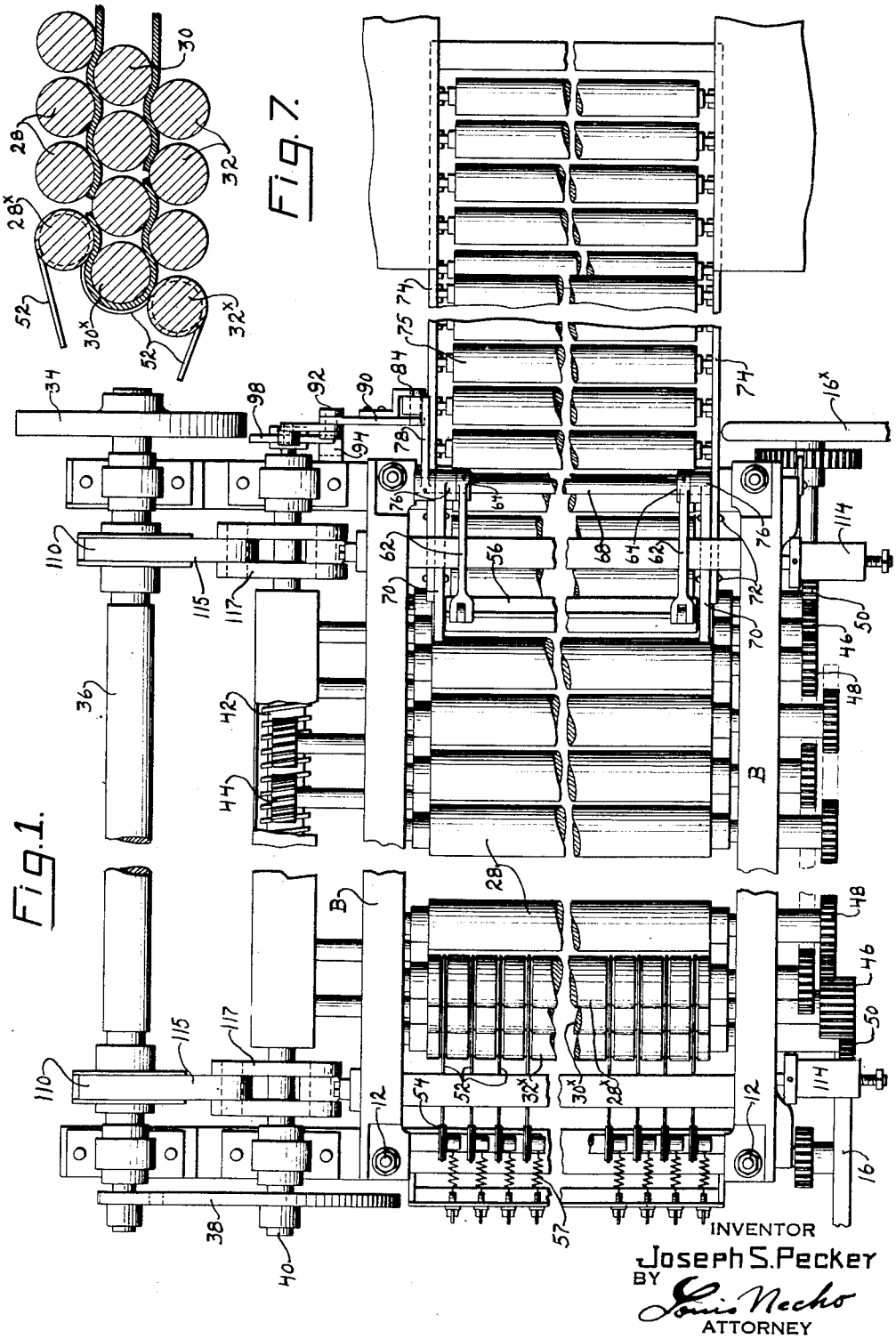
Aug. 15, 1939 J. S. PECKER 2,169,372

FELT TREATING MACHINE

Filed Feb. 8, 1937 5 Sheets-Sheet 1



Aug. 15, 1939 J. S. PECKER 2,169,372

FELT TREATING MACHINE

Filed Feb. 8, 1937 5 Sheets-Sheet 2

Fig. 2.

