Nov. 12, 1963 E. H. DU BOIS 3,110,253

OSCILLATING ROLLER MECHANISM FOR PRINTING PRESSES

Filed Dec. 15, 1961

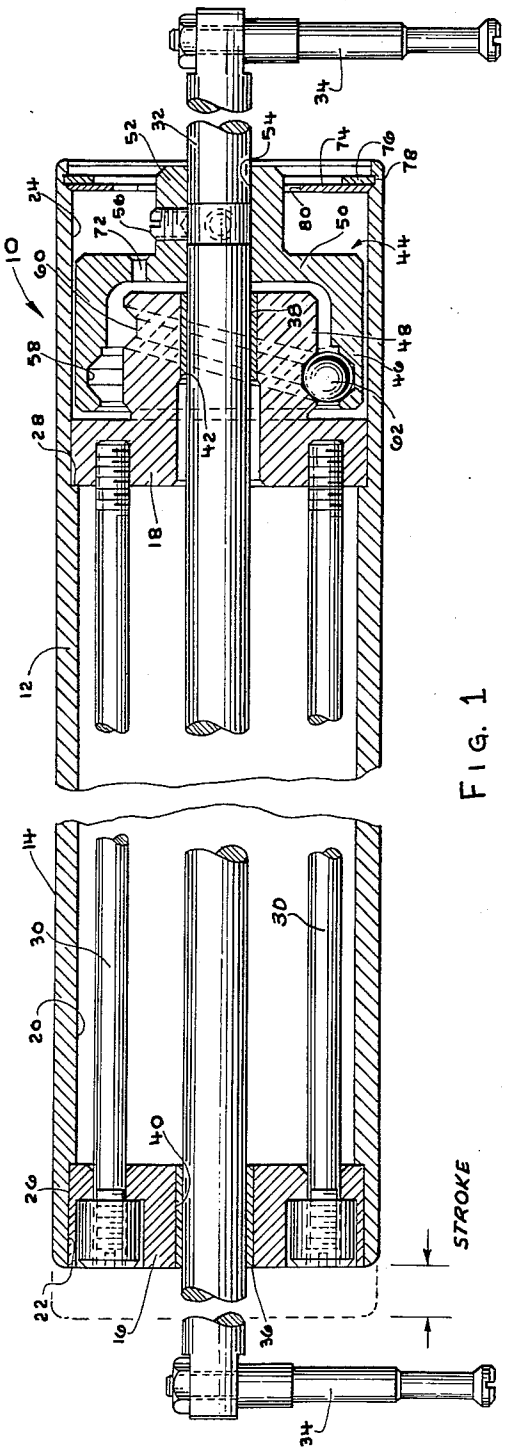


FIG. 1

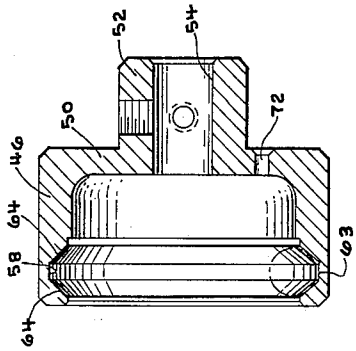


FIG. 3

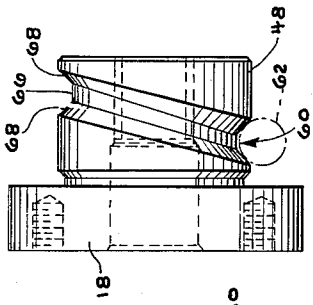


FIG. 2

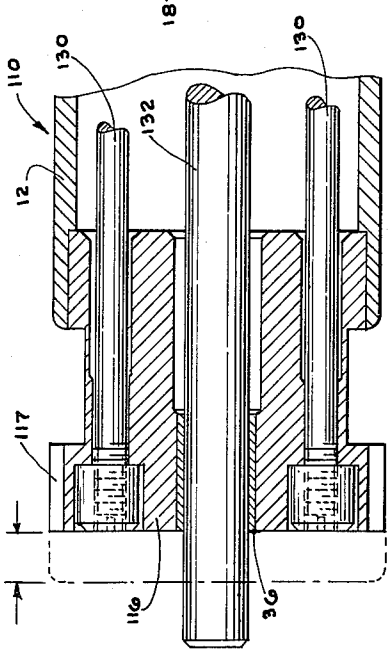


FIG. 4

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United States Patent Office 3,110,253 Patented Nov. 12, 1963

