Dec. 18, 1962 F. HAFF, JR 3,069,058

PRESSURE ROLLER

Filed Oct. 23, 1959

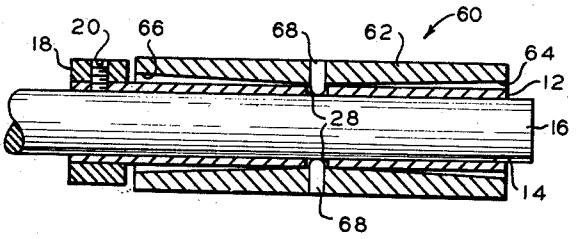


FIG. 6

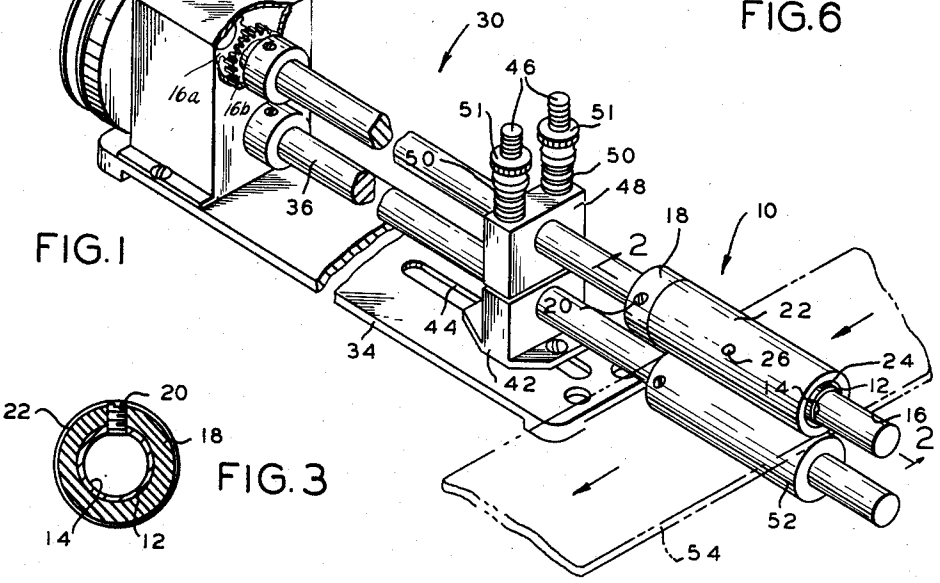


FIG. 1

FIG. 3

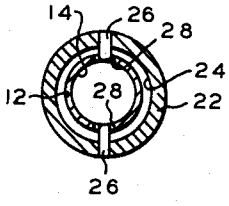


FIG. 4

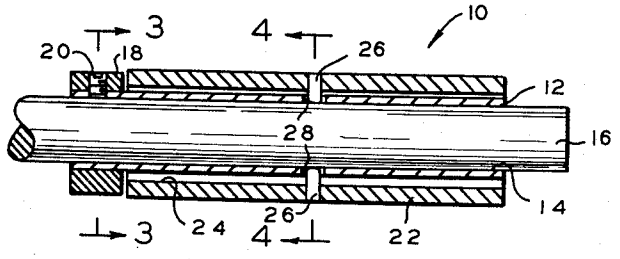


FIG. 2

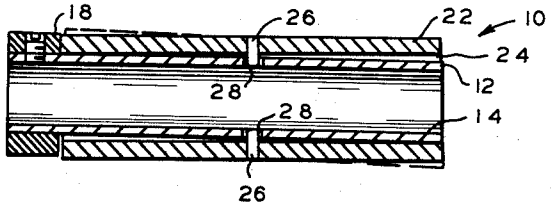


FIG. 5

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PRESSURE ROLLER

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This invention relates to material feed devices and, more particularly, to a pressure drive roller therefor.