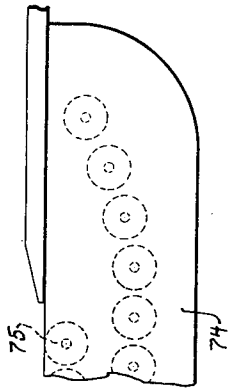
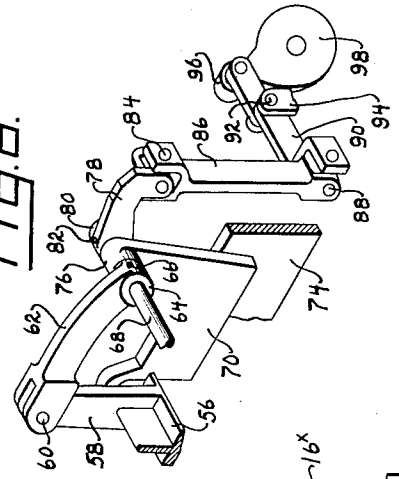
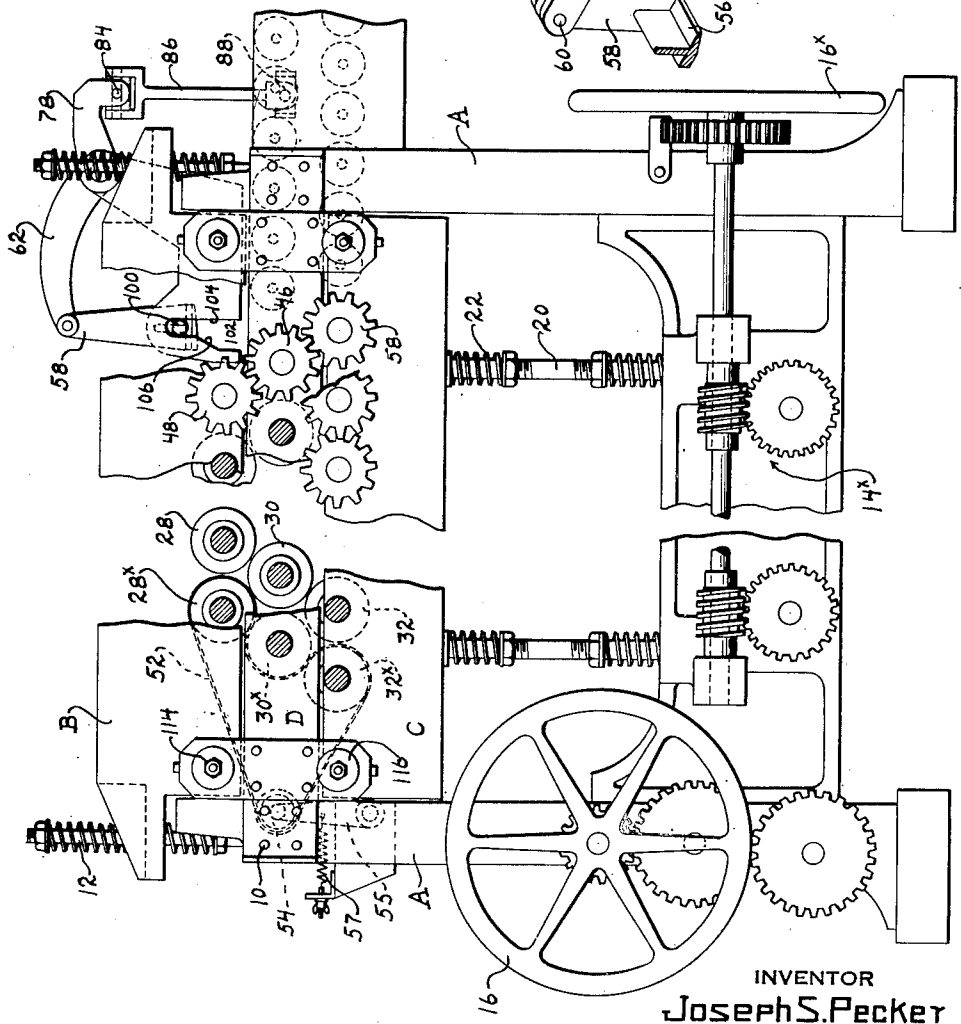


Fig. 8.





