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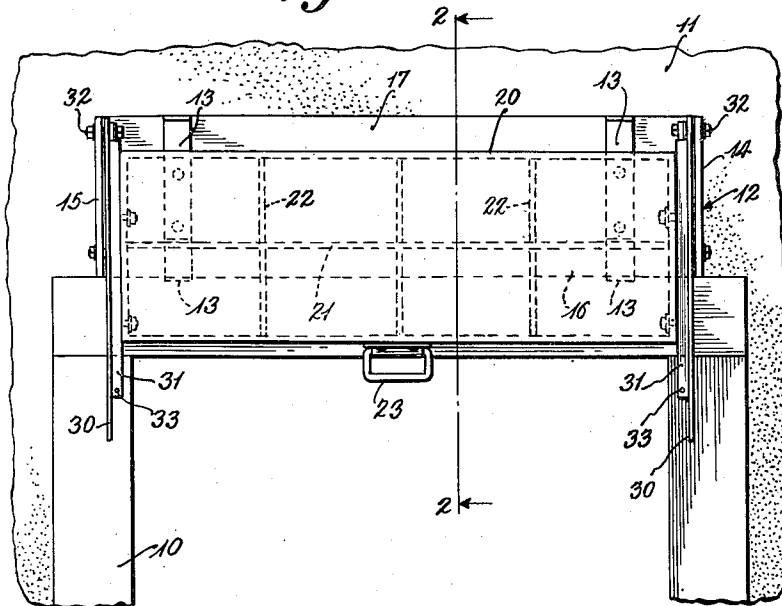
R. F. DAVIS

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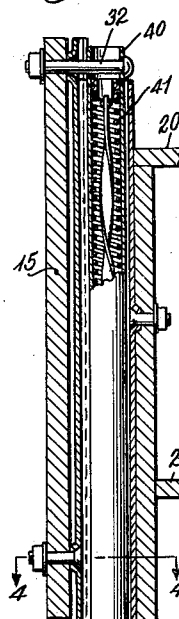
STORAGE BOX

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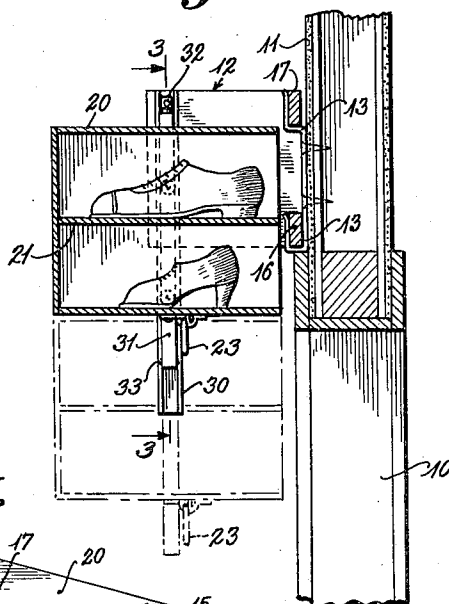
*Fig. 1.*



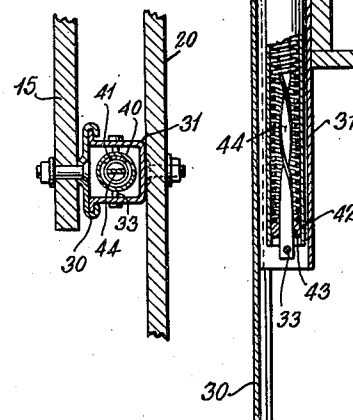
*Fig. 3.*



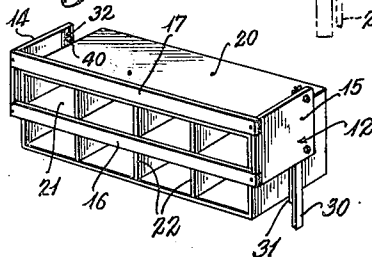
*Fig. 2.*



*Fig. 4.*



*Fig. 5.*



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## UNITED STATES PATENT OFFICE

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## STORAGE BOX

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5 Claims. (Cl. 312-112)

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This invention relates to retractable storage boxes and more particularly to an improved type of retractable storage box especially designed to utilize space that is otherwise wasted.

