July 3, 1962 C. J. IBEL 3,042,472

VERTICALLY MOVABLE FILING CABINET

Filed Feb. 4, 1960

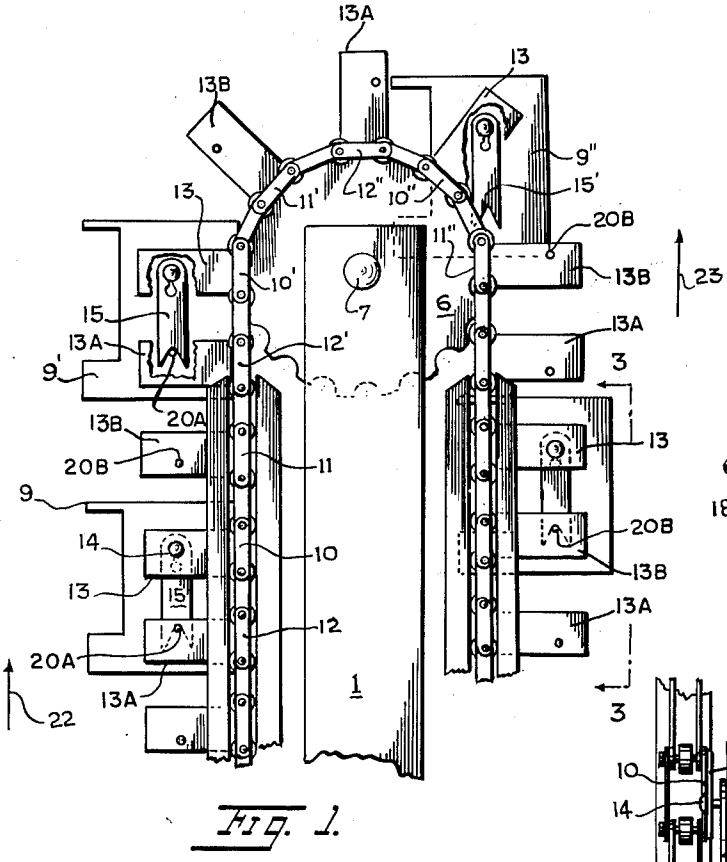


Fig. 1.

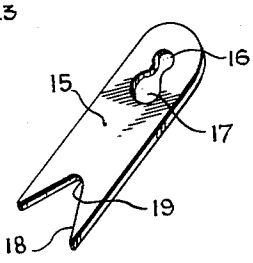


Fig. 2.

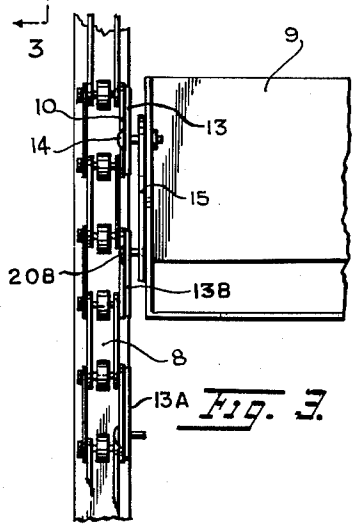


Fig. 3.

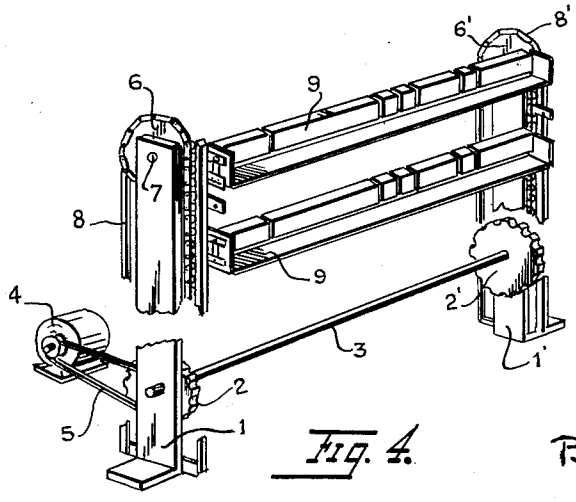


Fig. 4.

