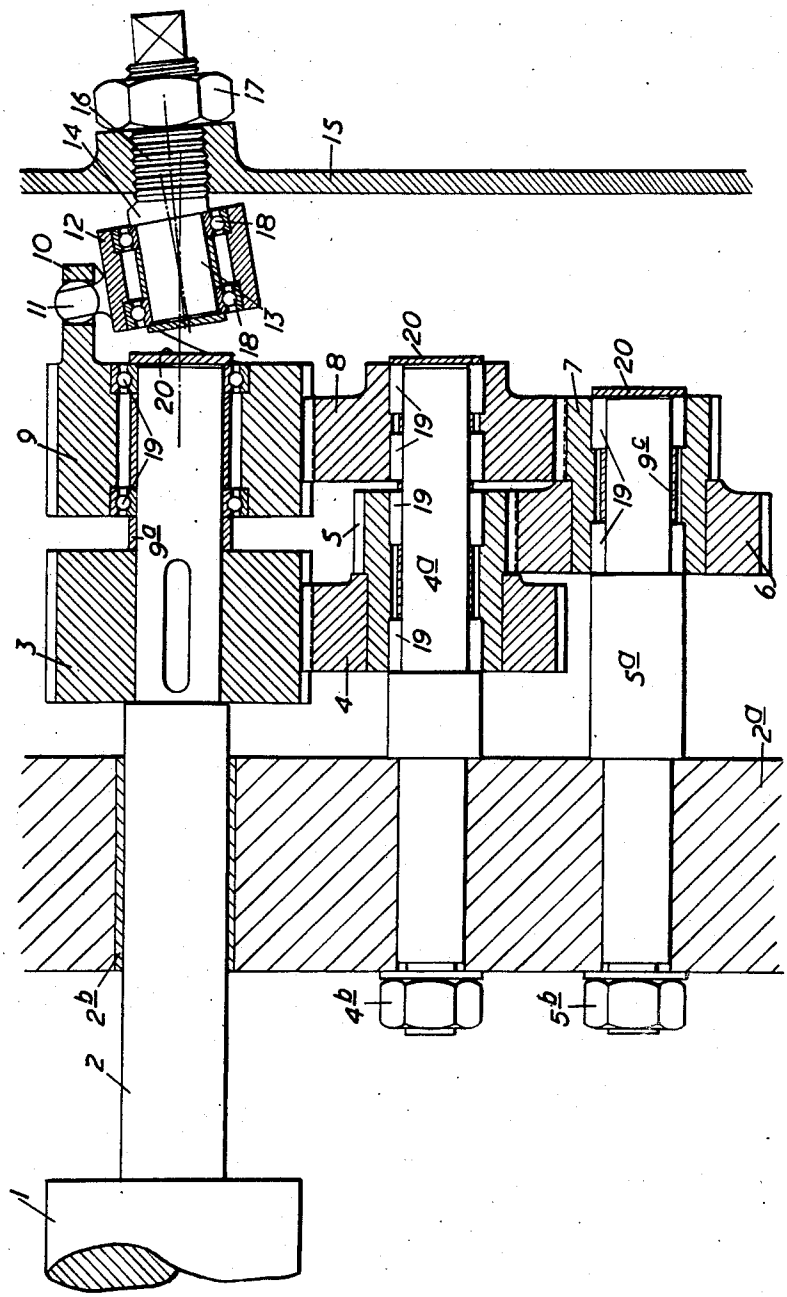
Aug. 9, 1960 N. NORLIN 2,948,158

ROLLER VIBRATOR MECHANISM

Filed Nov. 28, 1958



United States Patent Office 2,948,158 Patented Aug. 9, 1960

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ROLLER VIBRATOR MECHANISM

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Filed Nov. 28, 1958, Ser. No. 776,953

7 Claims. (Cl. 74—22)

This invention relates to mechanism for vibrating or reciprocating rollers in their axial sense as they rotate: such a requirement of roller movement occurs in various machines where a number of rollers are used to distribute a liquid or semi-liquid substance, the axial movement of one or more of the rollers serving to distribute the substance evenly: one particular machine with which the present invention is mainly concerned is a printing machine the ink-distribution in which is commonly effected through such a roller system.

It is the main object of the present invention to provide a roller-reciprocating device which shall be simple and shall readily be adjustable to enable the extent of reciprocation to be adjusted while the roller system is in use.

According to the present invention a roller reciprocating device comprises a follower which is moved in a closed looped path and which is held against axial movement with respect to the roller to be reciprocated and a stationary component which is angularly adjustable about an axis co-planar with the axis of the looped path and at an angle to that axis, the component having a circular track which is at an angle to the axis of adjustment of the component and cooperates with the follower to control its axial position as the follower moves in the looped path.

The angle made by the axis of the track to the axis of angular adjustment of the component is such that by turning the component the axis of the track can be moved between a position coaxial with the axis of the path of the follower and a position at an angle thereto: in the first position the follower moves idly relatively to the track in the coaxial position so that it is not moved axially; in the other position the obliquity of the track axis causes the follower to be moved axially by an amount depending on the angle of obliquity, which in turn depends on the adjustment of the component. Thus the extent of axial movement is variable from zero to a maximum by adjusting the component through an angle of 180°.

As the follower is held either directly or through intermediate parts against axial movement with respect to the roller, it follows that the axial movement of the follower will be imparted to the roller.

The movement of the follower in the looped path is usually effected by connecting it either directly or more usually through a variable step-down gear to the roller so that rotation of the roller is transmitted to the follower; if required however a separate drive could be provided to move the follower.

