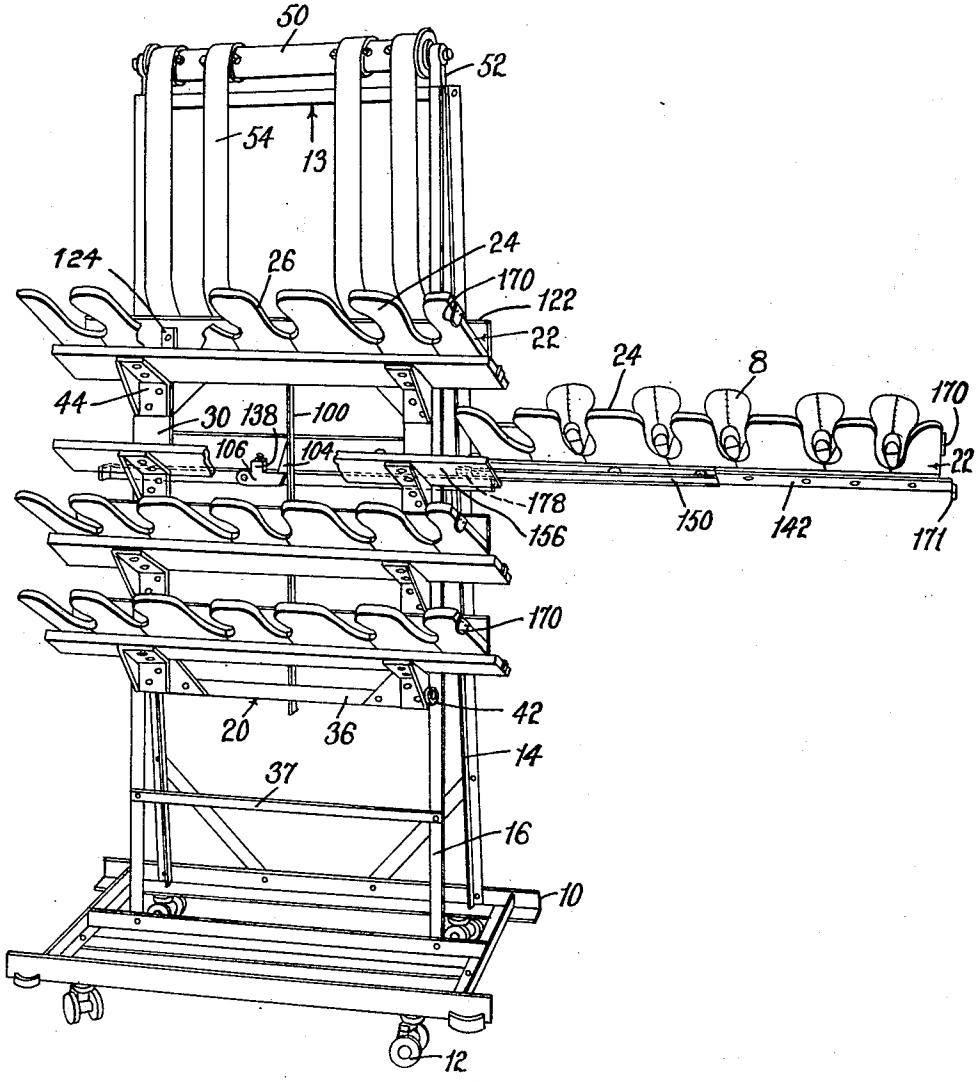
April 30, 1957 R. S. HORCHNER 2,790,555

SHOE RACKS

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Fig. 1.



