Oct. 17, 1950 A. J. DAVIES 2,526,542

MACHINE FOR CLEANING PRINTING PRESS ROLLERS AND ANALOGOUS ARTICLES

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Fig. 3

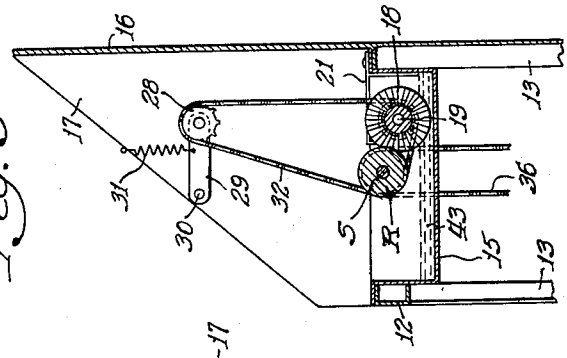
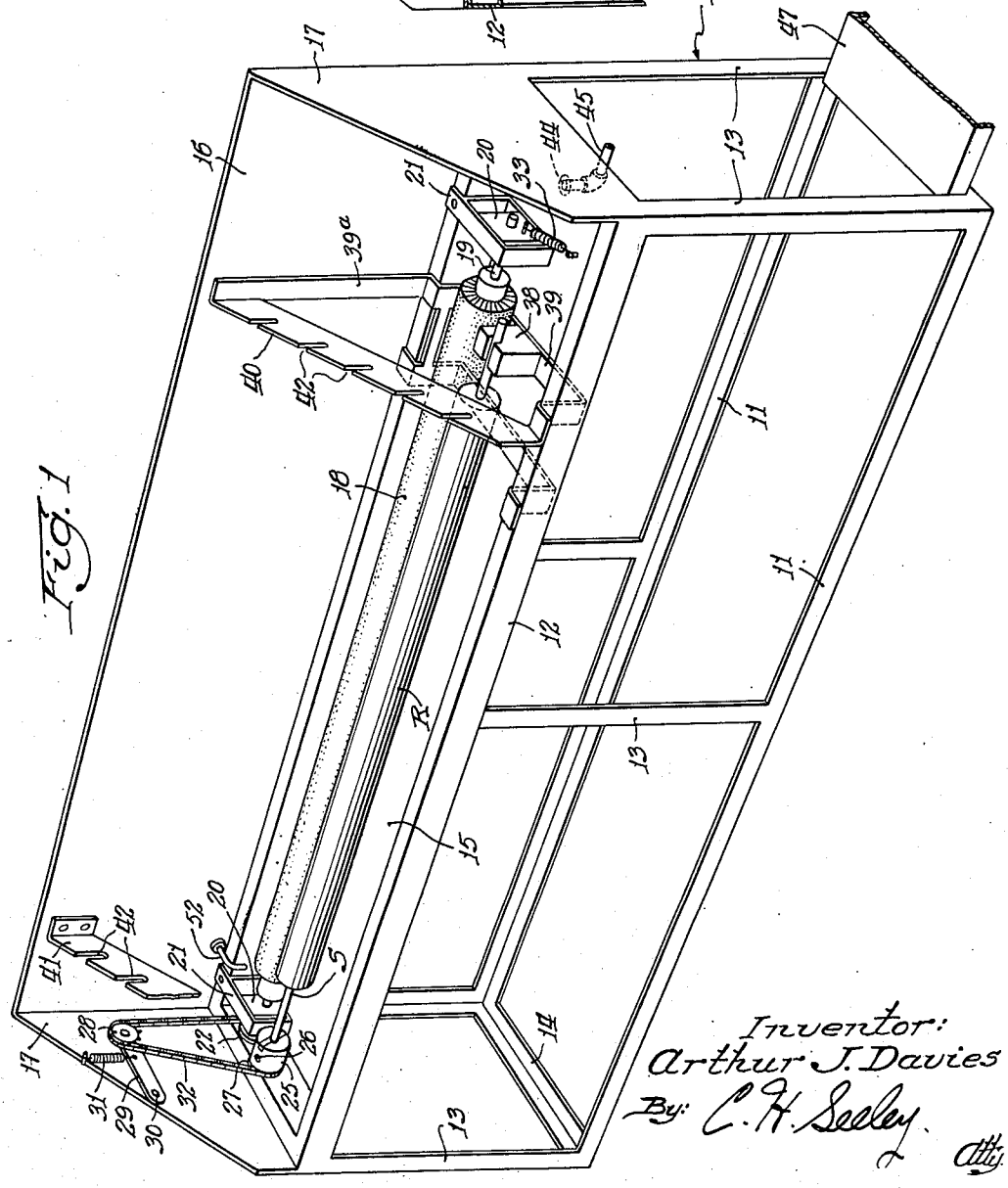