In certain types of material feed machines, such as used with industrial sewing machines, strips of material are fed through spaced apart drive rollers that exert a continuous pull upon the material so as to move it at a steady rate. In some cases, the shafts upon which the rollers are mounted are allowed to move angularly with respect to each other to adjust the distance between the pressure rollers for accommodating material of different thicknesses. Ordinarily, any movement of the shafts and supported rollers out of parallelism causes the rollers to slightly relax their pressurized engagement with the side of the material in which the rollers are further spaced apart, thus causing the material to be unevenly pulled through the rollers along only one portion thereof. It is therefore an object of the present invention to provide a compensating pressure roller for material feed machines which will adjust itself with respect to a cooperating reaction roller, to maintain such rollers in parallelism regardless of the angular movement of the supporting shafts.

Another object of the present invention is to provide a pressure roller for material feed machines which can be readily attached to an operating drive shaft without affecting the other working parts of the machine.

An additional object of the present invention is to provide a pressure roller for material feed machines of the above type that can be manufactured in large quantities at a relatively low cost, and which will assure the even and continuous movement of a strip of material therethrough. All of the foregoing and still further objects and advantages of this invention will become apparent from a study of the following specification, taken in connection with the accompanying drawing, wherein:

FIGURE 1 is a perspective view of a material feed machine partly cut-away and having a pressure drive roller made in accordance with the present invention;

FIGURE 2 is an enlarged longitudinal cross sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a transverse cross sectional view taken along line 3—3 of FIGURE 2, with the drive shaft removed;

FIGURE 4 is a transverse cross sectional view taken along line 4—4 of FIGURE 2, with the drive shaft removed;

FIGURE 5 is a view similar to FIGURE 2, with the drive shaft removed, showing the manner in which the outer pressure roller sleeve is maintained in a predetermined position independently of the angular movement of the inner mounting sleeve member; and

FIGURE 6 is a view similar to FIGURE 2, showing a slightly modified form of construction.

Referring now more in detail to the drawing, a pressure roller 10 made in accordance with the present invention, for use with a material feed machine, is shown to include an inner mounting sleeve 12 having a longitudinal central bore 14 of substantially the same diameter as a drive shaft 16 upon which it is to be mounted. A mounting collar 18 integral with one end of the inner sleeve 12 is provided with a set screw 20 for securing the pressure roller in any desired position along the length of the drive shaft 16.

A cylindrical roller 22 in the form of an outer sleeve having a longitudinal bore 24 of slightly larger diameter

than the outside diameter of the inner sleeve 12, engages with and drives the material, in a manner hereinafter more fully described. A pair of axially aligned pins 26, integrally secured within bores at diametrically opposite sides of the outer pressure roller sleeve 22 extend radially inwardly toward the inner sleeve 12 and are received within enlarged or oversize aligned openings 28 in diametrically opposite sides of the inner sleeve 12. Since the pins 26, integral with one of the sleeves, are received within the enlarged openings in the other one of the sleeves, such outer sleeve 22 may pivot with respect to the inner sleeve in all directions a limited amount, as illustrated in FIGURE 5. Therefore, the pins 26 may be integral with either one of the sleeves, the enlarged openings 28 being formed in the other one of such sleeves. However, by mounting the pins 26 on the outer sleeve 22, in the manner illustrated in the drawing, it is possible to provide a smooth uninterrupted surface for the outer roller 22 which may be necessary for certain types of operations.

In actual use, the compensating pressure roller 10 is placed upon a drive shaft 16 directly opposite to a reaction roller 52 which may be fixed with respect to its supporting drive shaft 36. Both shafts 16, 36, may be driven through suitable gearing contained within a gear box 32 mounted upon the base 34 of the unit, such gearing being actuated by a drive belt 37 which may transmit power to the pulley 38 from any suitable source. A friction clutch 40 acting between the drive pulley 38 and the gear box 32 may be used to prevent damage to the working parts in the event that any one thereof becomes jammed. The clutch also provides slippage between the drive pulley and gear box to compensate for changes in the stitch length of the material being sewed. As the speed of rotation of the pulley by the belt is constant, any reduction in the rate of feed through the machine results in slippage through the clutch.

