Jan. 5, 1954 W. W. SMITH ET AL 2,664,616

SLASHER WITH INTERCHANGEABLE PRESS ROLLS

Filed Oct. 23, 1952 4 Sheets-Sheet 1

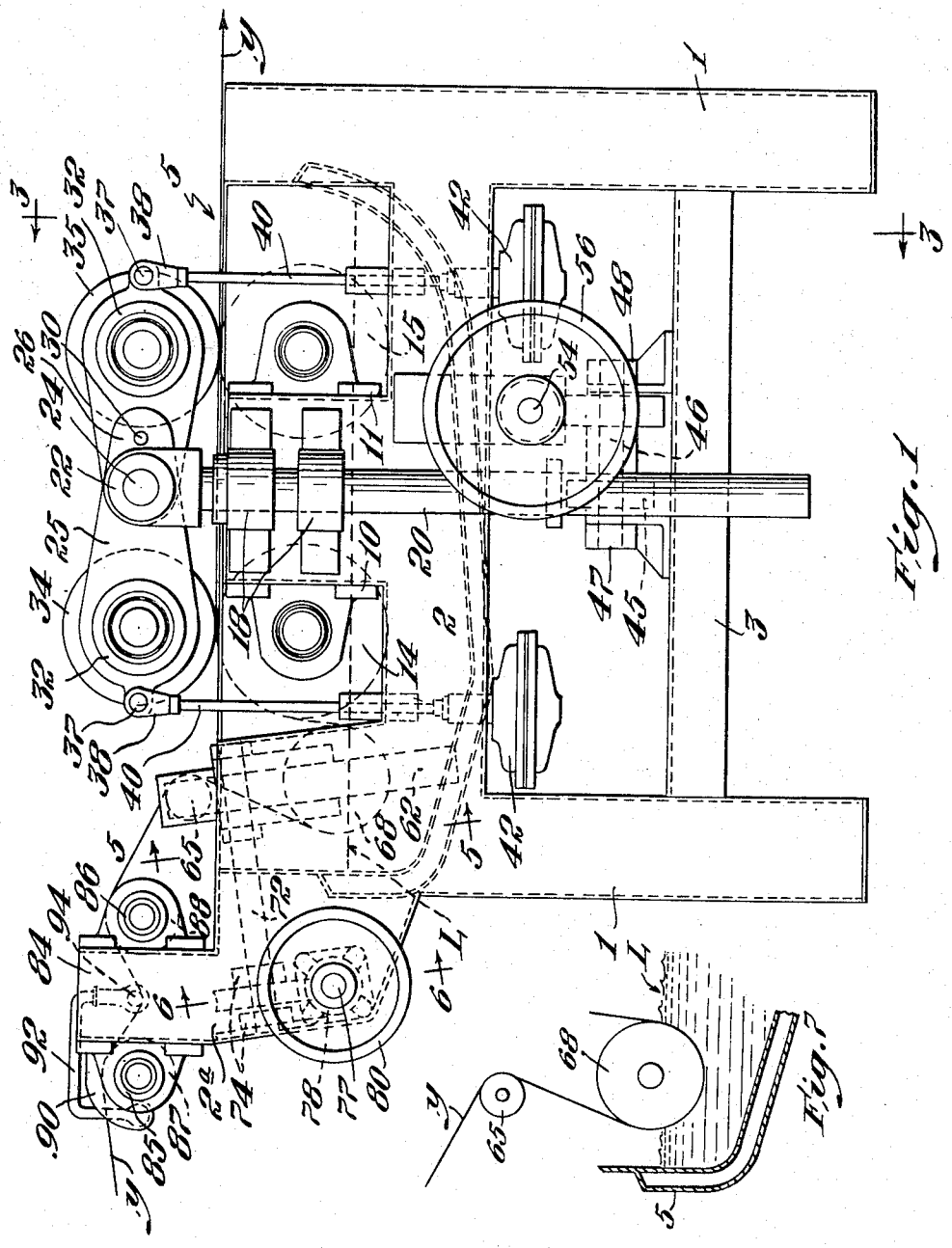

