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(54) **Messenger roller drive apparatus**

(57) A messenger roller (1) is provided, in at least one bearing head (2) associated therewith, with an independent decelerating and accelerating transmission preferably comprising a planetary gear train whose web (5) is fixedly connected to the shaft stub (4) and whose planet gears (6) engage with a central gear (7) which is fixedly connected to a brake flange (8). The brake flange (8) is operatively connected to a controllable brake (9). The planetary gears (6) also mesh with the internal teeth of an internal gear (10) which is rotatably supported by means of at least one sprag clutch (11) in the bearing head (2) and is connected by means of a spring element (12) to the shaft stub (4). Thus, application of the brake when the messenger moves away from the faster-rotating of the two rollers it oscillates between results in the rotational momentum of the roller being absorbed by stressing of the spring, thus slowing the roller for contact with the slower-rotating of the two rollers. Upon moving of the messenger from this slower-rotating roller, the brake is released, thus accelerating the messenger.

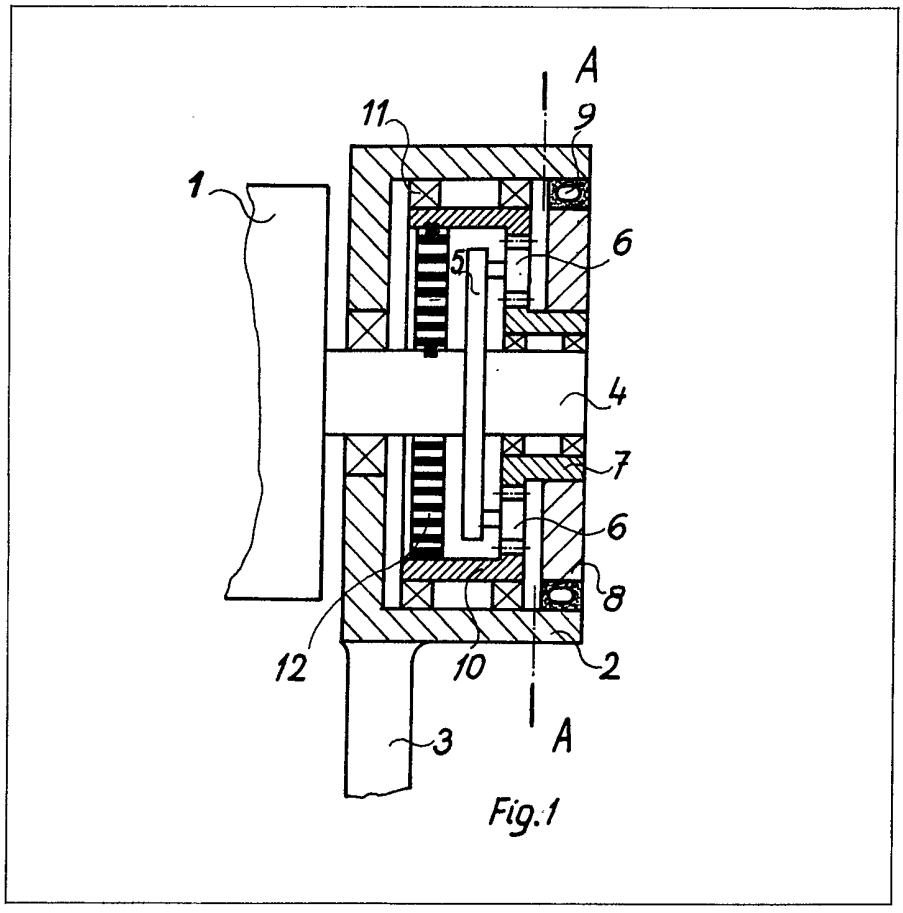

Fig.1

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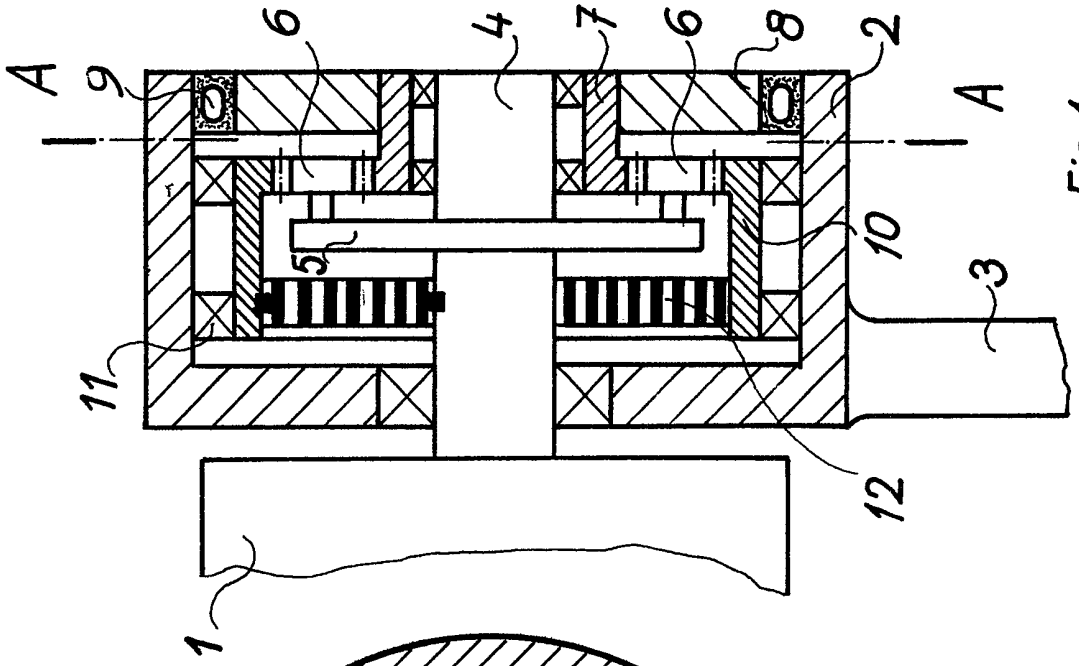