A lower bearing block 42 longitudinally adjustably mounted above a longitudinal slot 44 in the base 34 rotatably supports an intermediate portion of the lower shaft 36 and includes a pair of upwardly extending pins 46 upon which an upper bearing block 48 is slidably supported. The upper bearing block 48 rotatably supports an intermediate portion of the upper shaft 16 upon which the compensating pressure roller 10 is mounted. Compression coil springs 50 encircle the upper portions of the pins 46 which may be threaded for threadedly receiving adjustment nuts 51 for varying the spring pressure acting against the upper bearing block 48.

Thus, the springs 50 constantly maintain the yielding pressure upon the upper bearing block 48 to move the upper compensating roller 10 toward the reaction roller 52. However, in the event that a strip of fabric 54 is drawn through the rollers 10, 52, a suitable connection within the gear box 32 will allow the upper shaft 16 to pivot with respect to the lower shaft 36, under the yielding spring pressure of the springs 50 acting upon the bearing block 48, to enable the rollers to move sufficiently far enough apart to accommodate the thickness of the material therethrough. This may be done by providing a loose connection between a driving gear element 16*a* and a gear-driven part 16*b* secured at one end of shaft 16 as seen in FIG. 1 within the gear box 32; details of said loose connection in themselves being disclaimed herein and forming no part of the invention. During this movement, the outer sleeve 22 of the compensating roller will angle with respect to the longitudinal axis of the inner sleeve 12 and the supporting shaft 16, as shown in FIGURE 5, to maintain the contacting surfaces of the outer pressure roller sleeve 22 and the reaction roller 52 in parallel relationship, thus exert-

ing an even driving force along the entire width of the material 54 regardless of the thickness thereof.

Referring now more specifically to FIGURE 6 of the drawing, a slightly modified form of pressure roller assembly 60 is shown wherein the cylindrical roller 62 that is provided with a longitudinal bore having longitudinally outwardly flared portions 64, 66 that flare outwardly toward the opposite ends of the sleeve from the center thereof, in which the center portion of the bore has an inside diameter at least as large as the outside diameter of the inner sleeve 12. A pair of axially aligned pins 68, integrally secured within bores at diametrically opposite sides of the outer pressure roller sleeve 62, extend radially inwardly toward the inner sleeve 12 and are received within enlarged or oversized aligned openings 28 in the diametrically opposite sides of the inner sleeve 12. Since the pins 68, integral with the outer sleeve are received within the enlarged openings in the other one of the sleeves, such outer sleeve 62 may pivot with respect to the inner sleeve in all directions a limited amount, in the manner hereinbefore described. The outwardly flared portions 64, 66 of the longitudinal bore of the outer sleeve 62 allow for such pivotal movement, while the reduced diameter of the central portion of the longitudinal bore of the outer sleeve 62 maintains the inner and outer sleeves in spaced apart relationship at all times, thus assuring concentricity when the longitudinal axes of the inner and outer sleeves are parallel to the supporting shaft.

While this invention has been described with particular reference to the construction shown in the drawing, it is to be understood that such is not to be construed as imparting limitations upon the invention, which is best defined by the claim appended hereto.

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

In a material feed machine, the combination comprising a pair of normally parallel and operatively diverging cylindrical drive shafts free at the operative ends and one of said drive shafts being pivotally mounted, a pair of rollers externally cylindrical supported by said drive shafts and normally in parallelism and adjacent the free ends and drivingly receiving a strip of material therebetween, the roller on the pivotally mounted shaft having shaft mounting means for tiltable movement with respect thereto in response to the reception of material of different thicknesses therebetween to maintain parallelism with the roller on the shaft, said shaft mounting means comprising a shaft sleeve disposed concentrically, inwardly and spaced from the roller and radially disposed pins centrally disposed of the roller and penetrating said sleeve and terminating on the shaft, and a slidable collar and a sleeve extension on which said collar is secured to adjust the position of said roller along the shaft, said collar having means for detachable securement to the shaft.

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