Aug. 6, 1929. H. B. SCOTT 1,723,256

CLEANING MACHINE

Filed Aug. 28, 1922 4 Sheets-Sheet 1

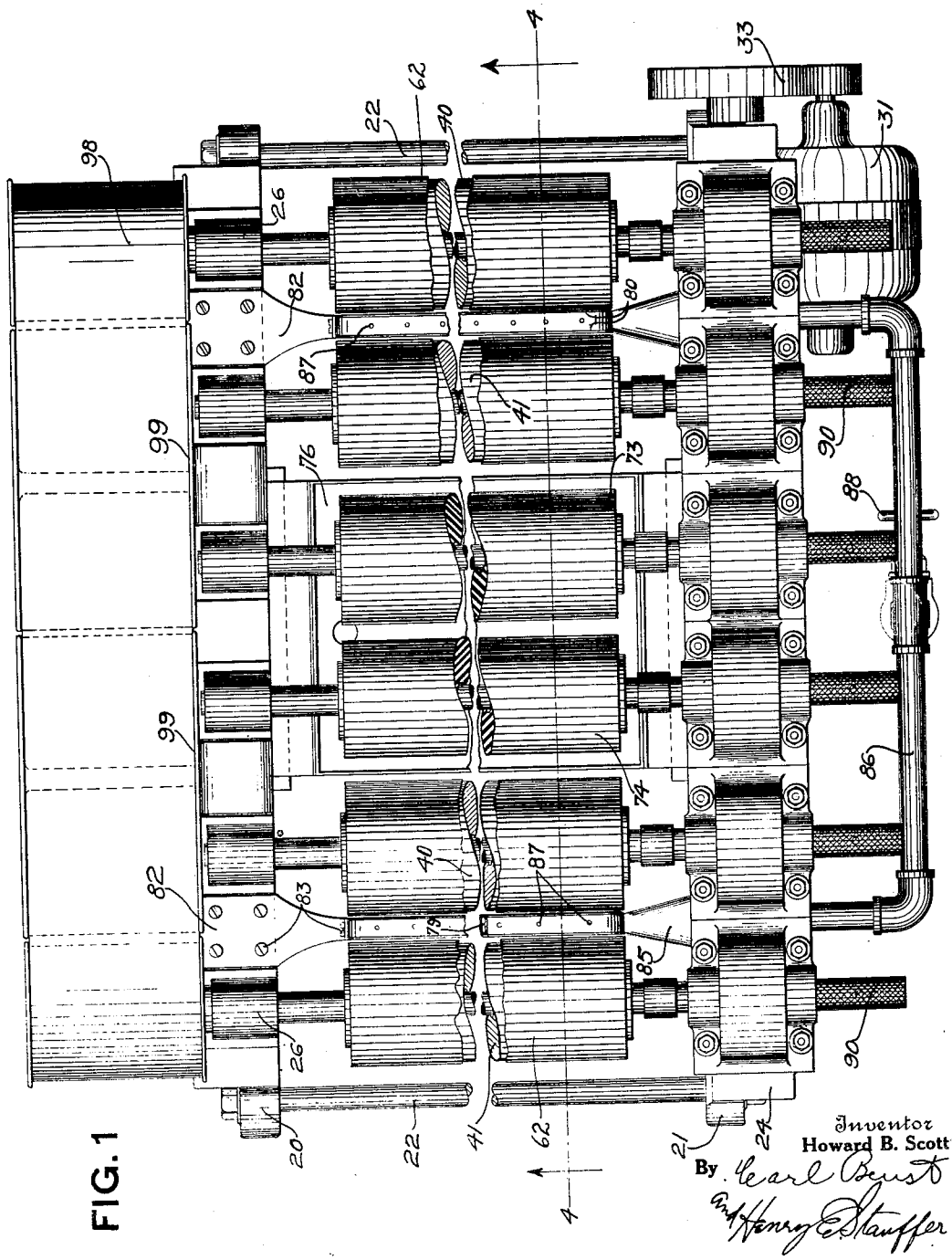


