Aug. 2, 1955 L. A. PRESCOTT, JR., ET AL 2,714,240

SLASHER

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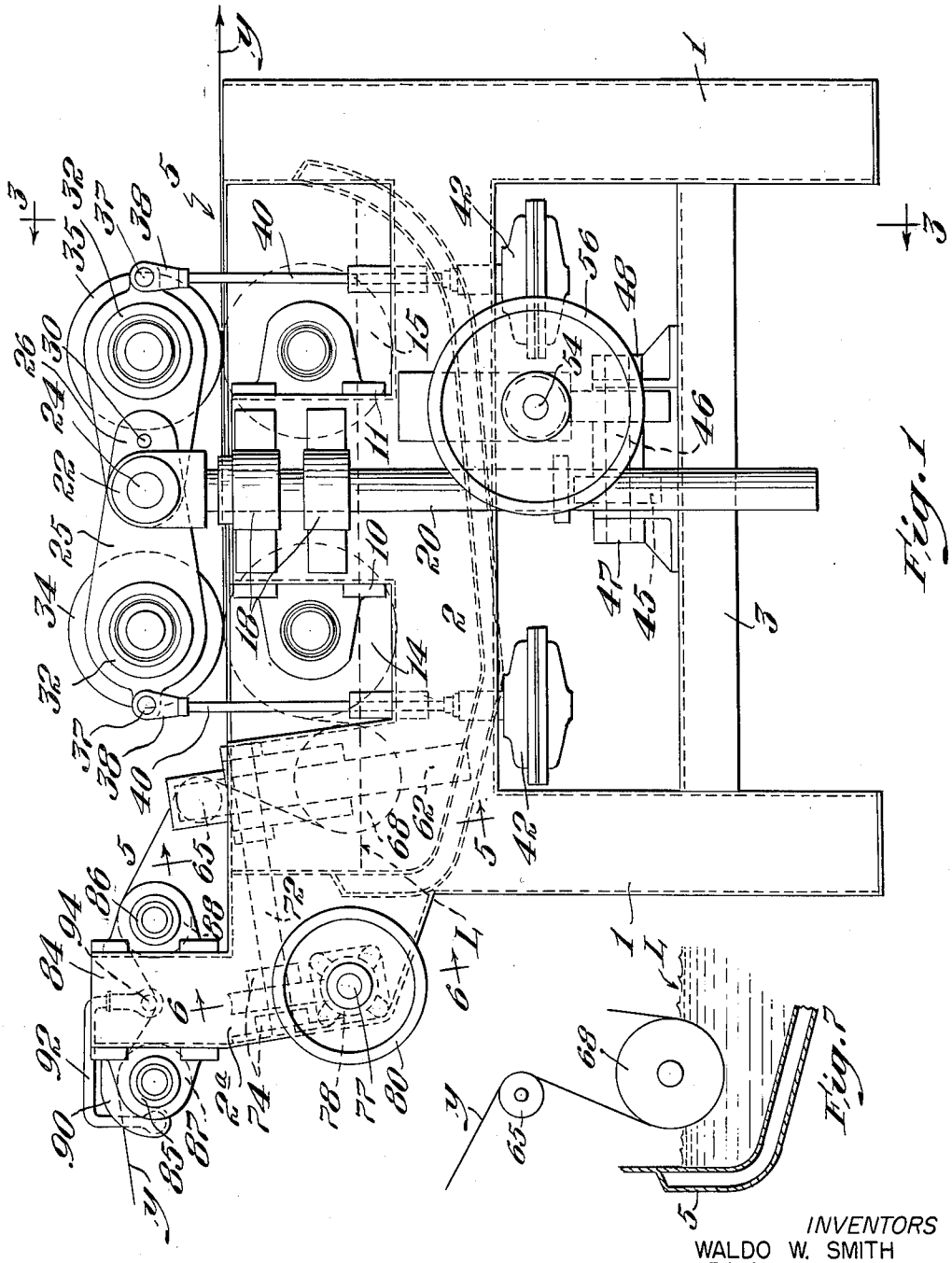