The problem of providing a sufficient amount of readily available storage space is a problem in every household. Regardless of the number of clothes closets, drawers, and even storage places under beds, under window seats and in kitchen cupboards, there is always a demand for still more storage space so arranged that the contents are readily accessible. One particular problem has been the storage of shoes and it has been mainly for the purpose of providing a better storage arrangement for shoes that the present invention has been made.

Shoe racks have been built into closets, under beds and in dresser drawers. Shoe boxes have been placed in closets and shoe racks fastened to closet doors. None of these arrangements has been entirely satisfactory. In many of them the shoes become dusty or rub against other garments and in others the shoe boxes or shoe racks clutter up the closet floor or provide an undesired obstacle on the door of the closet. The present invention avoids the difficulties, keeps the shoes easily accessible, substantially dust free, and off of the floor and out of the way.

In application Serial Number 674,220, filed June 4, 1946, now Patent No. 2,460,681, by this same inventor, there is described a device for this purpose which comprises a box adapted to contain shoes or any other object or objects which are to be stored, and which box is particularly adapted to be mounted just above and just inside of the door of a clothes closet. This box is so mounted that it normally occupies the space just above and just inside of a closet door, which space is otherwise unoccupied and unused. The box is also mounted so that it can be pulled downward to a position below the upper sill of the closet door and one face of the box is open to permit easy access to the contents, when the box is in its lowered position. Thus, when the box is properly installed, it remains out of sight and out of the way just inside of and above the closet door. When it is desired to reach the contents the box is pulled to a lower position by means of a handle affixed to it, and while in this position the contents may be inserted or removed.

By providing a spring or counterweighted suspension the box may be caused to remain in either its uppermost or its lowermost position once it has been placed there and regardless of

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whether or not it contains an object or objects to be stored. Thus, once the user pulls the box down, it can be arranged to stay down until the user takes from or places in the box an object or objects, and then, after the user has pushed the box into the uppermost position, the box will stay in that position until the user again pulls it down.

The present invention is an improvement upon the invention of the aforementioned application. It contemplates, as did the aforementioned application, a box mounted so that it normally occupies the space just above and just inside of a closet door, and this box, as was the box of the previous invention, is mounted so that it can be pulled downward to a position below the upper sill of the closet door, and one face of the box is open to permit easy access to the contents when the box is in its lowermost position. Again, when the box is properly installed, it remains out of sight and out of the way just inside of and just above the closet door. Again, the box may be pulled into a lower position by means of a handle affixed to it, and while in this position, the contents may be inserted or removed. Again, the box is provided with a suspension that causes it to remain either in its uppermost or its lowermost position once it has been placed there and regardless of whether or not it contains an object or objects to be stored.

The purpose of the present invention is to improve upon the specific arrangement disclosed in the earlier application. Thus, the storage box of the present invention has been made adaptable for use with doors of a wide variety of widths by so arranging the suspension mechanism that it can be mounted simply and easily on a wall above a closet door and is in no way dependent upon the width of the door since the parts are attached to the wall and do not extend down onto the side members of the door frame.

The new construction also is an improvement upon the construction of the earlier application in that it is arranged for very simple mounting by the simple process of attaching a few simple brackets to the wall and the insertion of the box and its supporting frame into these brackets.

The present invention is also an improvement upon the specific construction shown in the earlier application in that the storage box is arranged to move up and down in a straight line rather than in an arc and is supported by a particular type of spring tension members that provide a relatively constant lift at all positions

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of the box. These tension members also have sufficient friction so that the box will stay in the desired position, regardless of variations in the amount of weight in the storage box, if these variations do not exceed certain limits which are relatively wide. It has been found, for example, that with the type of tension members used in the present construction, the box will stay in any desired position either completely empty or loaded with as much as ten pairs of men's shoes.

Further details and advantages of this invention will be apparent from the appended drawings and the following detailed description of the embodiment illustrated therein.