Fig. 1

Fig. 2

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4 Sheets-Sheet 2

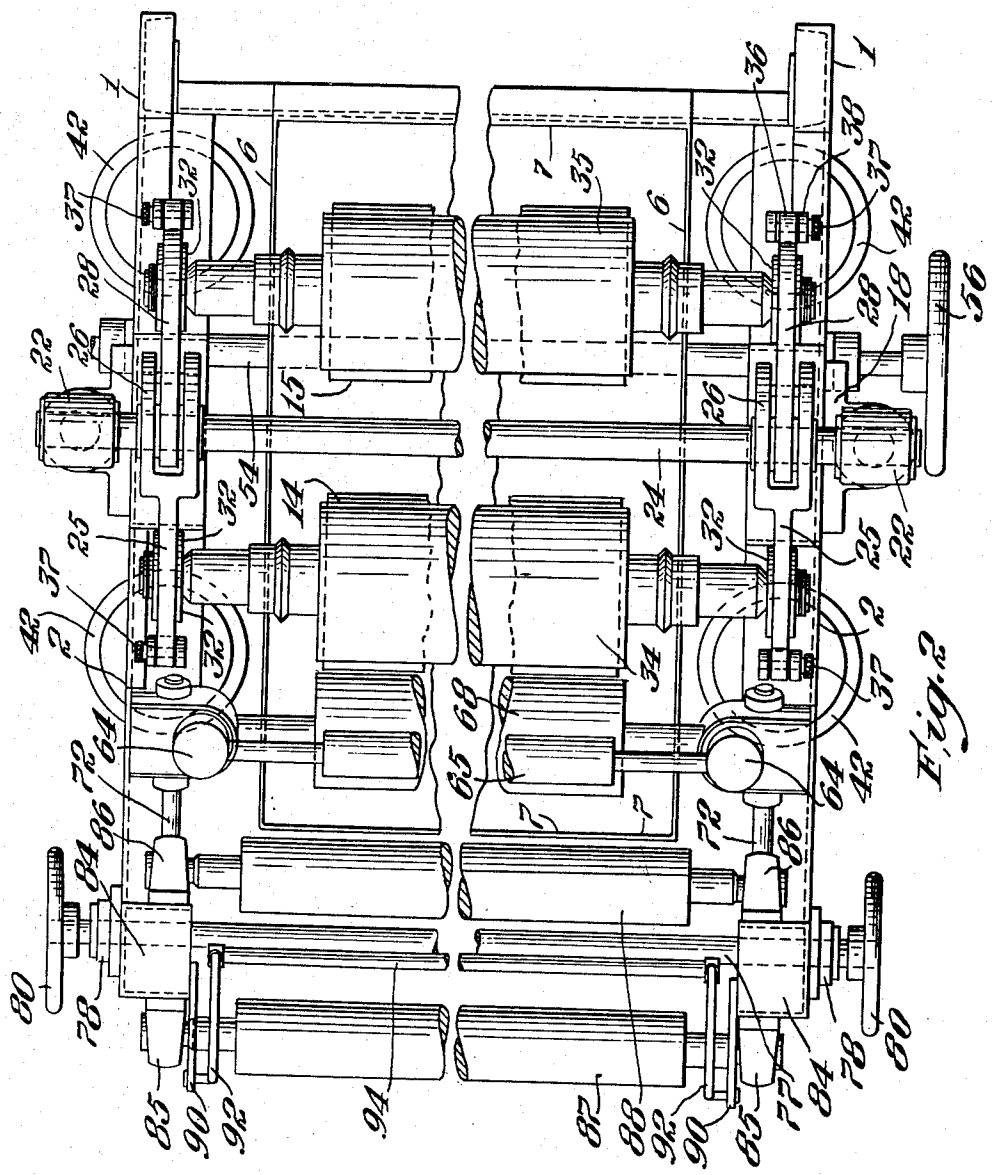

Fig. 2

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