Fig. 1

Fig. 2

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SLASHER

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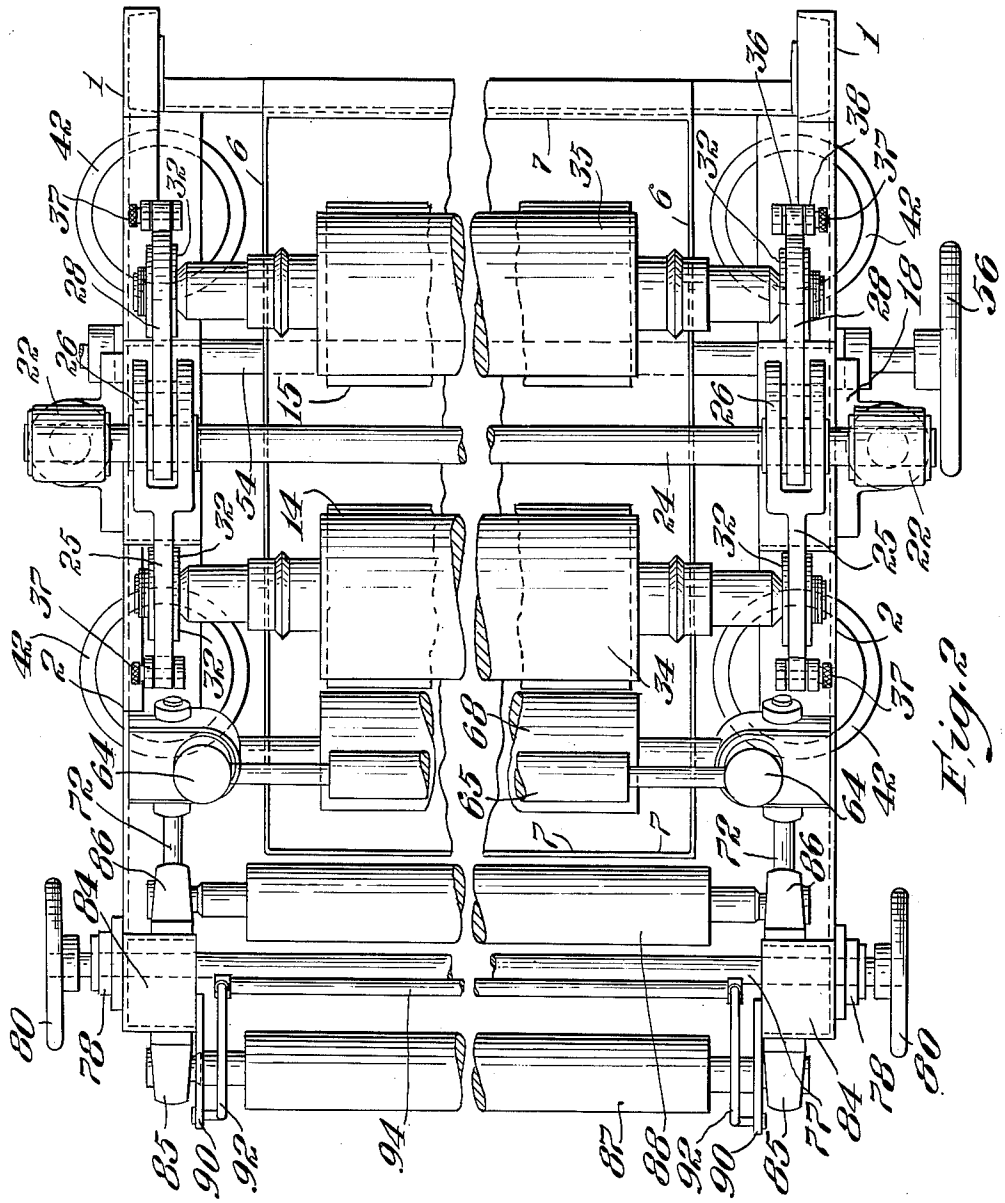