Fig. 1



Inventor:
Arthur J. Davies
By: C. H. Seeley
Atty

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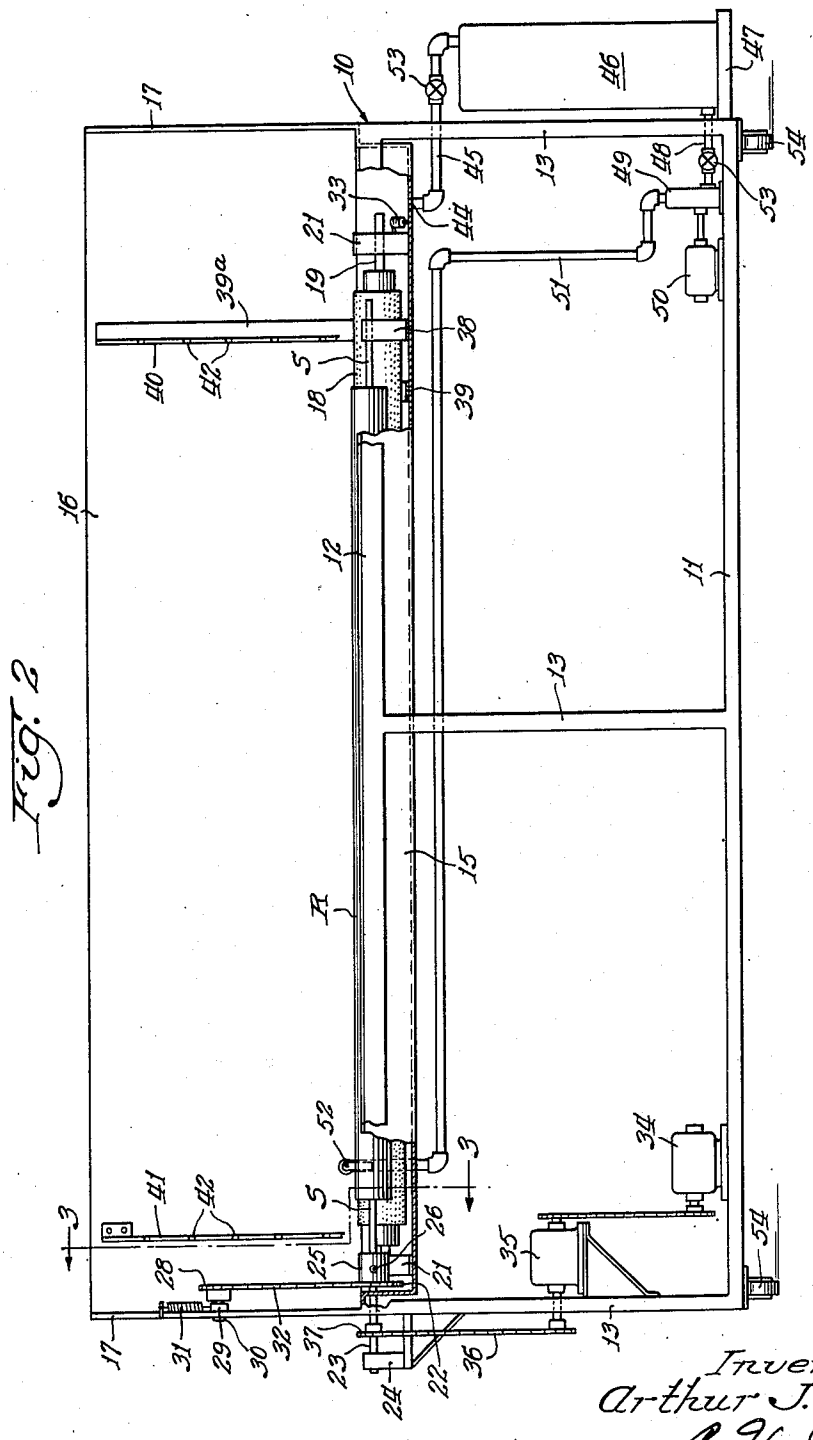


Fig. 2

Inventor:
Arthur J. Davies
By: C. H. Seeley.
Atty.