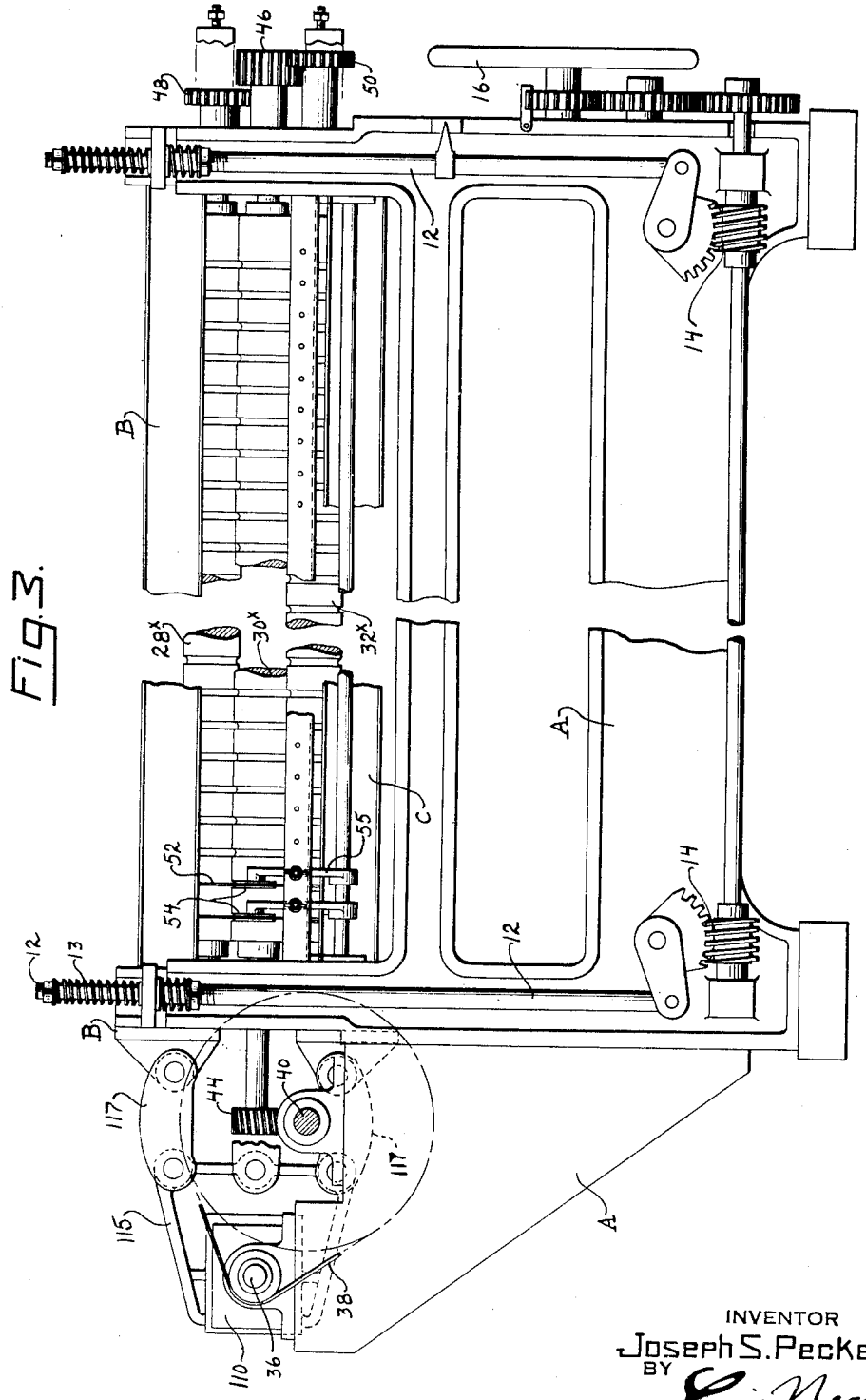
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FELT TREATING MACHINE

Filed Feb. 8, 1937 5 Sheets-Sheet 3

Fig. 3.