Fig. 2

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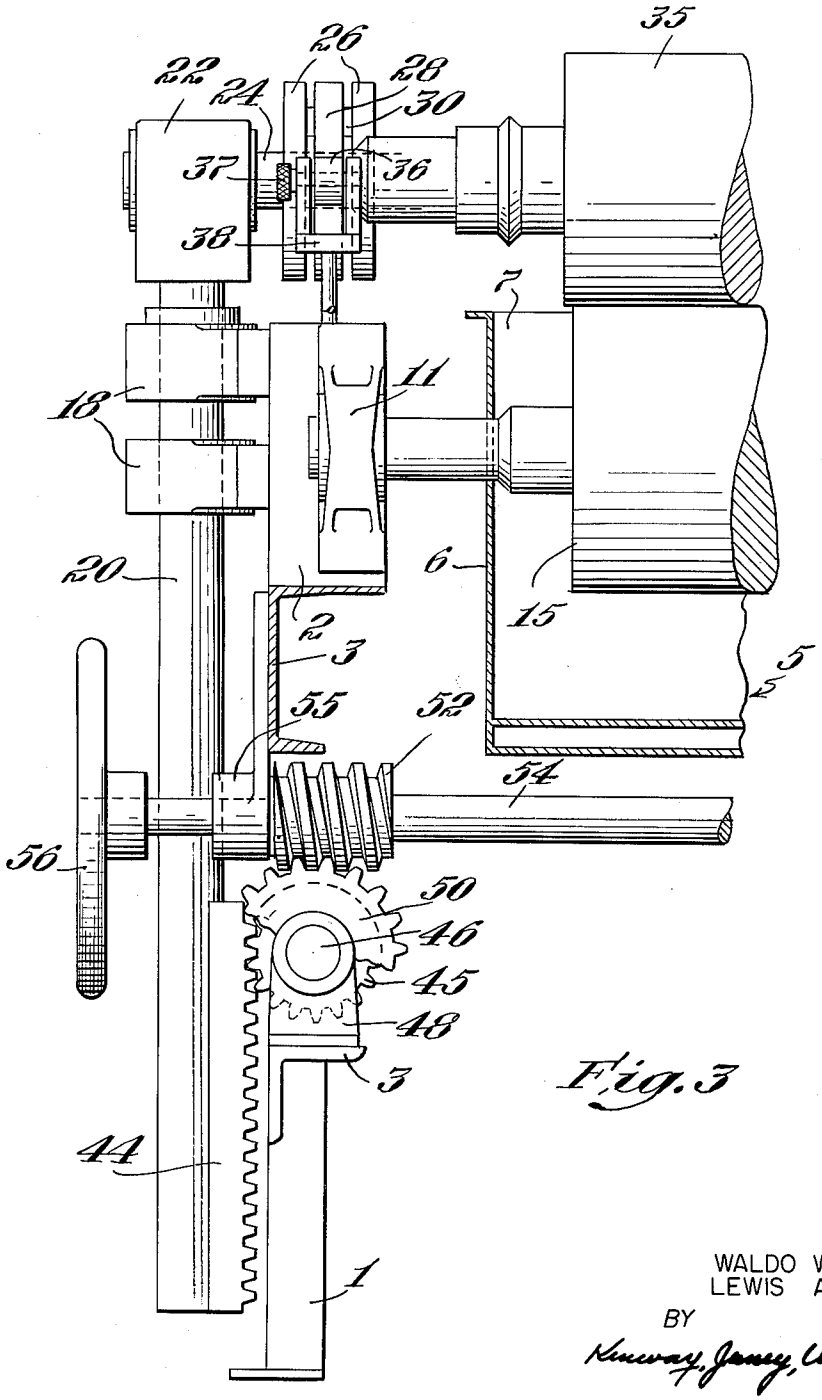