FIG. 1

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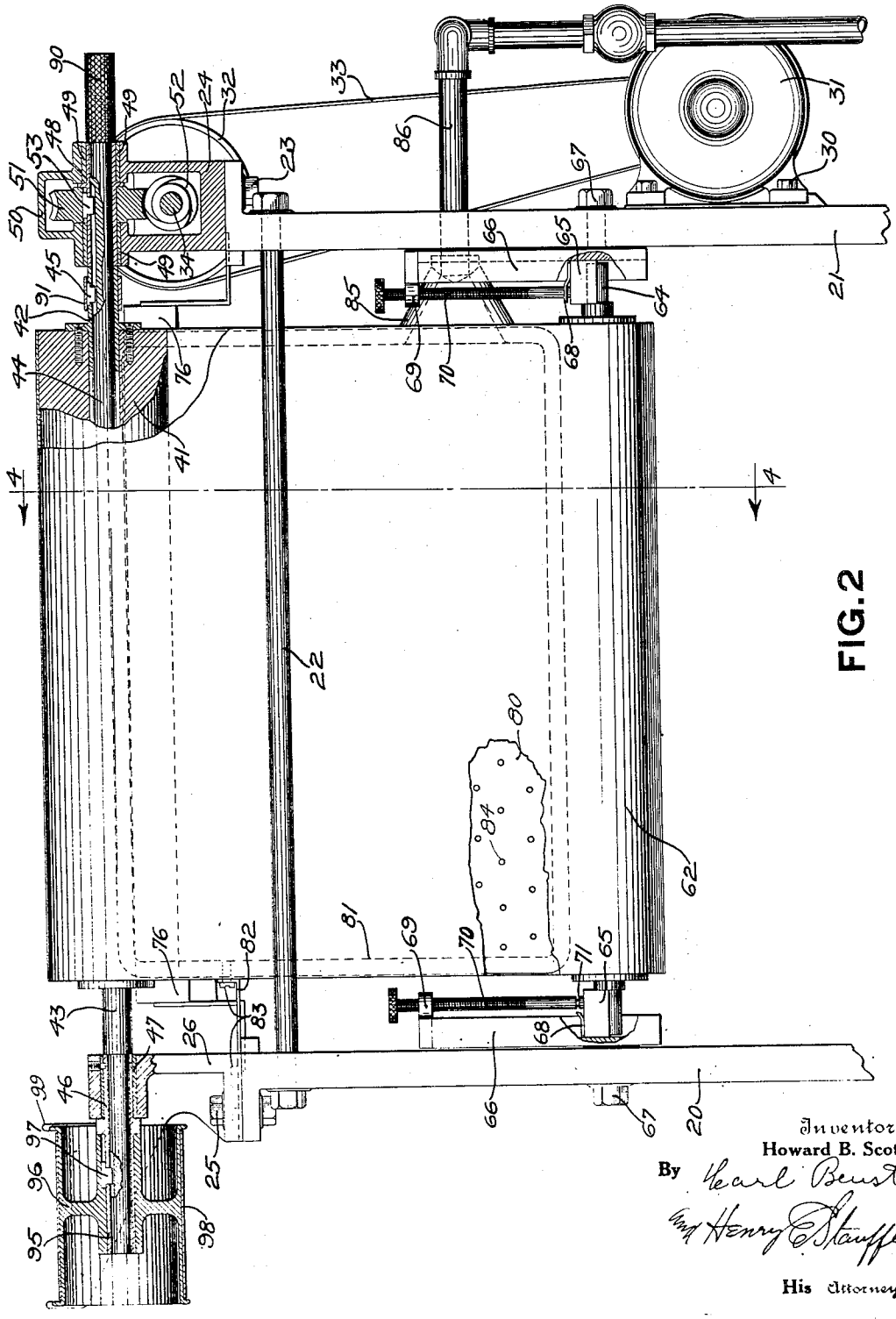