3,110,253

OSCILLATING ROLLER MECHANISM FOR PRINTING PRESSES

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Filed Dec. 15, 1961, Ser. No. 159,675
7 Claims. (Cl. 101—348)

This invention relates to printing presses, duplicators and similar equipment, and pertains particularly to a new and improved mechanism for imparting longitudinal oscillation to an inking roller or the like. Those skilled in the art will be familiar with the practice of imparting endwise oscillation to one or more rollers in the inking system of a printing press in order to spread the ink more evenly over the inking rollers.

One object of the present invention is to provide a new and improved roller oscillating mechanism which is extremely smooth, quiet and efficient in operation.

A further object is to provide a new and improved mechanism of the foregoing character which may be operated at extremely high speeds without causing excessive wear, vibration and noise and without impairing the uniformity with which the ink is spread over the inking rollers.

A further object is to provide such a new and improved mechanism which is extremely compact and is entirely enclosed within the oscillating roller so as to be protected from damage and contamination with ink, dust, repellent fluid and other foreign material.

Another object is to provide such a new and improved mechanism which is extremely durable, simple and economical in construction.

Further objects and advantages of the present invention will appear from the following description, taken with the accompanying drawing, in which:

FIG. 1 is a central longitudinal section taken through an ink roller equipped with an oscillating mechanism to be described as an illustrative embodiment of the present invention.

FIG. 2 is an elevational view of an inner race member employed in the oscillating mechanism.

FIG. 3 is a longitudinal section of an inner race member employed in the mechanism.

FIG. 4 is a central longitudinal section corresponding to the left-hand portion of FIG. 1 but showing a modified construction.

It will be seen that FIG. 1 illustrates an elongated cylindrical roller 10 which may be employed in the inking system of a printing press, duplicator or similar machine. The roller 10 is adapted to rotate and also to oscillate or slide longitudinally so as to spread the ink more evenly over the inking rollers.

The roller 10 may be of any suitable construction but is illustrated as comprising an outer cylindrical shell 12 having a smooth outer surface 14 which may be ground or otherwise finished so as to be accurately cylindrical. Plugs 16 and 18 are mounted in the opposite ends of the outer shell 12. It will be seen that the shell 12 has a cylindrical interior surface or bore 20 which has enlarged end portions 22 and 24 for receiving the plugs 16 and 18. In this case, the plugs 16 and 18 are seated against annular shoulders 26 and 28 which are formed between the main interior bore 20 and the enlarged portions 22 and 24. The plugs 16 and 18 may be retained within the outer shell 12 by a plurality of threaded tie rods 30 extending between the plugs.

In the illustrated construction, bearing means are provided to mount the roller 10 on stationary supporting means so as to provide for the rotation and longitudinal translation of the roller. In this case, the stationary supporting means comprise a stationary shaft 32 which extends longitudinally entirely through the roller along the axis thereof. Posts 34 or the like may be secured to the ends of the shaft 32 to mount the shaft on any suitable support. The bearings for the roller 10 take the form of bushings 36 and 38 which are secured within bores 40 and 42 in the plugs 16 and 18 and are in sliding engagement with the shaft 32 so as to provide for both the free rotation and endwise movement of the roller 10.