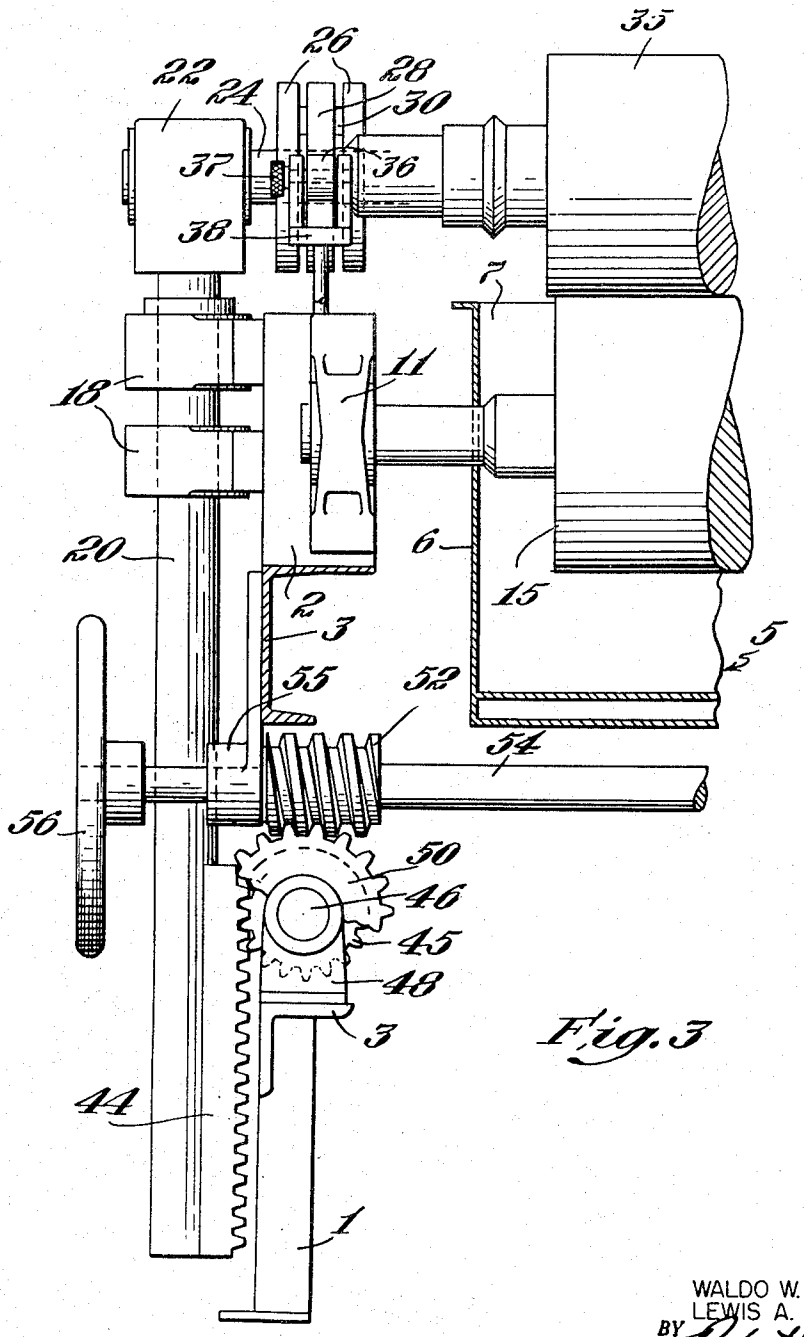

Fig. 3

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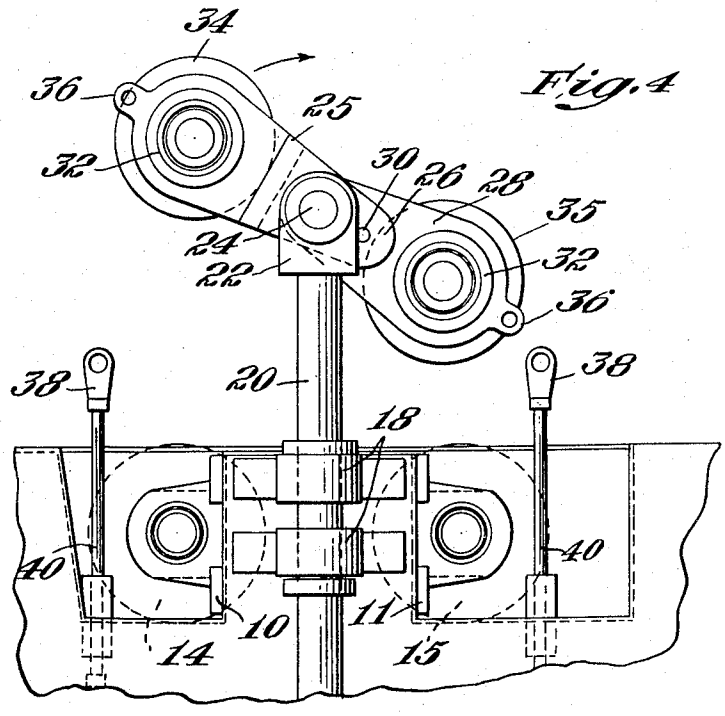