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2,526,542

MACHINE FOR CLEANING PRINTING PRESS ROLLERS AND ANALOGOUS ARTICLES

Arthur J. Davies, Cleveland, Ohio, assignor to Container Corporation of America, Chicago, Ill., a corporation of Delaware

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7 Claims. (Cl. 15—88)

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This invention relates to apparatus for cleaning or washing objects, particularly cylindrical objects such as printing rollers or the like.

It has been customary to clean printing rollers by hand, utilizing a suitable cleaning material, such as a suitable solvent, to remove the accumulated ink. Such manual cleaning requires considerable time and effort, and it has long been recognized that it would be desirable to dispense with the manual operations and thereby save the time and labor entailed thereby. The machine of this invention accomplishes mechanical cleaning of rollers and similar objects. Briefly, the apparatus comprises a cylindrical brush rotatable in a tank containing a cleaning liquid and contacting a roller or the like for cleaning the same by a scrubbing action while applying the cleaning liquid. Means are provided for positively driving the roller and brush at different speeds so as to obtain a relative surface travel of one about the other, and for urging the brush into contact with the roller regardless of the diameter of the latter. The support for one end of the roller is adjustable so as to accommodate rollers of different lengths. Means are preferably provided for circulating the cleaning liquid and filtering or otherwise purifying the same for re-use. The machine performs the cleaning operation on a number of rollers in a matter of minutes, in contrast to the hours formerly required for the same task.

It is an object of this invention to provide apparatus for cleaning printing rollers and the like which is rapid, efficient, and economical to construct and operate. It is another object to provide roller cleaning apparatus which is sturdy, and yet relatively light in weight, and readily movable from place to place. It is a further object to provide roller cleaning apparatus in which a brush rotates in contact with a roller to be cleaned at a speed different from the rotational speed of the roller. It is still another object to provide a roller cleaning machine including a rotatable brush mounted on slidable bearings and biasing means to urge the brush into contact with a roller. An additional object is the provision of roller cleaning apparatus including bearing means for a roller adjustable to accommodate rollers of varying lengths.

Other and further objects and advantages of the present invention will be apparent to those skilled in the art from the following description and the appended drawings, in which:

Figure 1 is a perspective view of one apparatus embodying the invention, certain parts being omitted or broken away for greater clearness;

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Figure 2 is a front elevational view of the apparatus, certain of the parts omitted in Figure 1 being fully illustrated;

Figure 3 is a fragmentary vertical sectional view taken substantially along the lines 3—3 of Figure 2.

The invention is primarily intended for application to the cleaning of rolls, such as printing rollers, but it will be clear that it may be utilized in the cleaning of other articles, of cylindrical or other shape.

The embodiment of the machine illustrated in the drawing comprises a frame 10 which may be formed of metal angle members. The frame may have lower and upper pairs of horizontal longitudinal frame members 11 and 12 connected by uprights 13. Suitable transverse horizontal members 14 are provided to rigidify the frame. A pan or tank 15 for cleaning liquid is supported by the upper frame members 12 and 14, and a wall or splash shield 16 extends upwardly from the rear edge of the frame and tank. End walls 17 are provided at the ends of the frame, preferably with the upper edges sloping downwardly from the top of the wall 16 to the front edge of the frame.

A brush 18 of a length sufficient to extend the full length of a roller R having a shaft S, or other article to be cleaned thereby, is disposed in the tank 15. The ends of the shaft 19 of the brush are journaled in suitable bearing blocks 20, which are arranged for sliding movement transversely of the tank, as by being disposed in suitable bearing brackets 21 extending from the rear wall of the tank. It will be clear that this mounting of the brush 18 permits sliding movement thereof transversely of the tank. Secured to one end of the shaft 19 is a sprocket wheel 22.