Fig. 3

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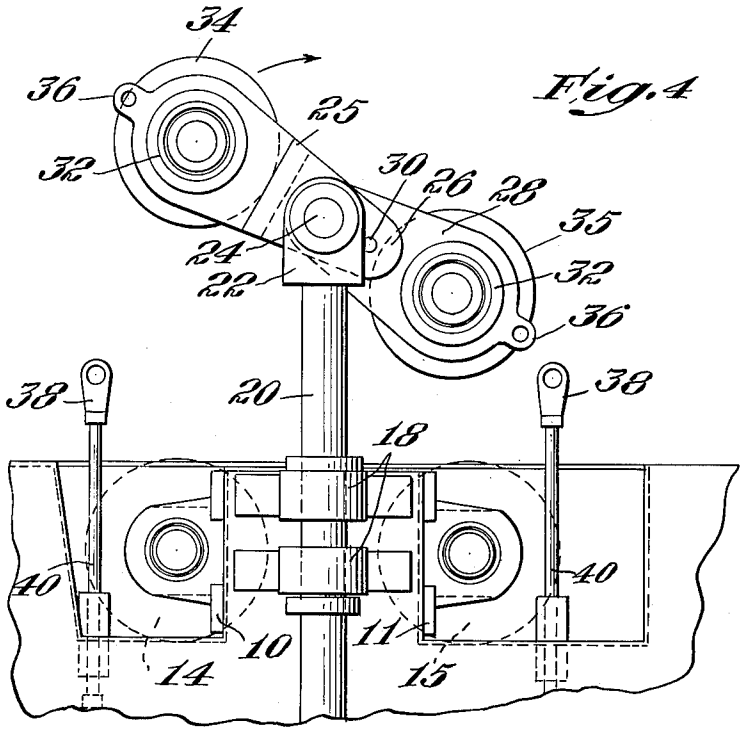