The roller 10 is adapted to be oscillated longitudinally by a mechanism 44 which is entirely enclosed within the right-hand end portion of the roller. In general, the mechanism 44 comprises first and second race members having oppositely facing generally annular grooves therein. A ball or other roller is confined between the grooves and is adapted to roll therein. One or both of the grooves are slanted at an acute angle with respect to the axis of the roller. When the roller is rotated, the ball is driven in the manner of a planetary gear so that it rolls between the grooves without any substantial slippage. Due to the slant of the groove or grooves, the rotation of the roller imparts longitudinal oscillation to the roller at a rate depending upon the diameter of the grooves and the size of the ball. Due to the planetary movement of the ball, a plurality of revolutions of the roller are usually necessary to complete a single longitudinal cycle of oscillation.

More specifically, the illustrated mechanism 44 comprises outer and inner generally cylindrical race members 46 and 48. It is preferred that the outer race member 46 be stationary and that the inner race member 48 be mounted on the roller 10. However, this situation can be reversed. In this case, the inner race member 48 is formed integrally with the plug 18 in the right-hand end of the roller 10. The outer race member 46 is secured to the stationary shaft 32. Thus, as illustrated, the outer race member 46 has an end wall 50 formed with a hub portion 52. The shaft 32 is received within a bore 54 extending through the wall 50 and the hub portion 52. One or more set screws 56 or the like are employed to secure the hub 52 to the shaft 32. An inwardly facing annular groove 58 is formed within the outer race member 46. The outer surface of the inner race member 48 is formed with an outwardly facing generally annular groove 60. It will be seen that a planetary roller in the form of a ball 62 is confined between the grooves 58 and 60 and is adapted to roll therein.

As shown to best advantage in FIG. 3, the groove 58 in the outer member 46 has a cylindrical bottom surface 63 and a pair of slanting frustoconical side surfaces 64. Similarly, the groove 60 has a cylindrical bottom surface 66 and a pair of slanting frustoconical side surfaces 68. The ball 62 fits snugly within the grooves 58 and 60 and is adapted to be driven as a planetary roller by wedging engagement with the side surfaces 64 and 68.

As already indicated, both of the grooves 58 and 60 could be slanted. Alternatively, either the groove 58 or the groove 60 in the inner race member 48 is slanted at an acute angle with respect to the axis of the roller 10. The slant of the groove 60 imparts endwise oscillating movement to the roller 10 when the roller is rotated. The inner race member 48 drives the ball 62 as a planetary roller so that the ball rolls between the grooves 58 and 60. The planetary rolling movement of the ball acts upon the slanting groove 60 so as to oscillate the roller 10 endwise.

The roller 10 of FIG. 1 is intended to be frictionally driven by one or more adjacent rollers in the inking system of a printing press. FIG. 4 illustrates a modified roller 110 which is similar to the roller 10 except that the roller 110 is adapted to be positively driven by suit-

able gears. Thus, the roller **110** has a modified left-hand plug **116**. A gear **117** is formed integrally with the plug **116** on the left-hand end thereof. The outer shell **12** of the roller **10** may be employed, but the roller **110** may be provided with a somewhat longer shaft **132** and longer tie rods **130** to accommodate the longer plug **116**. The bearing **36** may be the same as in FIG. 1.

Inasmuch as the ball **62** rolls between the grooves **58** and **60**, the oscillating mechanism **44** operates very smoothly, efficiently and quietly, with very little wear on the ball or the grooves. The roller **10** may be driven at extremely high speed without excessive wear, noise or vibration.

It will be noted that the oscillating mechanism is enclosed within the right-hand portion of the roller. Moreover, the grooves **58** and **60** and the planetary ball **62** are within the outer race member **46**. Thus, the moving parts of the oscillating mechanism are effectively protected from damage and contamination with dirt, ink, repellent fluid and other foreign material.

The grooves **58** and **60** and the ball **62** may be lubricated from time to time through an opening **72** in the end wall **50** of the outer race member **46**. A closure disk **74** may be mounted in the right-hand end of the outer shell **12** and may be held in place by a snap ring **76** seated in a groove **78**. An opening **80** is formed in the disk **74** to avoid any interference with the oscillating movement of the roller **10**.