FIG. 2

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CLEANING MACHINE

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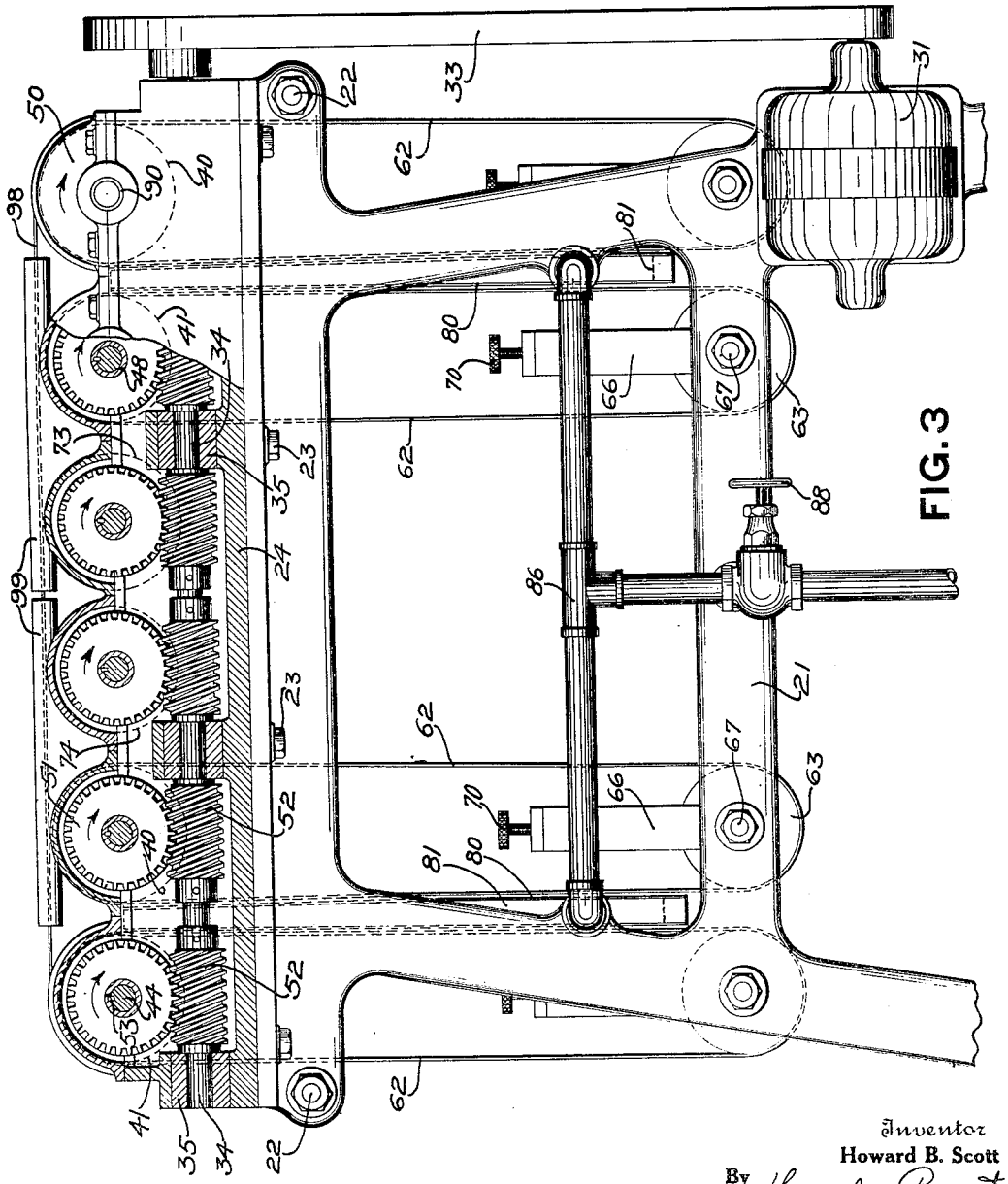