Fig. 4

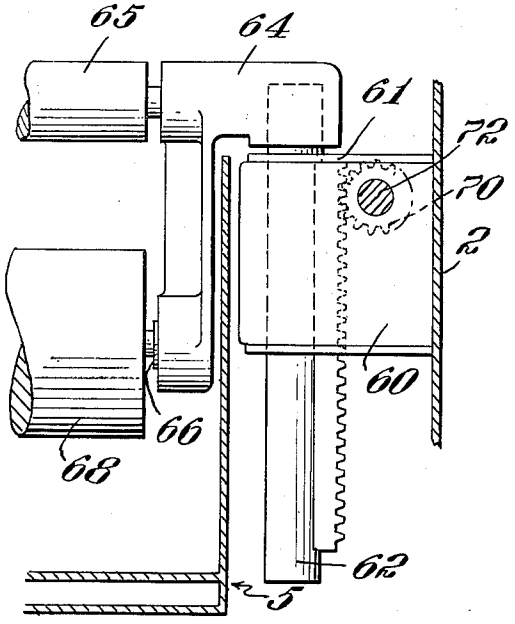


Fig. 5

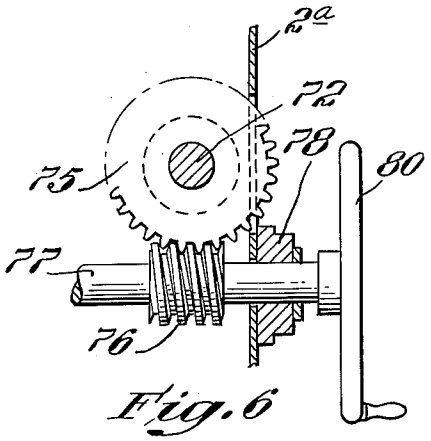


Fig. 6

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SLASHER

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Fig. 8

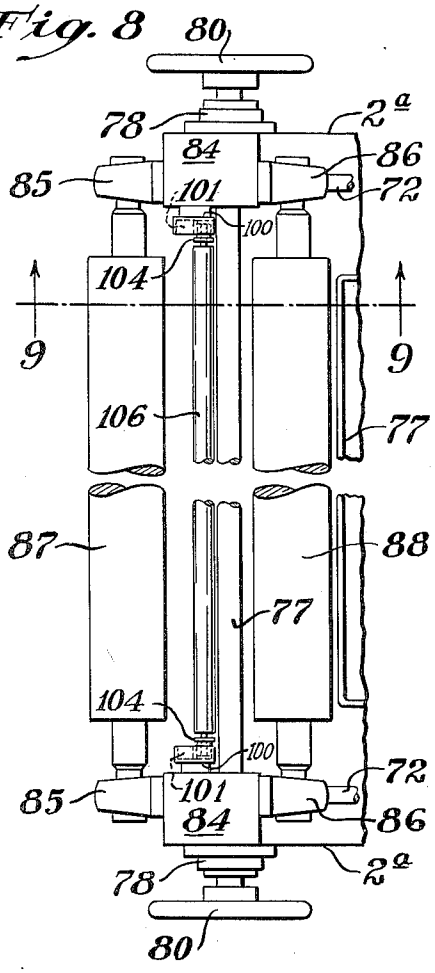
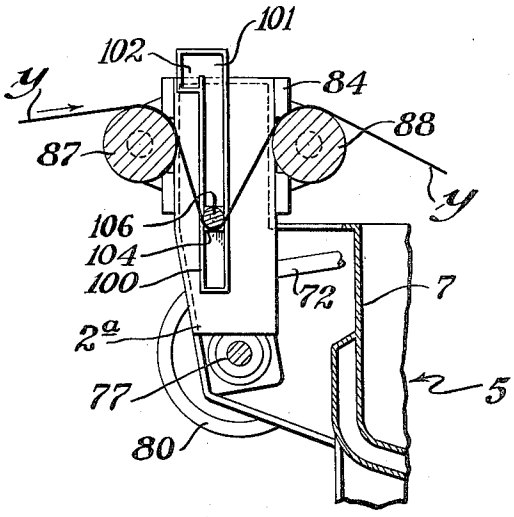


Fig. 9



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2,714,240

SLASHER

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Application February 9, 1953, Serial No. 335,828

3 Claims. (Cl. 28—28)

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.

In the conventional slashers the yarns travel in parallel contiguous relation over guide rolls directly into the size slurry and then about an immersion roll, after which the yarns travel to the squeeze rolls. Due to the turbulence of the size slurry in the vicinity of the immersion roll, there is a tendency for the yarns to tape and roll, i. e., lose their original parallel, contiguous position, so that they become stuck together to such an extent that the lease rods are not able to separate them without the danger of breakage which necessitates stopping the slashing operation to tie the broken ends together. Since the tied or knotted ends later interfere with the weaving operation, it is highly desirable to avoid the cause of the difficulty and the principal object of the present invention is to provide a slasher having efficient and reliable means whereby the yarns may be carried through the size box with little or no likelihood of undergoing taping and rolling.

Another object of the invention is to provide means whereby the immersion roll may be raised completely out of the size slurry so that a leader when tied to the leading ends of the yarns to be treated may be passed to the squeeze rolls without being immersed in the size slurry.

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;

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

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

Fig. 8 is a top plan view of the front end of the apparatus showing modified form of tension rod and associated parts; and

Fig. 9 is a section on the line 9—9 of Fig. 8.

In accordance with the present invention a slasher or size box is equipped with the usual squeeze rolls and guiding and tensioning means are disposed at the front end to receive the warp yarns arranged in parallel, contiguous relation. Between the squeeze rolls and the guiding and tensioning means an immersion roll is horizontally supported within the size box so that its undersurface is below the normal liquid level, and a reverse roll or the like guiding element is disposed above and parallel to the immersion roll, the construction and arrangement of parts being such that the rear surface of the reverse roll or guiding element is positioned rearwardly of the front surface of the immersion roll so that the reverse roll or guiding element receives the yarns from the guiding and tensioning means and is operative to present them directly to the upper surface of the immersion roll before being immersed in the turbulent size slurry. Since the yarns are under a slight tension and as they are in firm contact with the upper surface of the immersion roll before being carried into the size slurry, the turbulence of the latter at the zone of immersion is ineffective to cause taping or rolling, and hence the yarns in their travel through the slasher maintain their parallel, contiguous relationship.

In addition, the immersion roll is preferably supported so that it may be raised above the level of the size slurry, thereby to permit a leader to be tied to the leading ends of the yarns and passed to the squeeze rolls without being immersed in the size slurry, after which the immersion roll may be lowered into the size slurry and the slashing operation carried on in the usual manner.

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 brackets 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 diameter of the roll, as illustrated in Fig. 7.