Fig.1

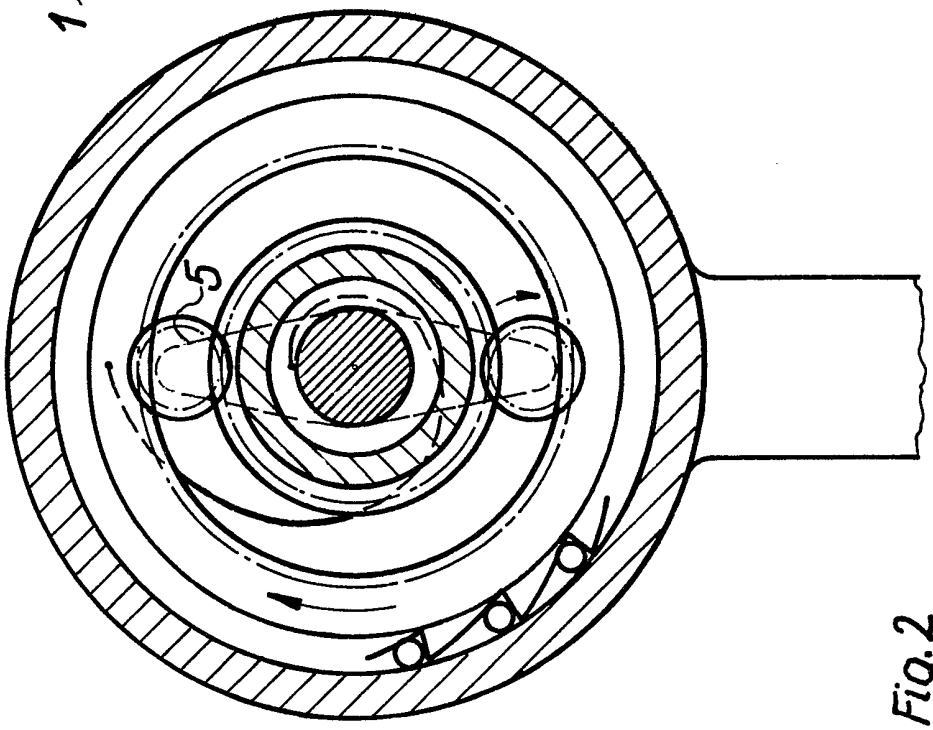

Fig.2

SPECIFICATION

Vibrator shaft drive apparatus

The invention relates to a drive apparatus for the timed deceleration and acceleration of the circumferential speed of a vibrator shaft in an inking or damping mechanism associated with a printing machine.

It is known that the purpose of a vibrator shaft in inking and damping mechanisms of printing machines is the timed transfer of liquid, obtained from a container by a doctor, which is driven at a relatively low circumferential speed, to the first cylinder which is associated with the inking or damping mechanism and rotates faster in accordance with the machine speed, and the desired transfer quantity is defined by regulating the number of reciprocating motions of the vibrator cylinder.

The vibrator cylinder itself is not usually driven. It is therefore entrained by friction, or alternately by the doctor or by the first inking mechanism roller.

Owing to the different circumferential speeds of the doctor and of the inking mechanism roller, the vibrator cylinder is constantly decelerated and again accelerated. This results in irregular guidance of the liquid, thus adversely affecting the printing program to a varying degree in accordance with the circumferential speed difference.