In the drawings:

Figure 1 is a rear elevational view of a device embodying the principles of this invention, mounted in an ordinary clothes closet;

Figure 2 is a side sectional elevational view of the same device taken on lines 2—2 of Figure 1;

Figure 3 is a detail view, partly in section, of one of the spring suspension elements used to suspend the box at the desired elevation in the closet;

Figure 4 is a detail view of this same suspension device taken on the lines 4—4 of Figure 3; and

Figure 5 is a perspective view of an assembled storage box and supporting mechanism ready for installation in a closet.

The ordinary clothes closet door comprises a door frame 10 mounted in an opening in a wall 11. A preferred form of the device of this invention comprises a supporting frame 12 mounted just above the door of the closet in brackets 13, nailed or screwed to the wall just above the closet door. It will usually be found desirable to form the supporting frame for the storage box from a pair of end plates 14 and 15 connected by a pair of cross-members 16 and 17, at their upper and lower edges. The upper cross-member 17 may be supported in S-shaped brackets 13, usually two, one at either end, and the lower cross-member 16 may also be supported in brackets 13, these latter brackets usually, although not necessarily, being U-shaped. There may be, if desired, two brackets for the upper cross-member and one bracket for the lower cross-member or vice versa. It is usually desired to have at least two brackets for one of the cross-members so that the device cannot tilt endwise and it is usually also desirable to have at least one supporting bracket on each of the cross-members to prevent the device from tilting back from the wall.

In placing these brackets in an ordinary clothes closet, it is desirable to locate the studs behind the plaster and to fasten the brackets at the studs so that the screws used for mounting the brackets will pass into the studs and firmly attach the brackets. However, expansion screws or other means may be used if desired to fasten the brackets to the wall. After the brackets are fastened to the wall, the supporting frame 12 may be set in the brackets along with its attendant parts which will be hereinafter described. If desired, the brackets may include catches to hold the cross-members in position so that the box cannot be accidentally lifted out of the brackets. Ordinarily, however, this will not be necessary.

Supported from the supporting frame 12 is the storage box 20. The height, width, and depth of this box may be whatever is desired and whatever the closet in which it is to be installed will accommodate. However, it has been found that most clothes closets will accommodate a box ap-

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proximately 13 inches in depth, 10 or 11 inches in height and 24 inches in length. Such a box is large enough to accommodate ten pairs of men's shoes.

The side of the box which faces the door when the device is installed in the closet is left open. The interior of the box may be sub-divided by shelves 21 and partitions 22 as desired, or such shelves and/or partitions may be omitted. In some instances, it will doubtless be found desirable to use removable shelves that can be either inserted or removed as the user desires. The storage box 20 will normally have one or more handles 23 attached to the bottom side thereof, to facilitate the lowering and raising of the box in the closet.

The storage box is attached to its supporting frame by means of a pair of interlocking channels 30 and 31, at each end of the box and supporting member. One of the channels of each pair is attached to the box 20 and the other channel of each pair is attached to an end member of the supporting frame 12. Thus, as the channel members slide relative to each other, the box is lowered or raised relative to the supporting frame.

In order to counterbalance the box and prevent it from moving up or down except when it is pushed or pulled, a constant-tension spring device is mounted between each pair of channels 30 and 31. At the top end, this spring device is attached by a bolt 32 to the fixed channel 30 and an end member of the supporting frame. At the bottom end this spring member is attached to the movable channel 31 by a pin 33, and is thus attached, in effect, to the storage box.

The spring tension members used in this construction are of a type now commonly used in ordinary house windows in place of ropes and sash weights. They comprise an outer tubular member 40 which encloses a coil spring 41 attached at one end to the tubular member. At the other end of the coil spring 41, and within the tubular member 40, there is positioned a rotatable guide member 42, in the center of which is a slot 43. A longitudinally movable, long spiral strip of metal 44 passes through this slot 43 and thus as this strip of metal is drawn downwardly, and held against rotation, the guide member 42 is turned.

Since the guide member 42 is attached to the lower end of the spring 41, and the spiral strip 44 is held against rotation by being attached to the movable channel 31 by a pin 33, the guide member is turned as the storage box is lowered and winds the spring 41. This, in turn, resists the downward motion of the metal spiral, and hence the downward motion of the storage box.