Mounted on each of the side members 2 between the brackets 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 uper 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 predeter-

mined 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 hand-wheel 56. Rotation of the hand-wheel 56 in a counter-clockwise 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 rear surface of the reverse roll 65 is rearwardly of the front surface of the immersion roll 68 and the undersurface of the immersion roll is below the normal level L of the size within the box 5, as shown in Fig. 7. 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 2*a* 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 2*a*. A hand-wheel 80 is keyed to each end of the shaft 77 so that rotation of the hand-wheel 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 2*a* 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 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 88, 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 hand-wheel 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.

It will be observed that the vertical movement of the tension rod 94 is limited by the engagement of the supporting arms 92 with the shaft of roll 87, and where a greater vertical movement is desired, the construction shown in Figs. 8 and 9 may be advantageously used. Except for the tension rod and associated parts, presently to be described, the construction is identical to that of the previously described embodiment and the same reference characters designate like parts.

In this embodiment each frame member 84 carries a vertical channel-shaped guide 100, the upper end of which is formed with a lateral offset 101 terminating in a depending pocket 102 (Fig. 9) so as to provide, in effect, an inverted J-shaped guiding channel. A flanged nylon bushing 104 has a sliding or rolling fit in the guide 100 and the ends of a tension bar 105 are rotatably supported by the bushings 104, the construction and arrangement of parts being such that in operation the tension rod vertically guided by the bushings 104 riding in the guides 100, "floats" on the yarns Y and thus maintains a uniform tension.

It will be noted that the tension rod 106 has a vertical movement coextensive with the length of the vertical guides 100 which, if desired, may be of greater or lesser length than that shown. When the apparatus is being prepared to receive yarns to be sized, the tension rod 106 may be lifted upwardly and urged forwardly so that the bushings 104 drop into the pockets 102, thereby holding the tension bar in inoperative position. After passing the leader yarns through the squeeze rolls, the tension rod and bushings may be lifted from the pocket 102 and dropped back to operative position.

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.

The present application is a continuation-in-part of our copending application, Serial No. 316,364, filed October 23, 1952, and entitled Slasher with Interchangeable Press Rolls, now Patent No. 2,664,616, granted January 5, 1954.

We claim:

1. A slasher comprising a size box having tensioning means adjacent to its front end, guide means slidably supporting a substantially vertically positioned rod at each opposite side of said box rearwardly of said tensioning means, a pair of brackets each having a substantially

horizontal arm rigidly connected to the upper end of one of the rods and extending inwardly above the upper edge of the adjacent side wall and each bracket having a substantially vertically extending leg projecting downwardly along the inside face of said side wall, an immersion roll rotatably supported by the lower ends of the legs of the brackets, a reverse roll rotatably supported by the upper ends of said legs, the rear surface of said reverse roll being rearwardly of the front surface of said immersion roll so that said reverse roll receives yarns from said tensioning means and presents them directly to the upper surface of said immersion roll above the level of a size slurry within said size box, and means for simultaneously adjusting the vertical position of the rods so that said brackets, immersion roll and reverse roll may be lifted as a unit into and out of the size slurry.

2. A slasher as set forth in claim 1, wherein each of said brackets consists of an inverted L-shaped member and the adjusting means includes a rack secured to each of the outer faces of said rods.

3. A slasher comprising a size box having tensioning means adjacent to its front end, guide means slidably supporting a substantially vertically positioned rod at each opposite side of said box rearwardly of said tensioning means, a pair of brackets each having a substantially horizontal arm rigidly connected to the upper end of one

of said rods and extending inwardly above the upper edge of the adjacent side wall and each bracket having a substantially vertically extending leg projecting downwardly along the inside face of said side wall, an immersion roll rotatably supported by the lower ends of the legs of the brackets, a reverse roll rotatably supported above the normal level of a size slurry within said size box, the rear surface of said reverse roll being rearwardly of the front surface of said immersion roll so that said reverse roll receives yarns from said tensioning means and presents them directly to the upper surface of said immersion roll above the level of a size slurry within said size box, and means for simultaneously adjusting the vertical position of the rods so that said brackets and immersion roll may be lifted as a unit into and out of the size slurry.

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