FIG. 3

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CLEANING MACHINE

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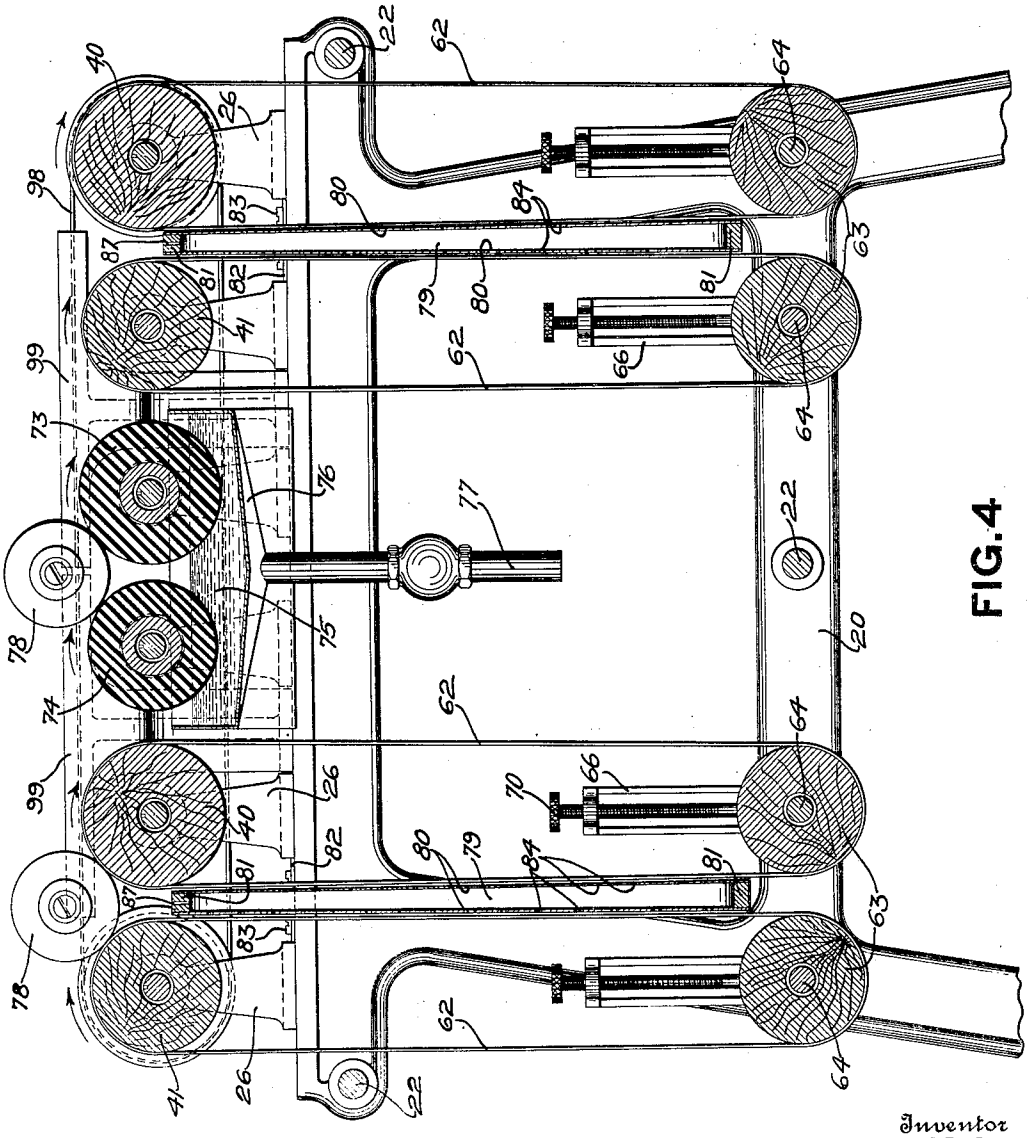


FIG. 4

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Patented Aug. 6, 1929. 1,723,256

UNITED STATES PATENT OFFICE.

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CLEANING MACHINE.

Application filed August 28, 1922. Serial No. 584,741.

This invention relates to cleaning and drying machines and is particularly adapted to clean the surface of a cylindrical transfer roller used in the transfer of wood grains onto metal.

The machine is not limited to cleaning this particular kind of transfer roller, as rollers for transferring other designs and images, which use various kinds of transfer material, can be cleaned and dried by the machine shown in this application. In fact, any kind of a cylindrical roller can be cleaned and dried by this machine.

One of the objects of this invention is to build a machine which will wash, and thoroughly dry the transfer roller after being washed, so that it is again ready to take up pigment.

Another object is to arrange to partially submerge the cleaning rollers in a fluid cleansing bath so that during their operation their entire circumferences will pass through the fluid.

Another object of this invention is to drive the cleansing rollers at different peripheral speeds so as to produce a scouring effect upon the transfer roller which is being cleaned.

Another object is to provide means for driving the rollers, over which the drying belts run, at different peripheral speeds, which causes one belt to travel faster than the other and thus produces a rubbing effect on the transfer roller which greatly hastens the drying thereof.

Another object of this invention is to provide means for keeping the drying belts dry.

Another object of this invention is to provide adjustable belt roller bearings so as to easily accommodate the varying lengths of belts and afford a take-up for loose or slack belts.