Various modifications, alternative constructions and equivalents may be employed without departing from the true spirit and scope of the invention, as defined in the following claims and exemplified in the foregoing description.

I claim:

1. In an oscillating roller mechanism for a printing press,
the combination comprising a stationary shaft,
a roller received around said shaft,
bearings supporting said roller on said shaft for rotation and longitudinal oscillation thereon,
an outer race member secured to said shaft and having an inwardly facing endless generally annular groove therein,
an inner race member secured to said roller and received within said outer race member,
said inner race member having an outwardly facing endless generally annular groove therein,
and a ball received between said grooves for rolling movement therein,
said groove in said inner race being slanted at an acute angle relative to the axis of said roller so that said ball and said grooves will impart a longitudinal oscillating movement to said roller as said roller is rotated relative to said shaft.

2. In an oscillating roller mechanism for a printing press,
the combination comprising stationary supporting means,
a roller,
means supporting said roller for rotation and longitudinal oscillation relative to said stationary supporting means,
a first race member secured to said stationary supporting means,
a second race member secured to said roller,
said race members having oppositely facing endless generally annular grooves,
and a roller member confined between said grooves for rolling movement therein,
at least one of said grooves being slanted at an acute angle relative to the axis of said roller so as to impart longitudinal oscillating movement to said roller as said roller is rotated.

3. In an oscillating roller mechanism for a printing press,

the combination comprising a roller,
stationary means supporting said roller for rotation and longitudinal oscillation,
a first member secured to said stationary supporting means,
a second member opposite said first member and secured to said roller,
said members having opposite generally annular endless grooves formed therein,
and a planetary roller member confined between said grooves for rolling movement therein,
said groove in said second member on said roller being slanted at an acute angle relative to the axis of said roller so as to impart longitudinal oscillating movement to said roller when said roller is rotated.

4. In an oscillating roller mechanism for a printing press,
the combination comprising a roller,
stationary supporting means supporting said roller for rotation and longitudinal oscillation,
an outer generally cylindrical member secured to said stationary supporting means,
an inner generally cylindrical member within said outer member and secured to said roller,
said outer and inner members having oppositely facing endless generally annular grooves therein,
and a planetary ball confined between said grooves for rolling movement therein,
said groove in said inner member being slanted at an acute angle relative to the axis of said roller so as to cause longitudinal oscillation of said roller when said roller is rotated.

5. In an oscillating roller mechanism for a printing press,
the combination comprising stationary supporting means,
a roller,
means supporting said roller for rotation and longitudinal oscillation relative to said stationary supporting means,
a first race member secured to said stationary supporting means,
a second race member secured to said roller,
said race members having oppositely facing endless generally annular grooves,
and a ball confined between said grooves for rolling movement therein,
at least one of said grooves being slanted at an acute angle relative to the axis of said roller so as to impart longitudinal oscillating movement to said roller as said roller is rotated.

6. In an oscillating roller mechanism for a printing press,
the combination comprising a roller,
stationary means supporting said roller for rotation and longitudinal oscillation,
a first member secured to said stationary supporting means,
a second member opposite said first member and secured to said roller,
said members having opposite generally annular endless grooves formed therein,
and a planetary ball confined between said grooves for rolling movement therein,
said groove in said second member on said roller being slanted at an acute angle relative to the axis of said roller so as to impart longitudinal oscillating movement to said roller when said roller is rotated.

7. In an oscillating roller mechanism for a printing press,
the combination comprising a roller,
stationary supporting means supporting said roller for rotation and longitudinal oscillation,
an outer generally cylindrical member secured to said stationary supporting means,

an inner generally cylindrical member within said outer member and secured to said roller,

said outer and inner members having oppositely facing endless generally annular grooves therein,

and a planetary ball confined between said grooves for rolling movement therein,

at least one of said grooves being slanted at an acute angle relative to the axis of said roller so as to cause

longitudinal oscillation of said roller when said roller is rotated.

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