The degree of twist of the metal spiral is adjusted so that it varies over the length of the metal spiral to compensate for the additional force exerted by the spring as it is wound tighter. This results in a device that can be extended by tension, and which will resist that extension by tension with approximately equal force throughout the entire extension. Furthermore, this device has a considerable amount of friction which causes the device to remain in whatever position it is placed without any great tendency for it to change position due to the pressure of the spring.

As will be readily appreciated, such an arrangement is ideal for a storage box of the type herein disclosed, since it permits the storage box to be easily moved to any position from its uppermost to its lowermost position, and yet permits the

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box to remain in whatever position it is placed regardless of relatively wide variations in load.

Numerous variations and modifications of the exact construction above-described will immediately be apparent to those skilled in the art. This invention, therefore, is to be considered as limited only as indicated in the appended claims and not as limited to the specific construction above-described.

What is claimed is:

1. In a retractable storage box for use in a construction in which a wall section extends downwardly from a ceiling section and terminates well above the underlying floor section, and that comprises a retractable box, means to support said box behind said wall section, and above its lower edge and under said ceiling section, said means also permitting said box to be pulled downward a limited distance to a position below the lower edge of said wall section for access to its contents, the improvement that comprises a supporting frame for said box, mounting means for mounting said supporting frame on said wall section above its lower edge, guide members for guiding said box up and down in a straight line, and spring means for counterbalancing said box, said spring means exerting substantially equal counterbalancing force regardless of the elevation of said box.

2. In a retractable storage box for use in a construction in which a wall section extends downwardly from a ceiling section and terminates well above the underlying floor section, and that comprises a retractable box, means to support said box behind said wall section, and above its lower edge and under said ceiling section, said means also permitting said box to be pulled downward a limited distance to a position below the lower edge of said wall section for access to its contents, an improvement that comprises a U-shaped supporting member for said box, means for removably fastening said U-shaped supporting member to said wall section entirely above its lower edge with the legs of the U-shaped member extending perpendicularly outward from said wall section, guide members attached to each leg of said U section for guiding said box in a straight line during its up and down movement, and a spring counterbalancing unit attached between each leg of the U-shaped supporting member and the corresponding end of the storage box to counterbalance the storage box, said spring counterbalancing units being of a type that will exert substantially uniform counterbalancing tension on said box regardless of its elevational position.

3. In a retractable storage box for use in a

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construction in which a wall section extends downwardly from a ceiling section and terminates well above the underlying floor section, and that comprises a retractable box, means to support said box behind said wall section, and above its lower edge and under said ceiling section, said means also permitting said box to be pulled downward a limited distance to a position below the lower edge of said wall section for access to its contents, an improvement that comprises a U-shaped supporting member for said box, means for removably fastening said U-shaped supporting member to said wall section entirely above its lower edge with the legs of the U-shaped member extending perpendicularly outward from said wall section, guide members attached to each leg of said U section for guiding said box in a straight line during its up and down movement, and a spring counterbalancing unit attached between each leg of the U-shaped supporting member and the corresponding end of the storage box to counterbalance the storage box, said spring counterbalancing units being of a type that will exert substantially uniform counterbalancing tension on said box regardless of its elevational position and being subject to sufficient friction during their operation to substantially retard the movement of the box in either direction.

4. The improvement defined in claim 3 further characterized in that the spring counterbalancing units each comprise an elongated cylindrical sleeve, a coil spring mounted within said sleeve and attached at one end to said sleeve, a slotted follower mounted on the other end of said spring and coaxial with said spring, and a spiral metal strip mounted in the slot in said follower and held against rotation but not against longitudinal movement whereby the longitudinal movement of said spiral strip rotates said follower and winds said spring, said spiral strip having a varying degree of twist to compensate for the increasing force exerted by said spring as it is wound.

5. An improvement as defined in claim 4 further characterized in that the spring counterbalancing units are mounted within the guide members that guide the movement of the storage box relative to the U-shaped supporting member.

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#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

| Number    | Name  | Date         |
|-----------|-------|--------------|
| 2,460,681 | Davis | Feb. 4, 1949 |