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VERTICALLY MOVABLE FILING CABINET

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The present invention is directed to filing cabinets and the like, and more particularly to the type wherein a series of shelves are adapted to be moved vertically in order to bring successive shelves into readily accessible positions.

Devices of this type have been known and used. They embody a pair of vertical supports spaced apart and having sprockets at top and bottom of said supports with endless chains on each pair of sprockets. Shelves are hung between the supports on the chains and pivoted so that they remain in horizontal position at all times. This provides a compact storage unit of substantial capacity and ready access. It suffers from the defect that the shelves have a tendency to swing when articles are placed thereon or removed therefrom. To obviate this, various expedients have been suggested, by the introduction into the structure of elements which tend to prevent such swinging. Usually the additional structures were complicated or expensive, or both, and they did not perform the intended function sufficiently to satisfy the users of such cabinets.

The present invention is intended and adapted to overcome the disadvantages inherent in cabinets of the type described, it being among the objects thereof to provide a structure which will prevent lost motion in or swinging of the shelves.

It is also among the objects of the invention to devise a mechanism for the stated purpose which is simple in construction, highly efficient in use, and adapted to withstand long and rough usage and accidental damage.

In practicing the present invention, there is mounted on the endless chain a plurality of brackets. Each of the brackets is held between the pivots of a link and it extends outwardly at about right angles to the link. Usually, the brackets are vertically held flat plates. In the preferred form a shelf is pivoted on every third bracket. Also mounted on the shelf pivot is a pendant which has an inverted V-notch at its opposite end. Each bracket has a pin extending towards the shelves and the distance between the pivot of the pendant and the apex of the notch is equal to the distance between the pivot of the shelf and the pins of the brackets on opposite sides of said pivot at the areas where the chain is in the vertical position.

Thereby, in the operation of the apparatus when a shelf is on the vertical part of the chain, its pendant has the notch engaged on the pin of the next lower bracket. As a result there is an additional support of the shelf on the next lower link of the chain holding the shelf steady and preventing swinging thereof. The engagement is facilitated by the pendant-shelf pivot being in the center of its bracket and the pin of each adjacent bracket being near the edge of the bracket closest to said pivot. As the shelf travels upwardly around the top of the chain and around the sprocket, the distance between adjacent brackets increases so that the pendant is no longer engaged in the next lower bracket. Then as the shelf reaches the other side of the sprocket and begins to travel down, its pendant has the notch engaged on the pin of the next lower bracket, whereby the shelf is again held steady. Because of the provision of a total of three brackets for each shelf, the travel of the shelves may be in opposite directions with equal facility.

The invention is more fully described in connection

with the accompanying drawing constituting a part hereof, and in which like reference characters indicate like parts, and in which:

FIG. 1 is a fragmentary side elevational view of a filing cabinet made in accordance with the invention, some parts being broken away for clearness;

FIG. 2 is a perspective view on an enlarged scale of the pendant which is the basis of the invention;

FIG. 3 is a fragmentary end view of the cabinet showing the means whereby the several essential elements are mounted; and

FIG. 4 is a general view in perspective of the cabinet.

The cabinet has essentially a pair of flat, spaced vertical supports 1 and 1' having sprockets 2 and 2' mounted near the lower end thereof by shaft 3. Motor 4 is connected by belt 5 to a pulley (not shown) fixed on shaft 3. Near the top of supports 1 and 1' in vertical alignment with sprockets 2 is a pair of sprockets 6 and 6' mounted on shaft 7. Chains 8 and 8' are carried by the sprockets 2 and 6 and by sprockets 2' and 6', respectively. A plurality of shelves 9 are pivoted between brackets on the oppositely mounted chains.