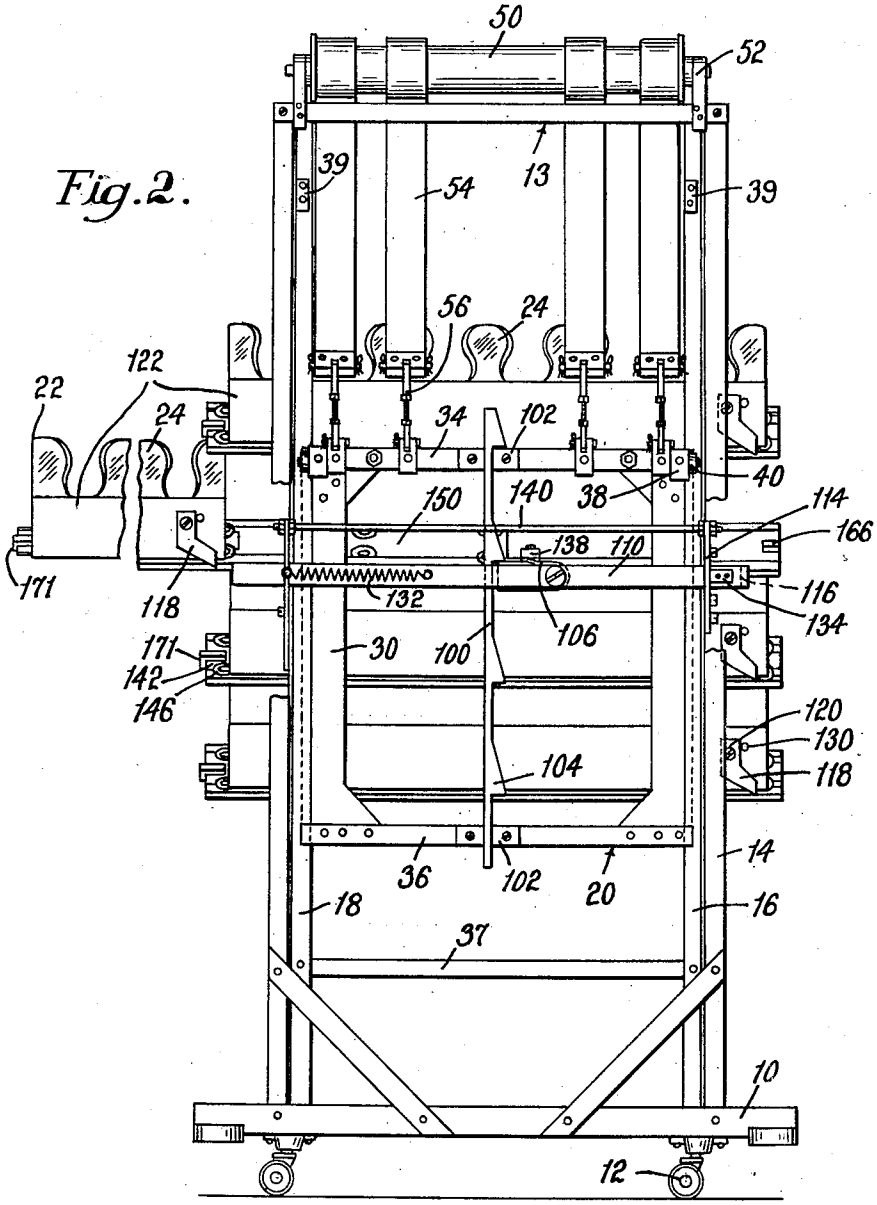
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Fig. 2.