A shaft 23 extends through the end wall of the tank 15 adjacent the sprocket wheel 22, and is journaled in the end wall and in a suitable support 24 mounted on the end of the frame 10. On the portion of the shaft 23 projecting into the tank, suitable means are provided for holding one end of the roller shaft S or the like and rotating the roller R. This means is illustrated as a conventional chuck 25 with a conventional key-receiving aperture 26. Any other suitable means might be employed for this purpose.

A sprocket wheel 27 is fixed on the shaft 23 substantially in the plane of the sprocket wheel 22. The sprocket wheel 27 is illustrated as having a diameter greater than that of the wheel 22, although the relative sizes of these

sprocket wheels might be reversed. An idler sprocket wheel 29 is disposed in the plane of the sprocket wheels 22 and 27, being carried on an arm or lever 29 pivoted as at 30 to the end wall 17. A spring 31 has one end secured to the lever 29 and the other to the end wall 17 to urge the sprocket wheel 28 away from the wheels 22 and 27. A sprocket chain 32 is trained over the three sprocket wheels. The spring 31, as will be evident, tends to urge the sprocket wheel 22 in the direction of the sprocket wheel 27 by reason of its take-up effect on the sprocket chain 32. This causes a biasing of the brush 18 toward the roller disposed in the machine for cleaning, movement of the brush horizontally in a direction transverse of the tank 15 being permitted by the sliding bearing block arrangement. A spring 33 may be provided for the bearing 20 at the end of the brush remote from the sprocket wheel 22 to equalize the pressure of the brush on the roller throughout its length. The spring 33 is illustrated as having one end secured to the bearing block 20 and the other to the bottom of the tank forwardly of the bearing, but it will be evident that other biasing means may be provided or the arrangement otherwise varied.

An electric motor 34 is provided to drive the chuck 25 and sprocket wheel 27 through any suitable speed reduction mechanism 35, drive chain 36, and sprocket wheel 37 fixed on the shaft 23 between the end wall 17 and the support 24. A suitable switch (not shown) may be provided to control operation of the motor from any suitable source of electricity (not shown). It will be clear that when the motor is energized, the shaft 23 is rotated and with it the chuck 25 and sprocket wheel 27, the sprocket wheel driving the sprocket wheels 22 and 28 by means of the chain 32. The roller R connected to the chuck 25 is thus rotated in the same direction as the brush 18, but at a lesser or greater speed than the brush, as the sprocket wheel 27 is larger or smaller than the wheel 22. The arrangement preferably is such that the brush rotates at a speed of approximately 90 R. P. M. As already pointed out, the difference in size between the sprocket wheels 22 and 27 causes a speed differential in the rotation of the brush and the roller R rotated by means of the chuck 25. As illustrated, the brush rotates faster than the roller and there is thus a relative travel of the brush about the roller surface. That is, speaking relatively, the brush revolves about the roller while rotating. Since both the brush and the roller rotate in the same direction, the contacting portions thereof move in opposition to each other and the ink, dirt, or other foreign matter removed from the roller is brushed away from the roller portion which has just passed from brushing contact, thus adding speed to the cleaning process by avoiding re-soiling of the roller. If desired, the brush speed may be slower than that of the roller to give a relative travel of the roller about the surface of the brush. The relative travel of the brush and roller provides a scrubbing action, as distinguished from a simple brushing. If the diameter of the roller or other article is such that its peripheral speed is the same or substantially the same as that of the brush, resulting in absence of any relative surface travel of one about the other, the ratio of the sprocket wheels 22 and 27 may be altered.

It has already been pointed out that the brush is urged into contact with the roller, regardless of the radial dimensions of the roller, by means of the springs 31 and 33, or equivalent biasing means. This assures a good cleaning contact of the brush against the roller and intensifies the scrubbing action.