With these and incidental objects in view, the invention consists in certain novel features of construction and combinations of parts, the essential elements of which are set forth in appended claims and a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompany and form part of this specification.

Of said drawings:

Fig. 1 is a plan view of the machine partly broken away.

Fig. 2 is a view in end elevation, with parts shown in section, to more clearly illustrate the manner of mounting the rollers.

Fig. 3 is a view in side elevation having parts broken away to show the drive for the cleaning and drying rollers.

Fig. 4 is a sectional view on line 4—4 of Figs. 1 and 2, looking in the direction of the arrows.

In general.

Described in general terms this machine comprises a pair of cleaning rollers; two pairs of rollers over which four drying belts run; and another pair of rollers over which a small drying belt passes.

Prior to the use of this cleaning and drying machine the transfer rollers were cleaned and dried by hand and this was a slow and laborious process. All that is now necessary is to lay the transfer roller upon the pair of cleaning rollers and then after it is washed place it over one pair of rollers over which the drying belts pass.

The machine will now be described in detail.

The framework of this machine comprises a left side frame 20 (Figs. 1, 2 and 4) and a right side frame 21 (Figs. 1, 2 and 3). These frames are held in parallel relation to each other by means of three shouldered tie-rods 22. Secured to and extending along the flanged upper edge of the side frame 21 by means of four bolts 23, is a housing 24 (Figs. 2 and 3). Secured to the upper flanged edge of the side frame 20 by means of bolts 25, are six brackets 26.

Secured to the side frame 21 by means of bolts 30, is an electric motor 31. Running from a pulley on the armature shaft of said motor to a larger pulley 32 (Fig. 2) is a drive belt 33. The pulley 32 is fast on a drive shaft 34 mounted to rotate in bearings 35 (Fig. 3) in the housing 24. By means of the belt 33 the shaft 34 is rotated clockwise (Fig. 2).

Cleaning and drying mechanism.—The cleaning and drying rollers and the mechanism for driving them will now be described.

There are two pairs of drying rollers. Each pair consists of a large roller 40 made of wood or other suitable material and a smaller roller 41 made of the same material. By making the two rollers different diameters, and driving them at the same number of revolutions per minute, different peripheral speeds are obtained, which has a rub-

bing effect on the cylinder under treatment, and by driving the small roller towards the larger roller, there is no tendency to wedge the article being dried between the drying rollers.

As these four rollers are all mounted in identically the same manner, the description of the mounting of one will suffice. In Fig. 2, the mounting for the front roller 41 is shown and this one will be used as an example.

Secured in the right end of the hollow roller 41 and projecting outwardly therefrom, (Fig. 2) is a flanged hub 42, and secured in the left end of the roller 41 is a similar flanged hub 43. These hubs each have a bearing on a removable shaft 44 extending through the roller 41, and each is mounted to rotate with the shaft by means of a key 45 which engages a key-way extending throughout the length of the shaft, and a key-way in the hub 42.

The left end of shaft 44 is mounted in a sleeve 46, which in turn is mounted in the bearing 47 in the front bracket 26. The right end of the shaft 44 is mounted in a sleeve 48, which in turn is mounted in bearings 49 in the housing 24. Mounted on the sleeve 48 is a worm gear 51 driven by a worm gear 52 fast on the drive shaft 34. The gear 51 in turn drives the shaft 44 by means of a key 53.

When the shaft 34 is rotated clockwise (Fig. 2), through the worm gears 52 and 51, the shaft 44 and the roller 41 are rotated in clockwise direction (Figs. 3 and 4).

The rollers 40 are mounted in identically the same manner. Therefore, no detailed description of their mounting is necessary, it being sufficient to state that there is a gear 51 on each of the shafts 44 which meshes with a gear 52 fast on the drive shaft 34.

Over each of the upper drying rollers 40 and 41 runs a belt 62 (Figs. 3 and 4). The lower bights of these belts also run over rollers 63, made of wood or other suitable material, each of which is mounted to rotate on a floating shaft 64. The floating shafts 64 run in half bearings 65 (Fig. 2) which are slidably mounted in vertically extending brackets 66 secured to the inner faces of the side frames 20 and 21 by bolts 67. Each bearing 65 carries a forked guide 68, and each bracket has a projection 69. Screwed into each projection 69 is a screw 70 which has an annular groove 71 (Fig. 2) adapted to fit in the forked guides 68 of the bearings 65 and each bottom of the screw rests against the upper side of the half bearing 65. By this means the bearings 65 may be adjusted up or down to allow for the variations in the lengths of the belts.