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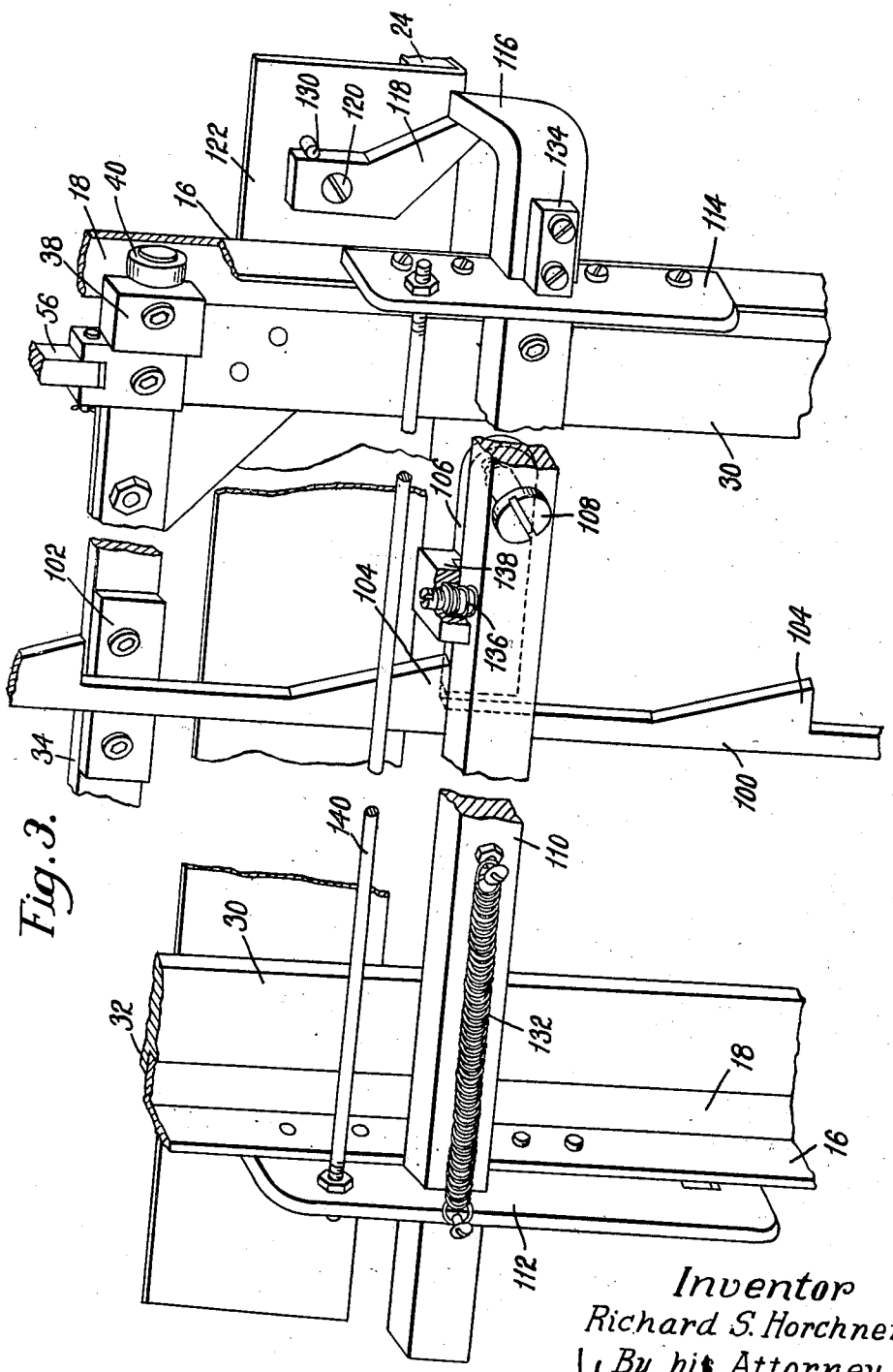


Fig. 3.

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Fig. 4.