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FELT TREATING MACHINE

Filed Feb. 8, 1937 5 Sheets-Sheet 4

Fig. 5.

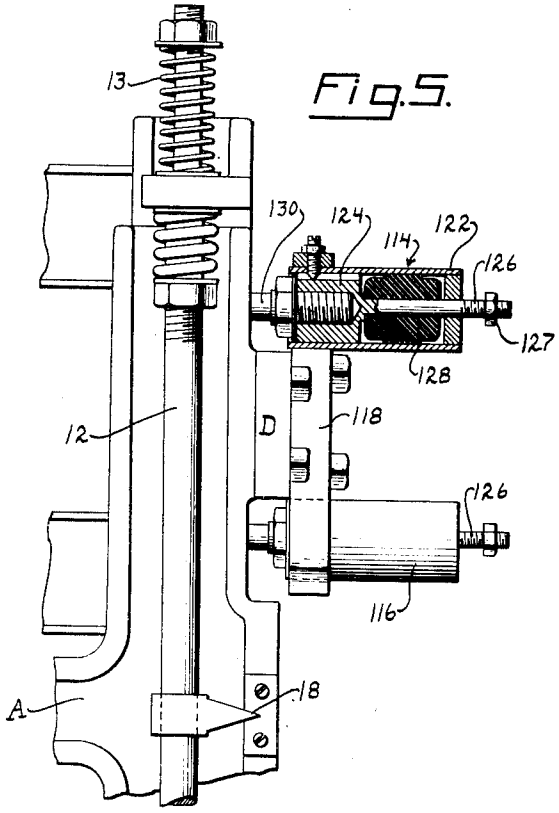


Fig. 4.

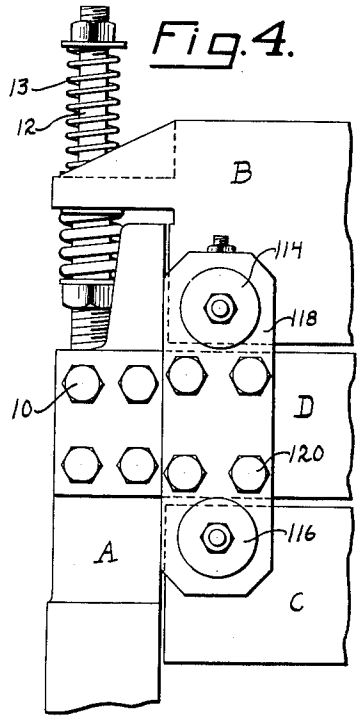
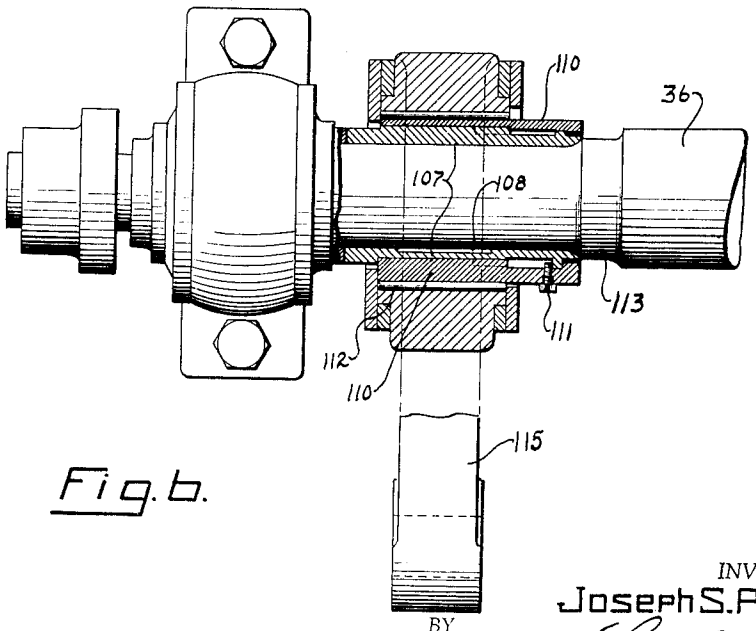


Fig. 6.