A suitable support or bearing block 38 is provided for the end of the shaft S of the roller R remote from that secured to the chuck 25. Preferably this bearing block 38 is arranged to be movable longitudinally of the tank 15 so that it may be moved toward or away from the chuck 25 for the accommodation of rollers of varying lengths. As illustrated in Figure 1, the bearing block 38 may be fixed on a bracket 39 having a sliding fit in the tank 15. A bar 40 may be secured between the upper end of a verticle extension 39a of the bracket disposed adjacent the wall 16 and the end of the bracket overlying the forward edge of the tank. A similar bar 41 is fixed adjacent the other end of the tank and wall 16, in parallelism with the bar 40. The bars 40 and 41 are provided with suitable notches 42 for the reception of the spindles of rollers or other articles which have been cleaned and which may be supported by the bars for drying. The bars 40 and 41 thus provide a drying rack, although it will be clear that if desired they might be conveniently utilized to support rollers prior to cleaning thereof. The bar 40, being secured to the slideable bracket 39, may be moved toward or away from the bar 41 to vary the distance there-between as may be required by the length of the rollers or other articles to be supported.

A cleaning liquid, such as a suitable solvent 43, is employed for cleaning the rollers, the solvent being maintained at a suitable height in the tank 15 for partial immersion of the brush 18 therein, and application thereof by the brush to the roller. At one end of the tank is an outlet aperture 44 to which is connected a conduit 45 leading to the inlet end of a conventional oil filter or other purifier 46 which may be supported on a platform 47 extending from one end of the frame 10 adjacent the bottom thereof. An outlet conduit 48 leads from the purifier to a pump 49 driven by a suitable electric motor 50, and a conduit 51 leads from the pump to a suitable nozzle or spout 52 extending through the wall 16 adjacent the end of the tank 15 remote from the drain aperture 44. The solvent 43, or other cleaning liquid, is circulated by means of the pump and conduits through the tank 15 and purifier 46 during operation of the machine. A suitable switch (not shown) controls the operation of the pump motor 50, and thereby the circulation of the cleaning liquid. Preferably the liquid is circulated for a short period after the cleaning operation has been completed so as to withdraw all of the dirt-loaded liquid from the tank and leave only clean liquid therein. Suitable valves 53 are provided to control the flow of liquid through the purifier and the associated conduits. It will be evident that clean solvent 43 is constantly supplied to the tank 15 during the cleaning operation and the dirt-laden liquid constantly withdrawn therefrom, so that the efficiency of the machine is not diminished by use of ineffective or partially ineffective cleaning liquid. The solvent 43 or other cleaning liquid may be supplied to the brush otherwise than by means of the tank. For example, it might be flowed directly onto the brush. Instead of a liquid, a solid cleaning material, such as a powder, might be employed, although such material

does not lend itself to circulation, purification, and re-use.

The motor 34, speed reduction mechanism 39, pump 49, and motor 50 are suitably mounted on the frame 10, as by brackets or the like. The purifier 46, if desired, may be mounted beneath the tank. The machine may be adapted to rest directly on the floor, as shown in Figure 1, and if desired may be secured thereto by bolts or other suitable means. Preferably, however, the machine is mounted on casters 54 or similar devices so that it may be easily wheeled from place to place. The machine may thus be positioned near a printing press or the like so that the printing rollers of the press need be carried only a short distance for cleaning. An electric extension cord may be employed in connection with the machine which may be plugged into any convenient electric outlet and thus provide for operation of the motors.

It will be obvious that various changes and modifications in the structure illustrated and described may be made without departing from the spirit and principles of the invention. For example, instead of the sprocket wheels and sprocket chains, pulleys and driving belts might be employed. Similarly, the particular springs 31 and 33 might be replaced by other means performing the same function of biasing the brush 18 transversely of the tank. Other possible changes and modifications have been pointed out in the foregoing descriptions, and others will readily suggest themselves.

In view of the variations and modifications which may be made, some of which have been pointed out above, it is not intended to limit the invention to the specific embodiment illustrated and described, but only as required by the spirit and scope of the appended claims.

I claim as my invention:

1. In a machine of the character described, a substantially cylindrical brush mounted for rotation about its axis and for movement transversely of its axis, means for mounting a roller to be cleaned in juxtaposed parallel relation to said brush and for rotation about its axis, and means effective for simultaneously rotating said brush and the roller at different peripheral speeds and yieldingly urging said brush toward the roller and holding it in contact therewith.