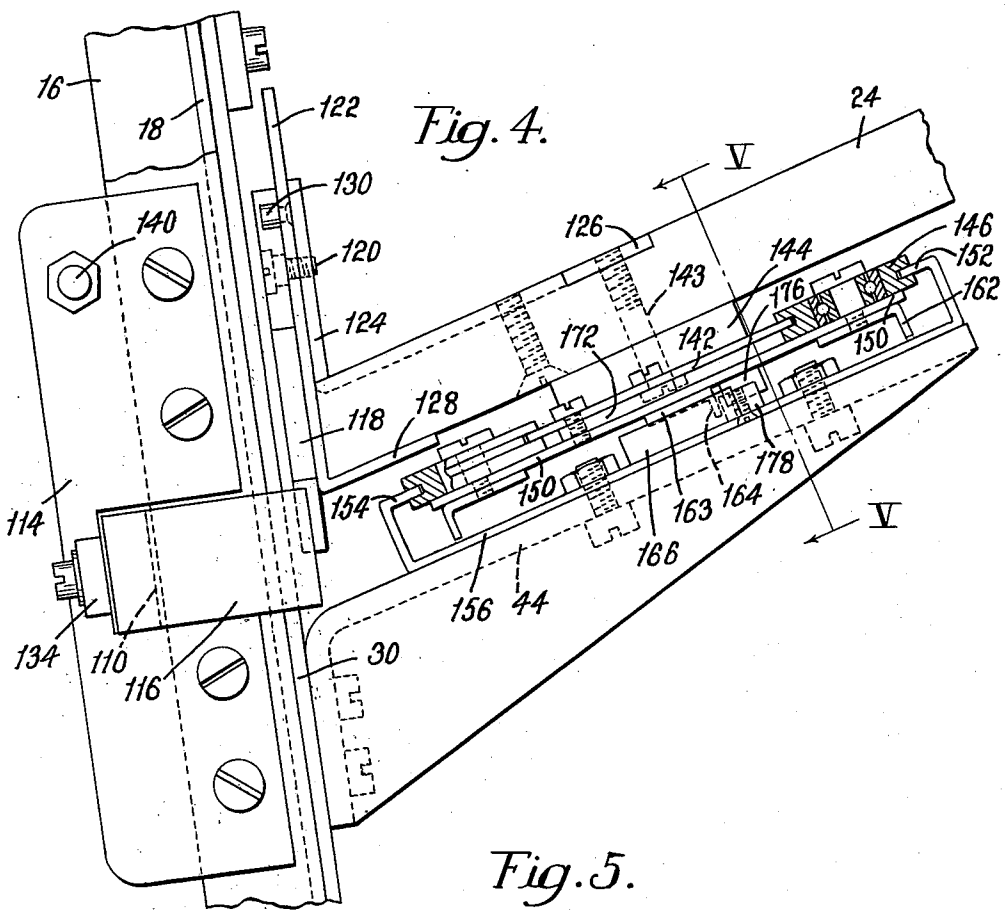
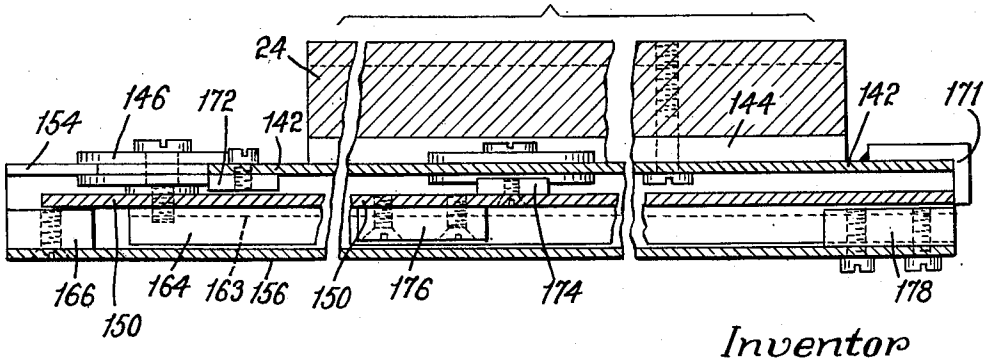


Fig. 5.



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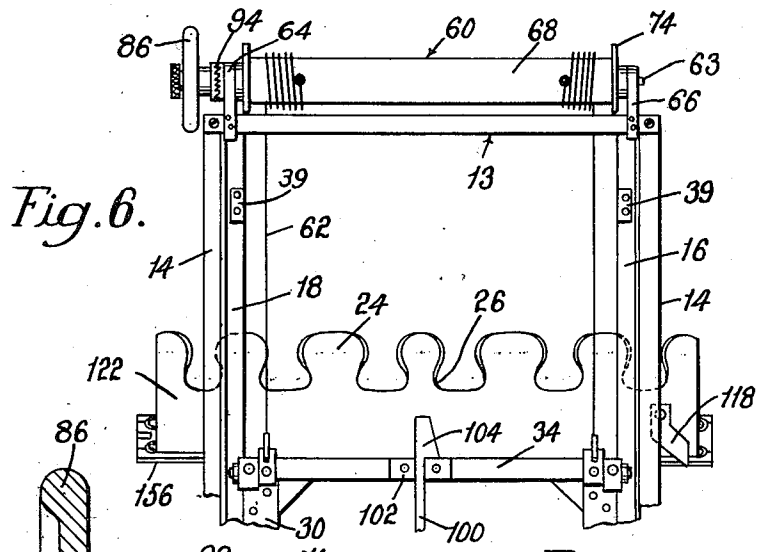


Fig. 6.