The cleaning rollers will now be described. There are two cleaning rollers 73 and 74, (Fig. 4) preferably made of some suitable plastic material. The roller 73 is larger in diameter than the roller 74 and therefore, a different peripheral speed is given each roller when rotated at the same number of revolutions per minute, thus giving a scouring action to the article being cleaned. Each of these rollers is mounted on a shaft 44 in identically the same manner as the rollers 41, and these rollers are driven in the same direction and by identically the same means as are the rollers 40 and 41 previously described.

These rollers 73 and 74 are partially submerged in benzine or other suitable fluid cleaning material 75 (Fig. 4) which is contained in a tank 76. This tank has a drain 77 by means of which the fluid may be drained off as often as is necessary.

From the above description it can be clearly seen that when the drive shaft 34 is rotated clockwise (Fig. 2), that through the six worm gears 51, all of the rollers 40, 41, 73 and 74 will be rotated clockwise (Figs. 3 and 4) and at the same number of revolutions per minute.

In Fig. 4 are shown two of the transfer rollers, which are numbered 78. One of these rollers is shown lying on the cleaning rollers 73 and 74 in a position to be cleaned, and the other one is shown lying on the drying belts around the drying rollers 40 and 41 in position to be dried.

The clockwise movement of the cleaning rollers 73 and 74 causes a counter-clockwise movement of the transfer roller 78. Since the roller 73 is larger in diameter than the roller 74 it will have a greater peripheral speed than the roller 74. This produces a scouring action upon the surface of the transfer roller 78 which cleans off any of the transfer substance which might stick to the surface thereof. As these rollers are rotated in the fluid bath, their peripheries are kept wet so that as the roller 78 is scoured the fluid washes it perfectly clean.

After the roller 78 has been cleaned, it is lifted from the rollers 73 and 74 and laid upon the drying belts over one of the pairs of rollers 40 and 41. The roller 40 is larger than the roller 41, and consequently the periphery of this roller travels at a greater speed than does the periphery of roller 41. This drives the belt 62 over the roller 40 faster than the belt over the roller 41, which produces a rubbing effect against the surface of the transfer roller 78. This thoroughly dries the transfer roller so that it is again in proper condition to be rolled over the grain or whatever design is being used to receive the transfer substance preparatory to transferring it onto metal or other material.

It is preferable to run the rollers 73 and 74 in the direction shown, that is, with the smaller one, 74, running toward the larger one, 73, at the top. This gives the desired

scouring action and in case a small transfer roller is being washed it never becomes wedged between the two rollers because the greater peripheral speed of roller 73 tends to draw the transfer roller away from the roller 74. This action also prevents any "chatter" or bouncing of a larger transfer roller when it is being cleaned.

For the reasons given above, the upper rollers for the drying belts 62 are arranged and driven in the direction shown in Fig. 4.

The belts 62 are made of cloth or other fluid absorbing material. Consequently, it is necessary to keep them dry so that they will dry the transfer roller when it is placed upon them. The means for drying the belts 62 will now be described.

Between the two left hand belts is a pocket or compartment 79 formed by two side plates 80 secured to the opposite sides of a rectangular frame 81 (Fig. 4). An L-shaped bracket 82 (Figs. 1 and 2) is fastened to the frame 81 and to the side frame 20 by means of screws 83 (Figs. 1 and 2). The side plates 80 are provided with a number of holes or ports 84 (Fig. 4). A funnel 85 (Fig. 1) connects an air pipe 86 with the distributor. Air is forced through pipe 86 under pressure and the funnel 85 into the distributor. This air escapes through the openings 84 against the belts 62, and as the belts are running, the air will dry them so that they can function properly on the transfer roller 78.

The frame 81 also has openings or ports 87 (Figs. 1 and 4) in its top portion to allow the air to escape upward directly against the work roller 78 when said roller is on the drying belts. This air helps to dry the work roller. The air in the pipe 86 is controlled by a valve 88 (Fig. 3).

Instead of forcing air into the compartment 79, a vacuum might be created therein which would draw the air over and through the belts for drying purposes.