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FELT TREATING MACHINE

Filed Feb. 8, 1937 5 Sheets-Sheet 5

Fig. 9.

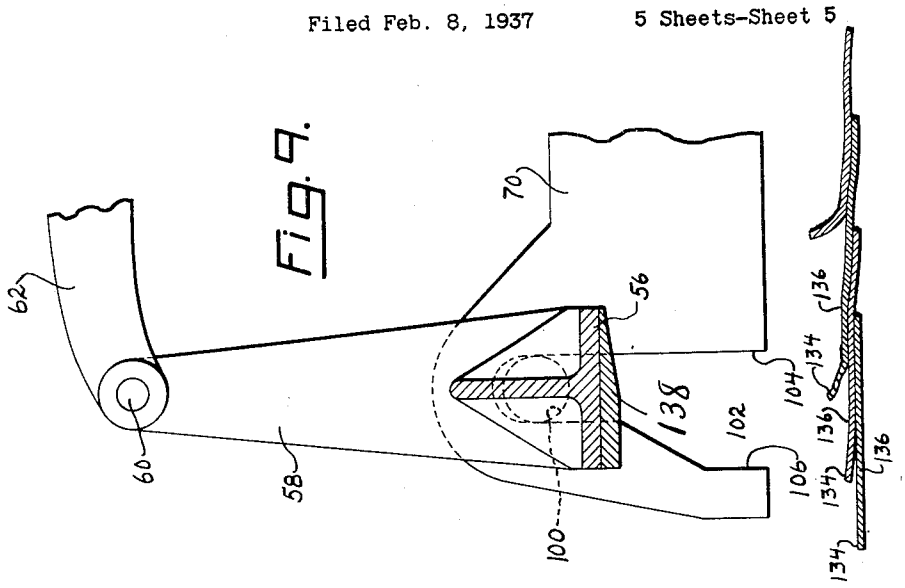
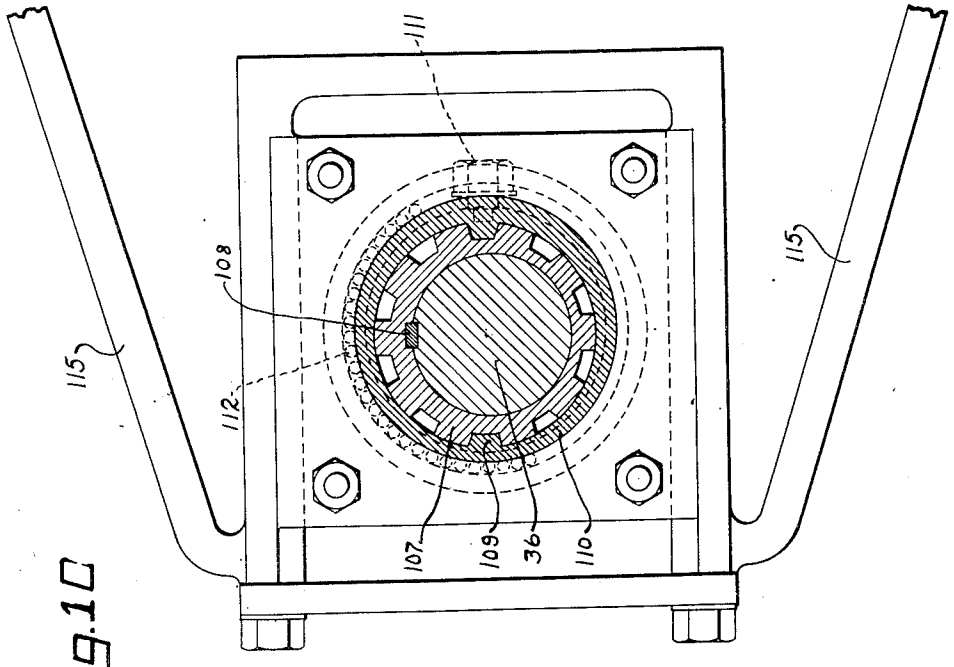


Fig. 10



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Patented Aug. 15, 1939

2,169,372

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2,169,372

FELT TREATING MACHINE

Joseph S. Pecker, Philadelphia, Pa.