The circumferential speed difference resulting from conventional machine speeds reaches a magnitude which fails to ensure neat liquid transfer by vibrator cylinders which are entrained purely by friction.

The German Offenlegungsschrift 26 06 590 discloses a vibrator damping mechanism or vibrator inking mechanism in which the vibrator cylinder can be decelerated by a braking device from the high to the low rotational speed.

This arrangement, which is relatively complex, enables the vibrator cylinder to be decelerated from the high to the low circumferential speed; however, no acceleration aid is provided for readaptation to the high circumferential speed.

The vibrator shaft drive according to the German Offenlegungsschrift 26 10 126 in theory permits precise adaptation of the circumferential vibrator cylinder speed to the low circumferential speed of the doctor as well as to the high circumferential speed of the first damping or inking mechanism roller. However, the proposed solutions are very complex and are correspondingly costly.

Experience has shown that any slip which accompanies the contact between the vibrator cylinder and the doctor or the first damping or inking mechanism roller does not lead to recognizable disadvantages of the printed product, provided such slip is maintained within specific limits.

According to the invention, there is provided a drive apparatus for timed deceleration and acceleration of the cicumferential speed of a vibrator shaft for an inking or damping mechanism of a printing machine, comprising an independent deceleration and acceleration transmission associated with the vibrator shaft in conjunction with at least one bearing head associated therewith.

It is thus possible to provide a drive apparatus by means of which the circumferential speed of a vibrator cylinder can be decelerated and accelerated in a simple manner.

In a preferred apparatus the vibrator cylinder is associated with an independent decelerating and accelerating transmission disposed in at least one bearing head associated with said vibrator cylinder.

The invention will be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is an axial section through a decelerating and accelerating transmission; and

Figure 2 is a section along the line A-A of Figure 1.

Each side of a vibrator cylinder 1 is rotatably supported in a bearing head 2 of a pivoting lever 3. A web 5 of a planetary gear train, arranged to support planetary gears 6, is fixedly connected in known manner to a shaft stub 4. The planetary gears 6 mesh with a sun or central gear 7, which is fixedly connected to a brake flange 8. The central gear 7 and the brake flange 8 together are supported on the shaft stub 4 so as to be freely rotatable. The brake flange 8 is connected to the bearing head 2 by means of a commercial, controllable brake 9.

The planetary gears 6 also mesh with the internal teeth of an internal or annular gear 10 which is supported in the bearing head 2 by means of at least one sprag clutch 11 so as to be freely rotatable in one direction and is connected by means of a spring element 12, for example a spiral spring, to the shaft stub 4.

Method of operation:

When the vibrator cylinder 1 bears on the first inking mechanism or damping mechanism roller, the brake 9 is released so that the entire planetary gear train rotates in synchronism with the vibrator cylinder 1.

When the vibrator cylinder 1 pivots on to the doctor, commencement of the oscillating motion causes the brake 9 to be engaged by means of a known control element (not shown) and the central gear 7 is thus stopped. Since the vibrator cylinder 1 together with the web 5 continues to rotate, owing to its mass inertia, the angular velocity imparted to the internal gear 10 by the planetary gears 6 will be greater than that of the shaft stub 4 so that the spring element 12 is stressed and the vibrator cylinder 1 is therefore decelerated. The spring element 12 continues to be stressed even during the short period in which the vibrator cylinder 1 bears on the doctor.

When the vibrator cylinder 1 is pivoted away from the doctor the known control system immediately releases the brake 9 so that the energy stored by the spring elements 12 causes the rotating motion of the vibrator cylinder 1 to be accelerated. The sprag clutch 11 prevents the spring element 12 being relaxed *via* the internal gear 10.

CLAIMS

1. A drive apparatus for timed deceleration and acceleration of the circumferential speed of a vibra-

tor shaft for an inking or damping mechanism of a printing machine, comprising an independent deceleration and acceleration transmission associated with the vibrator shaft in conjunction with at least one bearing head associated therewith.

2. A drive apparatus as claimed in claim 1, in which the deceleration and acceleration transmission comprises a planetary gear train, the planetary gears of which are rotatably supported by a web fixedly connected to a shaft stub of the vibrator shaft and engage with a central gear, which is fixedly connected to a brake flange supported on the shaft stub so as to be freely rotatable and connected to the bearing head by means of a controllable brake, the planetary gears also engaging with the internal teeth of an internal gear which is rotatably supported by means of at least one sprag clutch in the bearing head and is connected by means of a spring element to the shaft stub.

3. A drive apparatus substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

4. An inking or damping mechanism including a drive apparatus as claimed in any one of the preceding claims.

5. A printing machine including an inking or damping apparatus as claimed in claim 4.

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