrument platform 8, here shown in its projecting position. A hinged door 9 closes the opening in the front of the pedestal 7 when the platform 14 and the machine carried thereby (for example a typewriter) are housed.

The platform mechanism is not illustrated and may be of any of many well known types.

A small pedestal is indicated at 11 and so-called "sled bases" appear under each pedestal at 12. The usual knee-hole is generally indicated by the numeral 13. Mounted in the knee-hole by means to be described is the receptacle 14 which can be sub-divided into any desired number of pigeon holes by shelves 15 and dividers 16.

Refer now to Figs. 1-3. Attached to the walls of pedestals 7 and 11 within and at the top of knee-hole 13 are two suspender-link mechanisms, which as best indicated in Fig. 3 are mirror duplicates. They comprise the same elements,

One set assembled as a right-hand unit and the other as a left-hand unit. Hence, corresponding elements of each unit will be identified by the same reference numerals.

A mounting bar or plate 17 is attached to the wall of pedestal 7 and another to pedestal 11 just beneath top 6. Hinged to the ends of each bar 17 at 18 and 19 are two links, a relatively short link 21 and a longer link 22. The lower ends of the links 21 and 22 are hinged at 23 and 24 to a corresponding plate 25 which is fixed to the appropriate side of receptacle 14. Fixed to plate 25 is a stop 26, arranged to arrest the swinging motion of link 21 relatively to plate 25. The spacing of hinge pins 23 and 24 on plate 25 is much closer than the spacing of hinge pins 18 and 19 on bar 17.

The receptacle 14 is a parallelopiped, and the vertical cross section fore and aft is a rhomboid. The links and the mounting plates are so dimensioned that when (as in Fig. 2) the receptacle is retracted, its open face is practically in contact with the lower face of top 6 and the links 21, 22 are approximately equally inclined in opposite directions.

As the receptacle is drawn forward the rear links swing upward whereas the front links swing first downward and then upward, passing through a position in which the hinges 23, 24 and 19 aline to arrive at the position shown in Fig. 1. This last position is defined by the collision of stop 26 on each plate 25 with the corresponding link 21. In this position the swinging motion of the receptacle has brought it to the nearly horizontal position shown in Fig. 1 in which it projects forward from its support and so is retained by gravity.

Since the two linkages used are mirror duplicates, they operate similarly and synchronously. No spring is needed and none is used. The receptacle is retained by gravity in each limiting position, the retention in the forward position being particularly positive and rigid.

The linkage used is a four bar linkage and is a special case of the double rocking lever type. Such linkages comprise a frame or supporting member (bar 17 in this case) two swinging links (21 and 22) and a connecting rod or bar (25) of such relative lengths that the swinging motion of the swinging links is limited to less than 180° because the connecting rod element 25 swings into alinement with one or the other swinging link (according to the direction of swing) and limits the swinging motion of the swinging links.

In the present case, however, there is a further feature of functional significance. Alinement of members 25 and 22 limits forward swinging of the links, but link 25 has a further turning or tumbling motion in which link 21 retreats or swings back slightly and link 22 continues to move forward. This action is limited to a small range by stop 26, and is availed of to lock the linkage in its forward position.

Consider Fig. 1 and interpret statements of direction with reference to that figure. The weight of receptacle 14 holds stop 26 against swinging link 21, since it tends to produce counter-clockwise rotation of the receptacle about hinge 23. Link 22 acts in thrust as a strut and its line of thrust passes above hinge 23. Hence, its tendency is also to produce counter-clockwise rotation of the receptacle about hinge 23. As a consequence of passage of the members 25 and 22 beyond their positions of alinement a

very simple and effective locking action is produced.

An interesting characteristic not readily appreciated from Figs. 1 and 2 is the fact that the corner of the receptacle 14 indicated by the letter C in Fig. 2 moves forward from the position indicated in Fig. 2 in a nearly horizontal and approximately straight line for seven-tenths of its travel forward and then starts to swing down quite rapidly to the position shown in Fig. 1. There is, thus, no interference between the open end of the receptacle and the lower face of the desk top despite the fact that the mounting in the rear position is very close. The closeness of this mounting has great value because dust is almost completely excluded. The cross section of the receptacle 14 has been described as a rhomboid and that is a convenient form as shown. However, the beveled front face has functional significance, the inclined rear wall is a matter of choice.

So far as the geometry of the linkage is concerned, hinging of links 21 and 22 to bar 17 is the same as hinging to pedestal 7 in the same positions. Similarly the lower ends of links 21 and 22 are in effect hinged to receptacle 14 and stop 26 is in effect fixed to the receptacle. There are, however, sound reasons for using bar 17 and plate 25. Better hinge construction is possible, and precise location of all hinge axes and of the stop are assured in manufacture. Precision is necessary for smooth action and geometrical identity of the two linkages in any single installation is practically indispensable. These results, and great simplification of installation are assured by construction of the linkages as complete factory-assembled units.

Such units can be sold for use with a wide variety of desks. All that need be specified for any particular linkage is the bevel of the front face of the receptacle, the location of the members 17 in the knee-hole, and the location of members 25 relatively to the beveled front face of the receptacle.

The length of the receptacle is a function of the width of the knee-hole and can be determined by the manufacturer who constructs the desk and the receptacle. It follows that the linkages as shown in Fig. 3 can be availed of with desks of widely different dimension and with receptacles whose form is not seriously limited by the design of the linkage.

For the above reasons the construction specified is preferred, but such preference does not exclude modifications within the scope of the claims.

I claim:

1. A supporting linkage comprising in combination, a supporting member; a supported member; a pair of hinged links unequal in length between hinge axes, each link being hinged substantially at its opposite ends on parallel axes to the supporting member and to the supported member, respectively, the spacing of hinge axes being greater on the supporting member than on the supported member, said spacings being such relatively to the lengths of the links between hinge axes that swinging motion of the links about the axes on the supporting member through arcs less than 180° is capable of causing pivot alinement between the supported member and respective ones of said links in opposite directions of swing and motion of the supported member in the direction in which the shorter link leads, if continued beyond pivot alinement

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causes the shorter link to reverse its swing; and a stop located on the supported member in position to engage one of said links and limit said reverse swing.

2. The combination defined in claim 1 in which said stop is located between the hinge pivots on said supported member.

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