Fig. 4

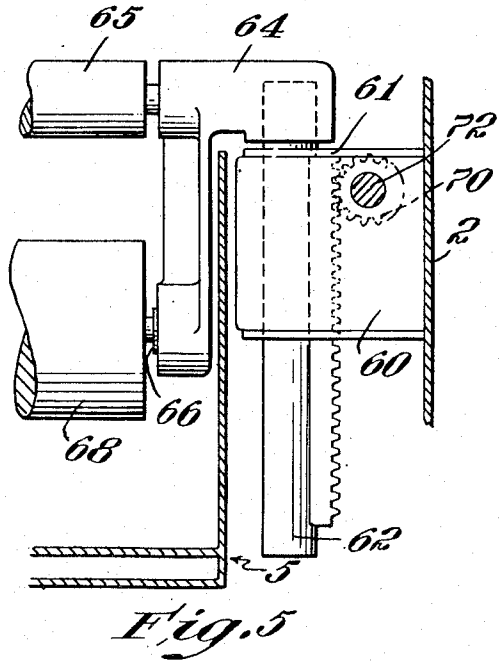

Fig. 5

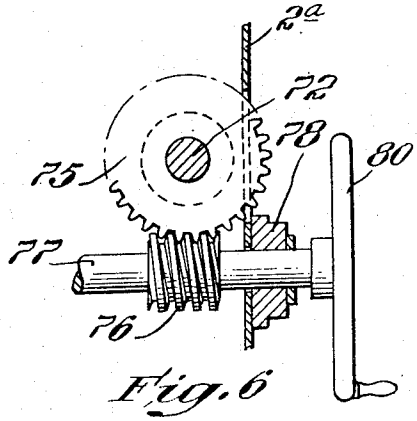

Fig. 6

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UNITED STATES PATENT OFFICE

2,664,616

SLASHER WITH INTERCHANGEABLE PRESS ROLLS

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Application October 23, 1952, Serial No. 316,364

5 Claims. (Cl. 28—28)

1

In the manufacture of woven fabric, it is usually necessary to size the warp yarns preparatory to weaving and to this end from several hundred to several thousand yarns, disposed in contiguous parallel relation, are passed through an apparatus known as a slasher which applies to the yarns a protective coating of a size enabling them better to withstand the abrasive action of the filler yarns during the weaving operation. Such a protective coating must be uniformly applied and in order to avoid breakage the yarns must not be permitted to become crossed or entangled. In carrying out the slashing operation, the yarns, after passing over carrier rolls and beneath a tensioning rod or the like, are first immersed in the size slurry by a dip roll and then carried between two pairs of squeeze rolls, consisting of an upper press roll and a lower fixed roll.

It has been found that in order to insure the desired uniform coating the covering on the rear press roll should be relatively firm and nap-free, and both press rolls should be supported so that they exert a uniform pressure on all yarns. To this end it is the practice periodically to wind on the front press roll a few layers of yarn and after operating for a day or so, during which time the nap has become worn with consequent loss of some resiliency, the front press roll is interchanged with the rear roll which is then wound with a few more layers of yarn. In this way the surface of the rear press roll is periodically replaced so that it remains relatively resilient and nap-free.

The principal object of the present invention is to provide a slasher having an efficient and reliable means whereby the press rolls may not only be interchanged so as to permit the aforementioned operations to be readily performed, but also supported at all times so as to exert a uniform pressure on the yarns.

Further objects will be apparent from a consideration of the following description and the accompanying drawings, wherein:

Fig. 1 is a side elevation of a slasher constructed in accordance with the present invention;

Fig. 2 is a top plan view with certain parts removed;

Fig. 3 is an enlarged vertical section, with certain parts removed, substantially on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary side elevation illustrating the manner in which the press rolls are interchanged;

Fig. 5 is an enlarged section of one end of the apparatus taken on the line 5—5 of Fig. 1;

2

Fig. 6 is a similar section on the line 6—6 of Fig. 1, and

Fig. 7 is a sectional elevation illustrating the manner in which the yarns are immersed in the size slurry.