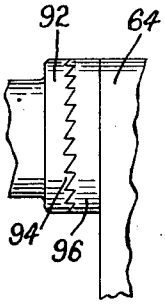


Fig. 10.

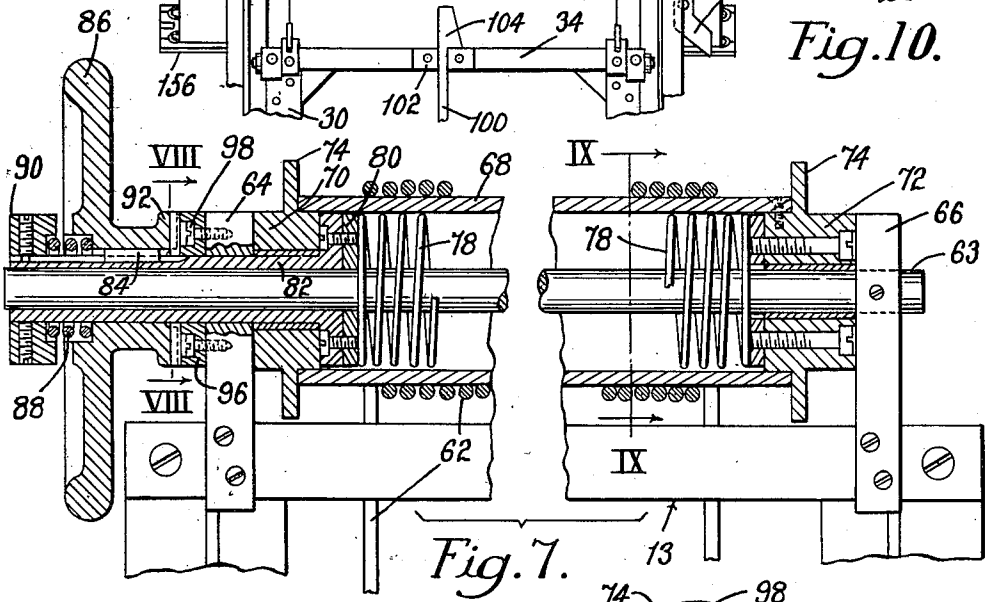


Fig. 7.

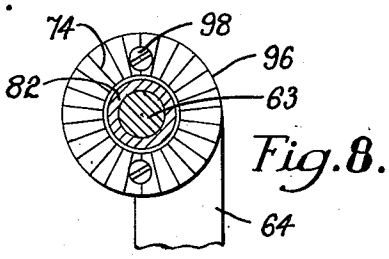


Fig. 8.

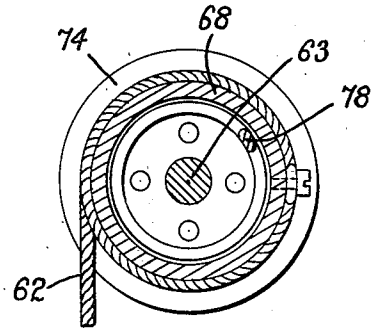


Fig. 9.

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2,790,555

SHOE RACKS

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Application March 8, 1952, Serial No. 275,506

1 Claim. (Cl. 211—34)

This invention relates to a device for carrying articles such as shoes or the like and is more particularly concerned with providing an improved support for a plurality of shoes or other workpieces individually undergoing or about to undergo one or more steps of treatment. Although hereinafter illustrated with regard to the storage and conveyance of footwear, it will be readily recognized that possible applications of the invention are not so limited.