While the follower could be arranged to cooperate directly with the track, it is preferable to effect such connection through a slipper or a sleeve which is supported for rotation by the track and which makes a radially sliding ball head connection with the follower.

The construction of this invention provides a simple arrangement for enabling the vibratory or reciprocatory

travel of the roller to be adjusted with ease and while the roller mechanism is in use.

Such distribution systems usually comprise two or more vibrator rollers; a device in accordance with this invention may be provided for each of such rollers and it will be clear that the various components can be separately angularly adjusted and arranged and set to give not only varying strokes to the individual rollers but also different times of reversal of the various rollers. In addition, as the drive to each of the followers may be effected through a variable-speed drive not only can the rate of reciprocation of each roller individually be varied, but also the rates of reciprocation of the various rollers relative to one another can be varied.

The invention is illustrated by the accompanying drawing shown as applied to one roller **1** of an ink distribution system the remaining rollers of which are not shown. The spindle **2** of the roller is rotatable and axially slidable in bearings, one shown at 2^b, in a fixed side frame of which only one part is indicated at 2^a; this spindle has secured to it a pinion **3** which, through intermediate gear wheels **4–8** mounted on spindles 4^a, 5^a, secured by nuts 4^b, 5^b to the frame 2^a, drives a pinion **9** loose for rotation on the spindle **2** but held against axial movement on the spindle by spacer sleeves 9^a and 9^b and ball bearing assemblies **19** held in place by an end plate **20**. This pinion **9** has a follower **10** which slidingly engages a spherical stud **11** on a sleeve **12**. The sleeves 9^a and 9^b, together with the bearing assemblies **19**, serve as a means for holding the pinion **9** and the follower **10** against axial movement with respect to the shaft **2** and roller **1**. This gearing forms a reduction gearing between the spindle **2** and the follower **10**, and this gearing can be selected to vary the ratio of rotation. The gear wheels **4**, **5**, **6**, **7** and **8** are located axially on the respectively associated shafts 4^a and 5^a by the races of anti-friction bearing assemblies **19** and spacer sleeves 9^c, held in place by end caps **20**.

The sleeve **12** is rotatable but not axially movable on a stub extension **13** of a component **14** which is mounted for angular adjustment in a fixed bearing bracket **15**, the stub extension **13** forming a circular runway or track for the sleeve **12**. As is clear from the drawing, the axis of adjustment of the component **14** is coplanar with the axis of rotation of the pinion **9** and hence of the closed looped path through which the follower **10** is moved and intersects that axis at an angle; the axis of the stub extension **13** is at an angle to the axis of adjustment of the component **14**; thus by turning that component **14**, the stub extension will be moved so that the axis of rotation of the circular track and hence of the sleeve **12** will be either coaxial with the axis of the path swept by the follower **10** as it moves with the pinion **9** (in which position the pinion **9** and hence the spindle **2** and roller **1** will rotate but will not be moved axially) or at an angle to that axis in which case the follower **10** and the pinion **9** and the roller **1** will be reciprocated by an amount which depends on the position to which the component **14** is turned.

To effect adjustment of the component **14**, an extension **16** of it is screwed into the bracket **15** and has its outer end formed to receive an adjusting tool, a lock nut **17** being fitted to enable the component to be locked in the desired setting.

As is shown, it is preferred to mount the sleeve **12** on ball or roller bearings **18**.

It will be clear that if a system comprises a number of such rollers **1** which are to be reciprocated, those rollers could each be equipped with the mechanism shown in the drawing: the components **14** could be adjusted independently of one another to give varying ex-

tents and timing of the reciprocation of the various rollers.

I claim:

1. For use in reciprocating a rotating roller, a device comprising a follower which is moved in a closed looped path, means holding the follower against axial movement with respect to the roller, a stationary component which is angularly adjustable about an axis co-planar with the axis of the looped path and at an angle to the latter axis, the component having a circular track the axis of which is at an angle to the axis of adjustment of the component, and means operable on said track and being operatively connected to said follower for varying the axial position of the follower as it moves in the closed path whereby the extent of axial movement of the follower can be regulated by angularly adjusting the component.

2. A device as claimed in claim 1 and wherein the means operable on the track comprises a member mounted to rotate on the track, the said member being held against axial movement in the axial direction of the track.

3. A device as claimed in claim 1 and wherein the follower is coupled to the roller to be reciprocated so that the rotation of the roller moves the follower in the closed looped path and axial movement of the follower is transmitted to the roller.

4. A device as claimed in claim 1 and wherein the follower is moved through the looped path through drive transmitted to it through a gear train selected to rotate the follower at a required rate relative to the rate of rotation of the roller.

5. A device as claimed in claim 3 and wherein the follower is carried by a rotatable member which is rotated through a reduction gear driven by the roller.

6. For use in reciprocating a roller as it rotates, a follower carried eccentrically by a continuously rotatable member, a stationary adjusting component which at one end is supported for angular adjustment about an axis in the same plane as but at an angle to the axis of rotation of the rotatable member, the adjusting component having at its other end a cylindrical track the axis of which is at an angle to the axis of angular adjustment, a shoe rotatable on that track and positioned against axial movement thereon, and a universal connection between the shoe and the follower, the whole arrangement causing the follower to be moved axially to an extent governed by the angular setting of the component, and the member carrying the follower being adapted to be connected to the roller so that axial movement of the follower is transmitted to the roller.

7. A mechanism as claimed in claim 6 and wherein the continuously rotatable member comprises a gear wheel forming part of a reduction gear assembly driven by the roller itself.

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