In accordance with the present invention a slasher or size box is equipped with a pair of relatively fixed horizontal rolls cooperating with a pair of press rolls disposed in superposed parallel relation, the press rolls being supported by means whereby they may be interchanged. Such means comprises a vertically movable supporting member disposed on opposite sides of the size box and equidistant from the axes of the press rolls, and pivotally connected to or mounted on each supporting member is one end of a pair of oppositely extending arms, the opposite or free end of each arm rotatably supporting one end of one of the press rolls the construction and arrangement of parts being such that the corresponding arms on each side of the size box provide a floating support for the associated press roll independently of the other press roll which is similarly supported.

The fixed end of one of each pair of arms is provided with an extension juxtaposed to the other arm, and a locking pin or other suitable means are provided for releasably interlocking the arms together so that each pair of arms may act as a rigid unit supporting the press rolls when interlocked. Any suitable mechanism may be provided for elevating and lowering the supporting members so that the press rolls may first be elevated a distance above the fixed rolls sufficient to permit the interlocked arm and press rolls to be rotated 180°, and then lowered into operative relation to the fixed rolls. The surface of the front press rolls may then be periodically renewed and after a period of use the front press roll may be quickly interchanged with the rear press roll which then becomes the front press roll and may have its surface renewed. Where, it is desired to subject the yarns under treatment to a greater pressure than that afforded by the weight of the press rolls, they may be weighted or loaded in any conventional manner, as for example, by a fluid motor detachably connected to each arm.

Referring to the drawings, the embodiment herein shown for the purpose of illustration comprises a rectangular frame structure having upright members 1, supporting side and horizontal members 2 and 3, within which is a jacketed size box 5 having side and end walls 6 and 7. The side members 2 carry pillow blocks 10 and 11 in

which the ends of the front and rear fixed rolls 14 and 15 are journaled, the construction and arrangement of parts being such that the underside of these rolls dip into the size box a distance of the order of one-half the radius of the roll.

Mounted on each of the side members 2 between the pillow blocks 10 and 11 is a pair of spaced bearings 18 providing vertical guides for a post 20, the lower end of which terminates below the horizontal frame member 3, and mounted on the upper end of each post is a rod eye 22 for supporting one end of a horizontal shaft 24 extending across and above the size box 5. Adjacent to each end of the shaft 24 is a pair of arms consisting of an arm 25 having a forked or a bifurcated end portion pivotally mounted on the shaft 24 so that its forked ends project beyond the shaft to provide integral extensions 26, and an arm 28 one end of which is mounted on the shaft 24 between the forked ends of the arm 25, as illustrated more clearly in Figs. 2 and 3. The arm 28 and juxtaposed extensions 26 are provided with aligned openings to receive a removable locking pin 30 by means of which the arms may be interlocked so as to act as a rigid unit.

The opposite or free ends of the arms carry bearings 32 in which the ends of the press rolls 34 and 35 are journaled, the construction and arrangement of parts being such that the axes of the press rolls are equidistant from the axis of the shaft 24 and the same is true with respect to the fixed rolls 14 and 15 so that either press roll may be supported in superposed parallel relation to either fixed roll. The outer end of each arm is provided with a lug 36 which may be attached by pin 37 to a clevis 38 carried by the upper end of a pressure rod 40 connected to a conventional fluid motor 42 which is supported in any suitable manner with the frame. The application of a predetermined fluid pressure to the motors 42 produces the desired loading on the press rolls and preparatory to interchanging the press rolls, the clevis pins 37 are removed, thereby disconnecting the pressure rods 40 from the arms 34 and 35.

The lower end portion of each post 20 carries a rack 44 which meshes with a spur gear 45 (Fig. 3) keyed to a shaft 46 which is journaled in bearings 47 and 48 mounted on the horizontal frame member 3 (Fig. 1). A worm gear 50 is keyed to the shaft 46 and meshes with a worm 52 keyed to a shaft 54 which extends across the machine beneath the size box 5. The end portions of the shaft 54 are rotatably supported in depending hangers 55 secured to the opposite side members, each end of the shaft projecting outwardly beyond the frame and carrying a handwheel 56. Rotation of the handwheel 56 in a counterclockwise direction, as viewed in Fig. 1, acts through the worm and gears to elevate the post 20 from retracted position (Fig. 1), wherein the press rolls are in contact with the fixed rolls, to an elevated position (Fig. 4), wherein the arms and press rolls are raised sufficiently above the fixed rolls to permit them to be rotated.