In the conventional frame structure termed a "shoe rack," a number of stationary work-supporting shelves are mounted vertically over one another, each shelf frequently comprising a series of fixed pins or paddles for individually supporting pieces of footwear to be manufactured or repaired by successive shoemaking operations. Such racks are normally mobile so that their loads, frequently in lots of a dozen pairs, can readily be moved in stages along a production line. It is found in shoe factories that, in proportion to the time used in performing actual machine operations, a great deal of time is spent in moving a case lot of shoes from machine to machine, in reaching for and placing the shoes one by one in the operating stations, and then replacing them one by one on the rack before the case lot is finally moved to the next machine in the line.

In view of the above, an object of this invention is to provide an improved device for carrying a plurality of articles to be fabricated and presenting them to an operator, which device shall, by reason of its organization and maneuverability, facilitate production by aiding operators in reducing the time required for the handling of the articles.

In accordance with this object a feature of the invention resides in the provision of an improved device for conveniently carrying articles, said device comprising a frame, a carriage movable heightwise thereon, a plurality of article supports spaced vertically and mounted on the carriage for vertical movement as a unit with respect thereto, each of said supports being mounted for individual sliding movement away from and toward a position in alignment with the remaining supports, means on the frame for yieldingly suspending said carriage, and means for indexing said supports heightwise against the influence of said means whereby a preferred operating level may be selected for the respective supports.

These and other features of the invention will best be understood from the following specification taken in connection with the accompanying drawings, in which

Fig. 1 is an angular view of the article carrying device;

Fig. 2 is a rear elevation of said device;

Fig. 3 is an angular view on a larger scale of a detent mechanism at the rear interposed between a vertically slidable carriage and the frame of the device;

Fig. 4 is a fragmentary side elevation also on a large scale showing in detail the mounting of laterally slidable shelves supported upon the carriage;

Fig. 5 is a fragmentary view, in vertical section on the line V—V of Fig. 4, lengthwise of a carrier interposed between each shelf and the supporting channel therefor, and showing various stops to limit the expansion of the parts;

Fig. 6 is a fragmentary view in elevation of a modified counterbalancing mechanism for the carriage;

Fig. 7 is a vertical section on a larger scale through the axis of a spring roller forming a part of this counterbalancing mechanism;

Fig. 8 is a detail vertical section on the line VIII—VIII of Fig. 7;

Fig. 9 is a similar section on the line IX—IX of Fig. 7; and

Fig. 10 is a fragmentary view of the ratchet interposed between the spring roller and a hand wheel for adjusting the tension of the spring therein.

This work transporting device, as herein illustrated, is fitted to support a plurality of shoes 8, and is mounted on a movable base 10 provided with casters 12 so that the whole structure may be transported from one shoe machine to another to enable operators to perform successive operations upon the shoes carried by the device. To this base 10 is secured an upright frame 13 comprising vertical angle irons 14 and inclined angle irons 16 arranged so that part of the flanges 18 of these inclined angle irons are turned inwardly and are in a common plane to form the support for a heightwise movable, substantially plane carriage 20 having a series of work supporting shelves 22 which are laterally slidable, as later described. These shelves are illustrated as provided with a series of paddles 24 forming notches 26 for the reception of the lasted shoes 8.

The carriage 20 has wide side plates 30 each of which, as shown in Fig. 3, has an overlapping lip 32 resting upon and guided by the flanges 18 of the inclined frame. These side plates 30 are joined by top and bottom bars 34 and 36 (Fig. 2). Adjacent to the top bars are blocks 38 (Fig. 3) supporting rollers 40 which engage the rear sides of the flanges 18 in opposition to the lips 32. On the other hand, the bottom bar 36 overlaps the rear faces of the flanges 18 and is provided with rollers 42 (Fig. 1) riding on the front faces of said flanges. This arrangement renders it easy for the carriage 20 to slide heightwise of the inclined angle irons 16 to an extent determined by a bottom stop strip 37 and a top stop 39 (Fig. 2).