When it is desired to remove one of the belts 62, or to make repairs, the operator grips a knurled sleeve 90 (Figs. 1 and 2) which is secured to the projecting end of each shaft 44 and draws the shaft endwise out of its bearings. Removal of the shaft 44 permits the roller 41 (Fig. 2) (assuming this to be the one to be removed) to descend far enough to allow the floating shaft 64 to drop out of the half bearings 65, after which the roller 41, belt 62 and roller 63 may be lifted upward out of the machine.

In order to keep the key 45 (Fig. 2) in proper position when the roller 41 is removed, a sleeve 91 encircles the hub 42 and overlies the head of the key 45. This keeps the key from turning because the sleeve 91 has a tight fit upon the hub 42.

When it is desired to remove one of the cleaning rollers 73 or 74, the operator simply pulls out the shaft 44 the same as when removing the roller 41, and lifts out the roller 73 or 74, as the case may be.

The bearings 46 (Fig. 2) in the front and rear brackets 26 each have an extension 95 upon which is mounted a pulley 96. A key 97 engaging the pulley 96, the extension 95 and shaft 44, causes the pulley 96 to be driven with said shaft. A belt 98, supported intermediate the two pulleys by two brackets 99 (Figs. 1 and 3) mounted on the side frame 20, runs over the pulleys. This belt 98 is made of the same material as the belts 62, and is used for drying odd-shaped articles, some of which may be crescent-shaped, while others are disk-shaped and of various other shapes, depending upon the particular use for which they are adapted. The operator simply rubs the article back and forth on the belt 98 as it is being driven by the pulleys 96.

As the operations of the various parts in this machine have been described in detail throughout the specification, further explanation seems to be unnecessary.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form or embodiment herein disclosed, for it is susceptible of embodiment in various forms all coming within the scope of the claims which follow.

What is claimed is:

1. In a machine of the class described, the combination of a pair of rollers adapted to support and rotate an article, a drying belt over each roller, means for driving said belts at different speeds, and an air distributor cooperating with said belts to dry said belts.

2. In a machine of the class described, the combination of a pair of rotatable members adapted to support and rotate an article, a second pair of rotatable members, a fluid-absorbing belt running over one member of the first pair and one member of the second pair, a second fluid-absorbing belt running over the other member of the first pair and the other member of the second pair, said belts being adapted to absorb fluid and thus act as dryers, and common means for forcing air against both belts to dry the belts.

3. In a machine of the class described, the combination of a pair of rollers, each supporting one loop of an endless drying belt, said belts adapted to support at their loops an article to be treated, means for driving said pair of rollers at different peripheral speeds so as to drive one belt faster than the other to rotate said article, and means for forcing air against said belts and also against said article, to dry the belts and the article.

4. In a machine of the character described, the combination with side frames; bearings mounted on the side frames; a pair of supporting and driving shafts mounted to turn in the bearings; rollers through which the

respective shafts extend; sleeves secured to the opposite ends of each roller; a key on each sleeve to enter a keyway in each shaft; endless belts passing over the rollers and depending therefrom; and floating rollers supported in the lower bights of the belts, and tending by their weight to maintain the belts taut.

5. In a machine of the character described, the combination with side frames; bearings mounted on the side frames; a pair of supporting and driving shafts mounted to turn in the bearings; rollers through which the respective shafts extend; sleeves secured to the opposite ends of each roller; a key on each sleeve to enter a keyway in each shaft; endless belts passing over the rollers and depending therefrom; floating rollers supported in the lower bights of the belts, and tending by their weight to maintain the belts taut; the supporting and driving shafts being removable endwise from the bearings in the side frames to enable the rollers and belts to be disassembled.

6. In a machine of the class described, the combination of a pair of rollers of different diameters and mounted adjacent each other; two endless drying belts, one bight of each belt being supported by each roller, said belts adapted to cooperate with an article at their bights to scour and dry the article; means for driving said rollers and belts at different peripheral speeds; and means to dry said belts.

7. In a machine of the class described; the combination of a pair of drying belts cooperating to rotate an article, and simultaneously wipe the surface of the article; means for driving said belts at different speeds; and an air distributor located between the belts and adjacent the article being rotated and wiped, said air distributor having air ports for the escape of air to dry said belts and additional air ports for the escape of air to assist in the drying of said article, as the article is being rotated and wiped.

In testimony whereof I affix my signature.

HOWARD B. SCOTT.