Mounted on each inner face of the side members 3 is a gear housing 60 (Fig. 5) which includes a vertical guide 61 for a rack rod 62, the upper end of which carries an inverted L-shaped bracket 64. The upper part of this bracket has an opening to receive one end of a reverse roll 65 and the lower end of the bracket carries a nylon bearing 66 in which is journaled one end of an immersion roll 68, the construction and arrangement of parts being such that the under part of the immersion roll 68 is below the normal level L of the size within the box 5, as shown in Fig. 1. The rack rod 62 meshes with a spur gear 70 keyed to a shaft 72, one end of which is journaled within the gear housing 60. The opposite end of the shaft 72 extends forwardly and is journaled in bearing members 74 (Fig. 1) mounted on forward extension 2a of the side member 2. The front end of shaft 72 carries a worm gear 75 (Fig. 6) which meshes with a worm 76 keyed to shaft 77 extending across the front end of the machine with its opposite ends journaled in bearing 78 secured to the outer faces of the side extension 2a. A handwheel 80 is keyed to each end of the shaft 77 so that rotation of the handwheel in one direction or another raises or lowers both the reverse roll 65 and dip or immersion roll 68.

Mounted on the upper part of each side extension 2a is an upstanding frame member 84 (Figs. 1 and 2) and secured to the front and rear faces of the member are bearings 85 and 86 which rotatably support carrier rolls 87 and 88. Mounted on the inner part of each frame member 84 is a forwardly extending arcuate bracket 90 on which one end of an inverted U-shaped supporting rod 92 is pivotally mounted. The opposite end of the rod 92 extends inwardly and downwardly, and carries one end of a tension rod 94 which extends horizontally across the machine between the carrier rolls to the companion supporting rod on the opposite side. Since the supporting rods are pivotally mounted in brackets 90, the tension rod 94 is free to float so that its weight is effective to tension yarn Y (Fig. 1) passing from one carrier roll to the other.

A summary of the operation of the apparatus is as follows: Assuming that the parts are as shown in Fig. 1, that box 5 contains a size slurry to the level L and that the motors 42 are set to apply the desired load on the press rolls—warp yarns Y drawn from creels in conventional manner pass over carrier roll 87, under tension rod 94, over carrier roll 82, after which the yarns pass directly to the reverse roll 65, rather than directly to the immersion roll 68. The reverse roll 65 functions to transfer the yarns Y to the exposed face of the immersion roll 68, that is, the upper surface of the roll, and in so doing the yarns are firmly supported by the exposed surface of the immersion roll before being subjected to the turbulent action of the size slurry with the box 5. Hence, the danger of taping and rolling, due to the turbulence of the size slurry, is effectively overcome and the yarns, after being wet with size, retain the desired contiguous, parallel relationship when presented to the squeeze rolls—after which they pass to the dryers in accordance with the customary practice.

After having operated the apparatus for a day or so, the front press roll, due to wear, loses its nap and resiliency, at least to some extent, while the rear press roll is likewise subjected to wear. Without removing the leading or trailing ends of the yarns, as the case may be, the press rolls may be quickly interchanged by first removing the clevis pins 37 to disconnect the motors 42 and applying the locking pins 30 to interlock the arms, after which the handwheel 56 is rotated to raise the press rolls to elevated position (Fig. 4), thereby permitting the arms and press rolls to be manually rotated and thus effect an interchange. The front roll may then be wound with several layers of yarns to renew its surface, while

the rear roll (formerly the front roll) has, in effect, a renewed surface as compared to the worn surface that existed before the interchange. Thereafter the press rolls are lowered and, after connecting the arms with the motors 42 and removing the locking pins 37, the slashing operation may be continued.