The carriage 20 is also provided with a series of brackets 44 projecting forwardly from the carriage for the support of guides 156 upon which the shelves 22 are individually slidable laterally of the carriage to a position at one side of the frame 13. The whole carriage and shelf structure is counterbalanced by means of a spring-containing roller 50 pivoted in standards 52 erected at the top of the frame. This roller is joined to the carriage by means of a series of straps 54 one end of each of which is secured to the periphery of the roller while its lower end is joined to the top bar of the carriage by turnbuckle connectors 56 (Fig. 2) pivoted each to an end of a strap and to the top bar 34 respectively.

Since there may be a variation in the weight of the load to be carried by the shelves, as for example, when children's shoes are being manufactured instead of adults', it may be found desirable to provide means for adjusting the tension of the spring in the counterbalance to meet the needs of the particular load. Such an arrangement is shown in Figs. 6 to 10 inclusive where the carriage is connected to a spring roller 60 by a pair of cables 62. This roller is journaled on a rod 63 secured in a pair of standards 64 and 66 which are mounted at the top of the frame as are the standards 52 and it comprises a cylinder 68 secured to hubs 70 and 72 each of which is provided with a radial flange 74. The hub 72 is rotatable upon the transverse rod 63 carried by the stand-

ards and one end of a coil spring 78 contained within the roller is secured to the hub 72.

The other end of this spring is secured by an end plate 80 to a sleeve 82 upon which the hub 70 is mounted and the sleeve is splined at 84 to a hand wheel 86. This hand wheel is held inwardly by a spring 88 which is interposed between a collar 90 and the hub of the wheel. At its inner end the hand wheel has an enlargement 92 provided with ratchet teeth 94 (Fig. 10). The ratchet teeth 94 cooperate with similar teeth upon an annular plate 96 (Fig. 8) which lies adjacent to the standard 64 and is secured to it by means of screws 98. Thus the hand wheel 86 working through the spline 84 is able to turn the sleeve 82 on the rod 76 and to increase the tension of the spring 78 when the top of the hand wheel, as shown in Fig. 7, is moved toward the viewer. If less tension is desired, the operator only needs to pull the hand wheel toward the collar 90 and let it slip past the ratchet teeth on the collar 96.

The indexing of the shelves on the carriage to bring the desired shelf to the position desired by the operator is effected by means of a notched index rod 100 mounted upon the back of the carriage 20 by means of brackets 102 (Fig. 2). This rod is provided with overhanging teeth 104 with one tooth corresponding to each of the shelves. The underside of each tooth overhangs the end of a latch 106 (Fig. 3) which is pivotally mounted by means of a screw 108 upon a sliding detent bar 110. This detent bar is horizontally slidable in plates 112 and 114 secured to the sides of the inclined frame 16 and has an inturned end 116 which is positioned to cooperate with an indexing lug 118, one of which is provided on each of the shelves. These lugs are pivoted on screws 120 which are threaded in back plates 122 and braces 124 (Fig. 4). A strip 126, flush with the upper surface of the paddles, extends the whole length of each shelf while the inner back plate 122 is provided with a forwardly turned lower end 128 secured to the undersides of the paddles.

Each of the indexing lugs 118 is provided with a stop pin 130 which prevents its rotation in a clockwise direction as viewed in Fig. 3. Accordingly, when a shelf unit is returned to a position adjacent to the frame 13 of the device, by moving it to the right in Figs. 2 and 3, a lug 118 will engage the inturned end 116 of the detent bar 110 and, moving the latter against the tension of a spring 132, will withdraw the end of the latch 106 from a position beneath the corresponding tooth 104 and allow the carriage to drop until the next tooth above it engages the end of the latch 106, assuming that the spring 132 will have, in the meantime, drawn the detent bar to the left to an extent allowed by a stop block 134 on the bar. The blow imparted to the latch 106 by the tooth on the falling carriage will be absorbed by a cushion spring 136 contained in a recess in a lip 138 forming part of the latch and overhanging the top of the sliding detent bar 110. Greater rigidity is imparted to the plates 112, 114 which support this sliding bar by means of a cross rod 140 which is secured to each of said plates by coacting nuts threaded on the rod at either side of each plate.