2. In a machine of the character described, a substantially cylindrical brush mounted for rotation about its axis and for movement transversely of its axis, means for mounting a roller to be cleaned in juxtaposed parallel relation to said brush and for rotation about its axis, means adjacent one end of said brush effective for simultaneously rotating it and the roller at different peripheral speeds and yieldingly urging said brush toward the roller and holding it in contact therewith, and supplementary means adjacent the other end of said brush yieldingly urging the latter toward the roller.

3. In a machine of the character described, a substantially cylindrical brush mounted for rotation about its axis, means for mounting a roller to be cleaned in juxtaposed parallel relation to said brush and for rotation about its axis, means mounting said brush for movement toward and away from the roller, said brush being freely movable toward the roller, and means effective for simultaneously rotating said brush and the roller at different peripheral speeds and yieldingly urging said brush toward the roller and holding it in contact therewith.

4. In a machine of the character described, an open top tank substantially oblong in plan, bearing blocks spaced apart lengthwise of said tank slidably mounted for movement transversely thereof, a substantially cylindrical brush overlying said tank mounted in said blocks with its axis disposed substantially horizontally, said brush being rotatable about its axis and movable with said block transversely of its axis, means for mounting a roller to be cleaned in juxtaposed parallel relation to said brush and for rotation about its axis, and means effective for simultaneously rotating said brush and the roller at different peripheral speeds and yieldingly urging said brush and blocks toward the roller and holding said brush in contact with the roller.

5. In a machine of the character described, an open top tank substantially oblong in plan, bearing blocks spaced apart lengthwise of said tank slidably mounted for movement transversely thereof, a substantially cylindrical brush overlying said tank mounted in said blocks with its axis disposed substantially horizontally, said brush being rotatable about its axis and movable with said blocks transversely of its axis, means for mounting a roller to be cleaned in juxtaposed parallel relation to said brush and for rotation about its axis, said blocks being freely movable toward the roller, and means effective for simultaneously rotating said brush and the roller at different peripheral speeds and yieldingly urging said brush and blocks toward the roller and holding said brush in contact with the roller.

6. In a machine of the character described, an open top tank substantially oblong in plan, bearing blocks spaced apart lengthwise of said tank slidably mounted for movement transversely thereof, a substantially cylindrical brush overlying said tank mounted in said blocks with its axis disposed substantially horizontally, said brush being rotatable about its axis and movable with said blocks transversely of its axis, means for mounting a roller to be cleaned in juxtaposed parallel relation to said brush and for rotation about its axis, said roller mounting means comprising a first driven member rotatably mounted adjacent one end of said tank and adapted for driving connection to the roller, a second driven member secured to said brush adjacent said one end of said tank, an idler driven member rotatably mounted adjacent said one end of said tank above said first and second driven members and yieldingly urged upward, a flexible member passing about all of said driven members establishing driving connection between said first and second driven members, said idler driven member in cooperation with said flexible member yieldingly urging said brush toward the roller, said brush bearing blocks being freely movable toward the roller, the ratio of said first and second driven members being such that the roller and the brush are driven at different peripheral speeds, and means for driving said first driven member.

7. In a machine of the character described, an open top tank substantially oblong in plan, bearing blocks spaced apart lengthwise of said tank slidably mounted for movement transversely thereof, a substantially cylindrical brush overlying said tank mounted in said blocks with its axis disposed substantially horizontally, said brush being rotatable about its axis and movable with said blocks transversely of its axis, means for mounting a roller to be cleaned in juxta-

posed parallel relation to said brush and for rotation about its axis, said roller mounting means comprising a chuck rotatably mounted adjacent one end of said tank adapted for driving connection to the roller, a first sprocket fixed to said chuck, a second sprocket secured to said brush adjacent said one end of said tank, a third idler sprocket rotatably mounted adjacent said one end of said tank above said first and second sprockets, a sprocket chain passing about said sprockets, means yieldingly urging said idler sprocket upward effective in cooperation with said chain for yieldingly urging said brush toward the roller, said brush bearing blocks being freely movable toward the roller, the ratio of said first and second sprockets being such that said brush and the roller are driven at different peripheral speeds, and means for driving said first sprocket.

ARTHUR J. DAVIES.

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