Application February 8, 1937, Serial No. 124,728

5 Claims. (Cl. 28—6)

Felt treating machines now in use include a series of central rollers, a series of upper rollers and a series of lower rollers, the felt being passed between the central and upper series of rollers and when it has emerged at the end of the machine it is re-fed into the machine and made to pass between the central and lower rollers for a secondary rolling action. Such machines also have provision for oscillating the upper and lower rollers transversely or in a direction at an angle to the direction of rotation of said rollers to subject the felt to a "kneading" or wiping or binding action better to distribute and reinforce the felting of the fibres and for other reasons well known in the art. Such machines are defective in various respects and it is the object of my invention to produce a felt treating machine of increased efficiency and one which produces a better product, without material alteration in the structure of standard machines, my invention comprising certain features which can be easily applied to existing machines or easily incorporated in machines of future manufacture.

More specifically my invention still further relates to a novel provision of a series of belts, strings, or other flexible element, so positioned at the end of the machine opposite the feeding end thereof which effectively serve automatically to turn the leading edge of the felt and guide it to travel in a reverse direction for a secondary treatment by the rotary and transversely moving rollers.

My invention still further relates to the provision of a tamper at the feed end of the machine together with means for intermittently actuating the tamper and permitting it a predetermined amount of longitudinal movement to retain the ends of the felt being fed into the machine flat, and to prevent their curling, wrinkling, or accidental entanglement with each other or with any part of the machine.

My invention further relates to a machine of this character which is provided with cushioning means for absorbing the jarring or impact which results from the oscillatory movement of the rollers during the progress of the felt through the machine.

My invention still further relates to novel adjustment for the oscillating or reciprocating series of rollers calculated to enable the operator to change the length of the stroke or range of reciprocation with a practically minimum effort and with minimum loss of time.

Other novel features of construction and advantage will be more apparent from the following specification and the accompanying drawings in which,

Fig. 1 represents a fragmentary plan view of a felt treating machine embodying my invention.

Fig. 2 represents a fragmentary side elevation of Fig. 1.

Fig. 3 represents a left hand end elevation of Figs. 1 and 2.

Figs. 4, 5, 6, 7, 8, 9 and 10 represent explanatory views of the various parts of my invention.

Referring to the drawings in which like reference characters represent like parts, A designates the main frame or general support which carries the top subsidiary frame B, the lower subsidiary frame C and the intermediate subsidiary frame D, the latter being rigidly secured to the main frame A as at 10. The top frame B is carried by the rods 12 which have the cushioning springs 13 which are adjustable vertically by any suitable mechanism 14 actuated by any suitable means such as the wheel 16. The lower frame C is similarly carried by the rods 20 which are cushioned at 22 and which are also vertically adjustable by means of any suitable adjusting mechanism 14x actuated by the wheel 16x. The top frame B is provided with the series of rollers 28, the center frame D with the series of rollers 30 and the bottom frame C with the series of rollers 32, said series of rollers 28, 30 and 32 being mounted in staggered relation to each other as best seen in Fig. 2. Power for operating the machine is supplied from any desired source to the pulley 34 on the shaft 36 which, by means of the belt 38, transmits rotary motion to the shaft 40 which is provided with the elongated worm 42 which engages the pinions 44 on the adjacent ends of the central series of rollers 30 to drive the latter. The rollers 30, at their other ends, are provided with gears 46 which mesh with corresponding gears 48 and 50 on the ends of the top and bottom series of rollers 28 and 32 respectively to drive the latter in opposite directions. The structure thus far described is conventional, it being understood that in a conventional machine the upper and lower series of rollers 28 and 32 reciprocate transversely of the direction of the travel of the felt, a method of operation of said rollers together with my novel adjustment therefor being hereinafter fully described.