Thus while greatly increased convenience is provided by this indexing arrangement and the vertically slidable carriage which permits any desired shelf to be brought to the most convenient level for the operator making use of the device, an added convenience results from the slidable mounting of the respective shelves so that the desired shelf may be slid laterally of the frame upon its supporting brackets 44, in a path substantially parallel to the plane of the carriage and thus caused to project outwardly from one side of the frame as shown in Fig. 1 to present some of the pieces to the operator as they are brought immediately adjacent to the machine where some operation is to be performed.

This slidable mounting of the shelves is rendered possible by an arrangement best shown in Figs. 4 and 5 from which it will be seen that each shelf is provided with a rectangular plate 142 which is secured to the bottom of the shelf and is held thereon by screws 143 passing through an interposed block 144. The long edges of this plate 142 are received in the grooves of rollers 146 of which there are ten which are rotatably mounted upon an intermediate carrier 150. They are provided with ball bearings for easy rotation. The outer peripheries of the grooves of the rollers ride upon the inturned margins 152 and 154 of a channel-shaped guide 156 supported upon the brackets 44 which are attached at spaced intervals to the side plates 30 of the carriage.

The intermediate carrier 150 which supports the rollers is provided with down-turned flanges 162 which slide upon the inner face of the channel guide 156 and maintain the spacing therebetween. Furthermore, the carrier 150 is provided with a strip 163 having a down-turned rib 164 which coacts with a stop block 166 attached to the channel guide 156 so as to limit the closing movement of the carrier within the channel. It will be noted from Fig. 1 that the end paddle of each shelf has a finger flange 170 by means of which the operator may grasp the shelf and cause endwise sliding movement thereof. Near this, on the shelf plate 142 is an angle lug 171 positioned to strike the end of the carrier 150 to push it back into closed position.

To prevent accidental separation of the parts of the shelf units, a stop 172 secured beneath the left end (Fig. 5) of the shelf plate 142 is arranged to contact a stop 174 screwed to the top of the carrier 150 near the middle thereof lengthwise. In the same neighborhood is another stop block 176 screwed to the under side of the carrier 150 and this is aligned with a block 178 screwed to the inside upper surface of the bottom of the channel 156 near its right end.

In the use of the device, assuming that the shoes have been placed in inverted position in the notices 26 between the paddles of each shelf with the toes of the shoes directed inwardly toward the upright plate 122 and the cones of the lasts projecting downwardly through the notches, an operator may move the whole device on its casters and bring it to a place adjacent to his machine. Usually he will prefer to release the detent latch and allow the whole carriage to assume its topmost position and will move the lowermost shelf to an extended position. If desired, this may be directly in front of the machine so that it will be possible for him to lift a shoe from the shelf and present it to the operating mechanism of the machine just above it so as to require a minimum of effort and time.

Having completed the work upon the shoes on that particular shelf, he will slide it back into the channel to a position adjacent to the frame 13 of the device and when the indexing lug 118 thereon contacts the inturned end 116 of the slidable detent bar 110 it will withdraw the latch 106 from beneath the corresponding tooth 104 upon the the vertical bar 100 which is attached to the carriage. The carriage may then be readily moved downward against the counterbalancing spring until the next tooth 104 engages the latch 106. The shelf then at the level of the detent bar may then be pulled to an outward, extended position and the operation will proceed as before.

If there is a radical difference between different loads of work, such as would exist between men's shoes and children's, it will be possible to adjust the tension of the counterbalancing spring 78 by turning the hand wheel 86.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

A carrying and presenting rack for articles during manufacture comprising an upright frame, a carriage movable up and down on the frame, work supporting shelves slidable laterally on the carriage between a posi-

tion close to the frame and an extended position, an indexing detent interposed between the frame and the carriage and operable to retain the carriage at a desired level, and means responsive to lateral movement of an extent shelf back to a position close to the frame for releasing said detent to permit the carriage to assume a different level.

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