Adjacent links 10, 11 and 12 of chain 8 constitute a set. Brackets 13, 13A and 13B are mounted on said links extending at right angles to the links and being vertically arranged flat plates. A pivot or pin 14 on bracket 13 passes into the end of shelf 9 which is fixed on said pivot, said pivot being freely rotatable relative to bracket 13. As seen in FIG. 2, a pendant 15 has a hole 16 near the upper end and forming a keyhole slot with opening 17, whereby the pendant may be mounted on and fixed to pivot or pin 14. At the lower end is a notch 18 in the form of an inverted V having its apex at 19.

Bracket 13A has pin 20A near the upper edge in alinement with pivot or pin 14. Bracket 13B, between brackets 13 and 13A, has pin 20B near the lower edge and also in alinement with pivot 14. The distance between pins 20A and 20B and pivot 14 between them when in vertical alinement is equal to the distance between hole 16 and apex 19.

In the operation of the cabinet and referring to FIG. 1, shelf 9 is in the position shown and it is to be moved in the direction of arrow 22. Pendant 15 engages pin 20A of bracket 13A holding the shelf steady. As chain 8 moves shelf 9 takes the position 9' and the brackets of the sets taking positions 10', 11' and 12' with pendant 15 still engaging pin 20A. As the shelf reaches position 9'', bracket 13A takes a position pulling away from pendant 15 which has reached position 15' at the right of FIG. 1. Then as shelf 9'' travels down it gradually causes the pendant to approach pin 20A, and when it reaches pin 20A the apex 19 of notch 18 engages it, thus firmly holding the shelf in position for access. The shelves may be moved in the direction of arrow 23, the sequence of the operation of the several elements being similar.

Although the invention has been described setting forth a single specific embodiment thereof, the invention is not limited thereto. For instance, the sprocket and chains may be replaced by equivalent mechanism, such as endless belts. The shape of elements, such as the brackets or pendants, may be different from that shown. The shelves may be of different form and they may be used for storage of a variety of articles or for display of merchandise. In view of the various changes in details of construction, the invention is to be broadly construed and to be limited only by the character of the claims appended hereto.

What is claimed is:

1. In a filing cabinet or the like having a pair of spaced vertical supports, a pair of sprockets mounted at the top and bottom of each support, a vertical link chain passing over each of said pair of sprockets, means for actuating

said sprockets and chains, a plurality of spaced horizontal shelves between said chains, the ends of said shelves being pivotally held on corresponding links of the respective chains, the improvement which comprises a plurality of pairs of spaced brackets mounted on a pair of adjacent links of said chains and extending outwardly therefrom, a pivot on the upper of each pair of brackets, a shelf on which said pivot is fixed, a pin in the lower of said pair of brackets and extending toward said shelf, an additional bracket between each said pair of brackets and on a chain link between said adjacent links, a pin on said additional bracket and in alinement with said first pin and pivit when said pair of brackets and additional bracket are in horizontal position, a pendant on said pivot and depending toward said lower bracket, the lower end of said pendant having an inverted V-shaped notch, the distance between the pivot of said pendant and apex of said notch being equal to the distance between the pins of adjacent brackets.

2. In a filing cabinet according to claim 1 characterized in that said brackets are flat, vertically arranged plates.

3. In a filing cabinet according to claim 1 characterized in that the pivot hole of said pendant is part of a keyhole shaped opening.

4. In a filing cabinet according to claim 1 characterized in that, said pendant pivot is held in a contiguous bracket.

5. In a filing cabinet according to claim 1 characterized in that each of said shelves is held on pairs of adjacent chain links and corresponding brackets, there being a bracket between said adjacent pairs of links free from a shelf, said pendant pivot being held in a contiguous bracket.

6. In a filing cabinet according to claim 1 characterized in that said brackets are flat, vertically arranged plates, the pendant pivot being in the center of its bracket and the pins of adjacent brackets being near the adjacent edges thereof.

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