In order to make provision for automatically reversing the direction of the movement of the felt passing between the upper rollers 28 and the central rollers 30 at the point where it is ready to emerge from the machine and to cause said

felt to pass in the reverse direction between the central rollers 30 and the bottom rollers 32 I provide the belts or strings 52 which engage the idler pulleys 54 and pass around the endmost roller 28x of the top series 28 around the endmost roller 30x of the intermediate series 30 and around the endmost roller 32x of the lower series 32. The pulleys 54 are carried by the pivot arms 55 which are tensioned by the springs 57 to keep the belts 52 under the desired tension. In order to guard against wrinkling or entanglement of the pieces of felt while they are entering between the upper and central rollers 28 and 30 at the feed end of the machine I provide the tamping element 56 which is carried by the links 58 which in turn are pivoted at 60 to the arms 62. The arms 62 terminate in the sleeves 64 which are keyed at 66 to the shaft 68. 70 designates brackets which are secured at 72 to the extension 74 forming part of the main frame A and supporting the idle feed rollers 75. The brackets 70 terminate in the sleeves 76 which form bearings or journals for the shaft 68. To one end of the shaft 68 is provided the arm 78 which terminates in a sleeve 80 keyed to the shaft 68 at 82. The other end of the arm 78 is pivoted at 84 to the vertical link 86 which in turn is pivoted at 88 to the rocker arm 90 which is fulcrumed at 92 to the rigid support 94 and which is provided at its other end with a roller 96 which coacts with the cam 98. The cam 98 is carried and driven by the shaft 40. The tamper 56 is provided with the end rollers 100 which engage the slots 102 in the ends of the brackets 70 to guide the tamper 56 and give it a longitudinal as well as a vertical movement. Thus, when the tamper drops and the rollers 100 slide down against the wall 104 of the opening 102, the tamper is able to move forward with the material, on which it is acting, a distance equivalent to the width of the slot 102, whereupon, as the tamper begins its upward movement, the rollers 100 climb against the upwardly tapering opposite wall 106 of the slot 102 thus bringing the tamper back to its initial position or its extreme right hand position as viewed in Fig. 2.

In order to impart to the upper and lower series of rollers 28 and 32 a lateral vibratory or reciprocatory movement in addition to their rotary movement, I provide the main drive shaft 36 with the inner eccentric 107 which is keyed at 108 to the shaft 36 and to which is keyed at 109 the outer eccentric 110. The eccentrics 107 and 110 are secured together by any means such as the set screw or bolt 111. 112 represents needle bearings for the outer eccentric 110. In order to effect adjustment, the set screw 111 is released and the outer eccentric 110 is moved over the reduced portion 113 of the shaft 36 to disengage the outer eccentric 110 from the inner eccentric 107 and it is then turned about its axis to bring the thick portion thereof against the thin portion of the inner eccentric 107, or vice versa, it being understood that when the thickest portion of the outer eccentric 110 coincides with the thickest portion of the inner eccentric 107 the throw is greatest and hence the stroke of reciprocation of the rollers 28 and 32 is longest. Intermediate adjustments are made in the same way according to requirements. The action of the eccentrics is transmitted to the rollers 28 and 32 through the rocker arm 115 and any suitable linkage 117 to the upper and lower frames B and C respectively. In order to cushion the noisy and violent jarring incident to the oscillation of the frames B and C and their rollers 28 and 32 to eliminate their attendant ill effects on the machine, the operator and the product of the machine, the upper and lower frames B and C are provided with the shock absorbers 114 and 116 respectively which are carried by the brackets 118 which are secured as at 120 to the central rigid frame D, it being understood that the shock absorbers may be mounted on any desired support in position to act upon the upper and lower movable frames B and C. Generally each of said shock absorbers comprises the casing 122 in which is disposed a piston element 124 having the guide and adjustment extension 126 passing through the casing and engaged by the nut 127, said piston element 124 being adapted to impact against the cushion 128 when the piston stem 130 of said piston is displaced by movement of the frames B or C against which it abuts.