While we have shown and described one desirable embodiment of the invention, it is to be understood that this disclosure is for the purpose of illustration and that various changes and modifications may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

We claim:

1. In a size box, a pair of relatively fixed rolls horizontally disposed in spaced relation, a pair of press rolls horizontally disposed in superposed parallel relation to said fixed rolls, and means for interchanging said press rolls relative to said fixed rolls, comprising two vertically movable supporting members disposed on opposite sides of said size box and equidistant from the axes of said press rolls, a pair of oppositely extending arms pivotally connected at one end to each of said supporting members with the opposite free end of each arm rotatably supporting one end of one of said press rolls, the fixed end of one arm of each pair having an extension juxtaposed to the other arm, means for releasably interlocking said extension and said other arm so that each pair of arms act as a rigid unit in supporting said press rolls when interlocked, and means for elevating and lowering the supporting members so as to raise said press rolls a distance above said fixed rolls to permit said press rolls and interlocked arms to be rotated 180° and then lowered into operative relation to said fixed rolls.

2. In a size box, a pair of relatively fixed rolls horizontally disposed in spaced relation, a pair of press rolls horizontally disposed in superposed parallel relation to said fixed rolls, and means for interchanging said press rolls relative to said fixed rolls, comprising two vertically movable supporting members disposed on opposite sides of said size box and equidistant from the axes of said press rolls, a pair of oppositely extending arms for each of said supporting members, means carried by said supporting members for pivotally supporting the ends of each pair of oppositely extending arms so that the opposite free end of each arm rotatably supports one end of one of said press rolls, the fixed end of one arm of each pair having an extension juxtaposed to the other arm, means for releasably interlocking said extension and said other arm so that each pair of arms act as a rigid unit in supporting said press rolls when interlocked, and means for elevating and lowering the supporting members so as to raise said press rolls a distance above said fixed rolls to permit said press rolls and interlocked arms to be rotated 180° and then lowered into operative relation to said fixed rolls.

3. In a size box, a pair of relatively fixed rolls horizontally disposed in spaced relation, a pair of press rolls horizontally disposed in superposed parallel relation to said fixed rolls, and means for interchanging said press rolls relative to said fixed rolls, comprising two vertically movable supporting members disposed on opposite sides of said size box and equidistant from the axes of said press rolls, a shaft extending horizontally from one supporting member to the other, a pair of oppositely extending arms pivotally mounted on said shaft adjacent to each end with the opposite free end of each arm rotatably supporting one end of one of said press rolls, the fixed end of one arm of each pair having an extension juxtaposed to the other arm, means for releasably interlocking said extension and said other arm so that each pair of arms act as a rigid unit in supporting said press rolls when interlocked, and means for elevating and lowering the supporting members so as to raise said press rolls a distance above said fixed rolls to permit said press rolls and interlocked arms to be rotated 180° and then lowered into operative relation to said fixed rolls.

4. In a size box, a pair of relatively fixed rolls horizontally disposed in spaced relation, a pair of press rolls horizontally disposed in superposed parallel relation to said fixed rolls, and means for interchanging said press rolls relative to said fixed rolls, comprising upstanding posts at opposite sides of the size box, means guiding said posts for vertical movement relative to said fixed rolls, a pair of oppositely extending arms pivotally mounted at one end to the upper part of each post, the opposite free end of each arm rotatably supporting one end of one of said press rolls, the fixed end of one arm of each pair having an extension juxtaposed to the other arm, means for releasably interlocking said extension and other arm so that each pair of arms act as a rigid unit in supporting said press rolls when interlocked, and means for elevating and lowering said posts so as to raise said press rolls a distance above said fixed rolls to permit said press rolls and interlocked arms to be rotated 180° and then lowered into operative relation to said fixed rolls.

5. In a size box, a pair of relatively fixed rolls horizontally disposed in spaced relation, a pair of press rolls horizontally disposed in superposed parallel relation to said fixed rolls, and means for interchanging said press rolls relative to said fixed rolls, comprising upstanding posts at opposite sides of the size box, means guiding said posts for vertical movement relative to said fixed rolls, a shaft extending horizontally from the upper part of one post to the upper part of the other post, two pairs of oppositely extending arms pivotally mounted on said shaft adjacent to each end with the opposite free end of each arm rotatably supporting one end of one of said press rolls, the fixed end of one arm of each pair having an extension juxtaposed to the other arm, means for releasably interlocking said extension and said other arm so that each pair of arms act as a rigid unit in supporting said press rolls when interlocked, and means for elevating and lowering the supporting members so as to raise said press rolls a distance above said fixed rolls to permit said press rolls and interlocked arms to be rotated 180° and then lowered into operative relation to said fixed rolls.

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