The operation is as follows:

The felt to be treated is placed on the idle rollers 75 on the frame extension 74 (to the right hand of Fig. 1) and is pushed until the leading edge thereof enters between the right hand (see Fig. 2) endmost rollers of the upper and middle series 28 and 30 respectively, whereupon the rotation of these rollers propels it until the leading edge of the felt reaches the rotating belts or strings 52 which cause it to turn and travel in the reverse direction between the intermediate series of rollers 30 and the bottom series of rollers 32 until it emerges from the right hand or feed end of the machine. As the pieces of felt are fed into the machine, the tamper 56, actuated by the mechanism heretofore described, descends upon the felt by its own weight and moves along with the piece of felt in the direction of its travel, a distance predetermined by the width of the slot 102, whereupon the tamper is again lifted to drop on the next successive piece of felt. The action of the tamper which is best illustrated in Fig. 9 is to flatten and maintain flat the leading edges 134 of the pieces of felt 136 which, as illustrated, may turn up, wrinkle or otherwise get entangled, until the leading edges of the felt have entered between the rollers 28 and 30. As the pieces of felt travel between the rollers, the eccentrics 107 and 110, acting on the shaft 36, vibrate or reciprocate the frames B and C and their rollers transversely of the machine, or at a right angle to the direction of the movement of the pieces of felt, thus subjecting the felt not only to a squeezing action, but also to a composite binding action resulting from the rotation as well as reciprocation of the rollers. The shock absorbers 114 insure smooth operation and prevent violent jarring or impact, while the adjustment devices 14 and 14x serve to adjust the spacing of the upper, middle and lower series of rollers to the desired thickness.

It will be noted that the novel construction of the eccentrics 107 and 110 not only permits instantaneous adjustment but it also affords a wide range of adjustment which can be effected in very large or very small degrees depending on the extent to which the eccentric 110 is turned with respect to the eccentric 107.

It is also to be noted that the belts or strings 52 automatically reverse the felt 136 thus eliminating the labor which would otherwise be necessary.

If desired, the bottom or effective end of the tamper 56 may be tapered or provided with the bottom tapered plate 138 better to receive or accommodate the roughened or up-turned edges

134 of the felt 36 as the hammer descends upon the same, and also to continue to hold the ends flat while the tamper is carried forward.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination with a felt treating machine including upper, lower and intermediate rollers, of means at the end of the machine, opposite the feed end thereof, for causing the felt which has passed between the upper and intermediate series of rollers in one direction to reverse its direction of movement and pass between the intermediate and lower series of rollers, comprising a traveling flexible element passing over corresponding sides of the upper and lower adjacent rollers and around the opposite side of the adjacent intermediate roller.

2. The combination with a felt treating machine including upper, lower and intermediate rollers, of traveling flexible elements at the end of the machine, opposite the feed end thereof for causing the felt which has passed between the upper and intermediate series of rollers in one direction to reverse its direction of movement and pass between the intermediate and lower series of rollers, said flexible elements engaging corresponding faces of the adjacent upper and lower rollers and the opposite face of the adjacent intermediate rollers.

3. The combination with a felt treating machine including a series of rollers between which the felt to be treated is passed, of a tamping element associated with the feed end of the machine and adapted to act on said felt as it is fed to said rollers, and means for intermittently actuating said tamper.

4. The combination with a felt treating machine including a series of rollers between which the felt to be treated is passed, of a tamping element associated with the feed end of the machine and adapted to act on said felt as it is fed to said rollers, means for intermittently actuating said tamper, and means for permitting said tamper a predetermined amount of travel in the direction of the rotation of said rollers.

5. The combination with a felt treating machine including a series of rollers between which the felt to be treated is passed, of a tamping element associated with the feed end of the machine and adapted to act on said felt as it is fed to said rollers, and means for intermittently actuating said tamper, the bottom effective surface of said tamping element being tapered in the direction opposite to the movement of the felt through the machine.

JOSEPH S. PECKER.