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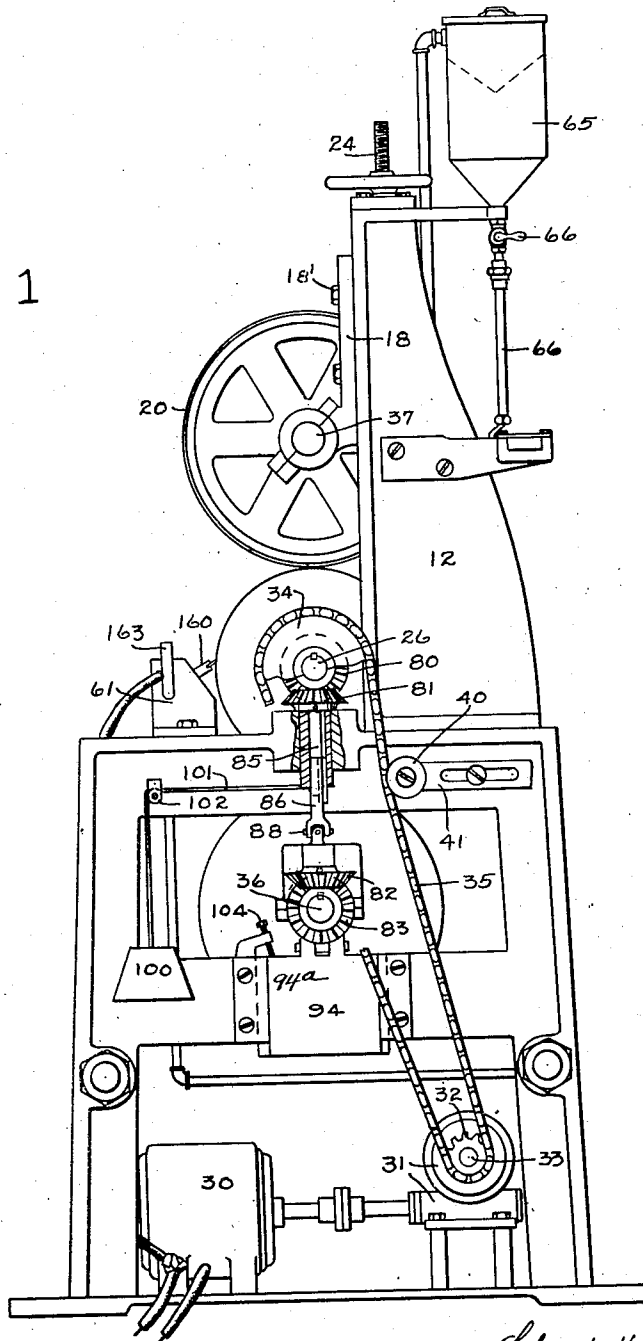
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GRAINING MACHINE

Original Filed Sept. 11, 1926 2 Sheets-Sheet 1

FIG.- 1



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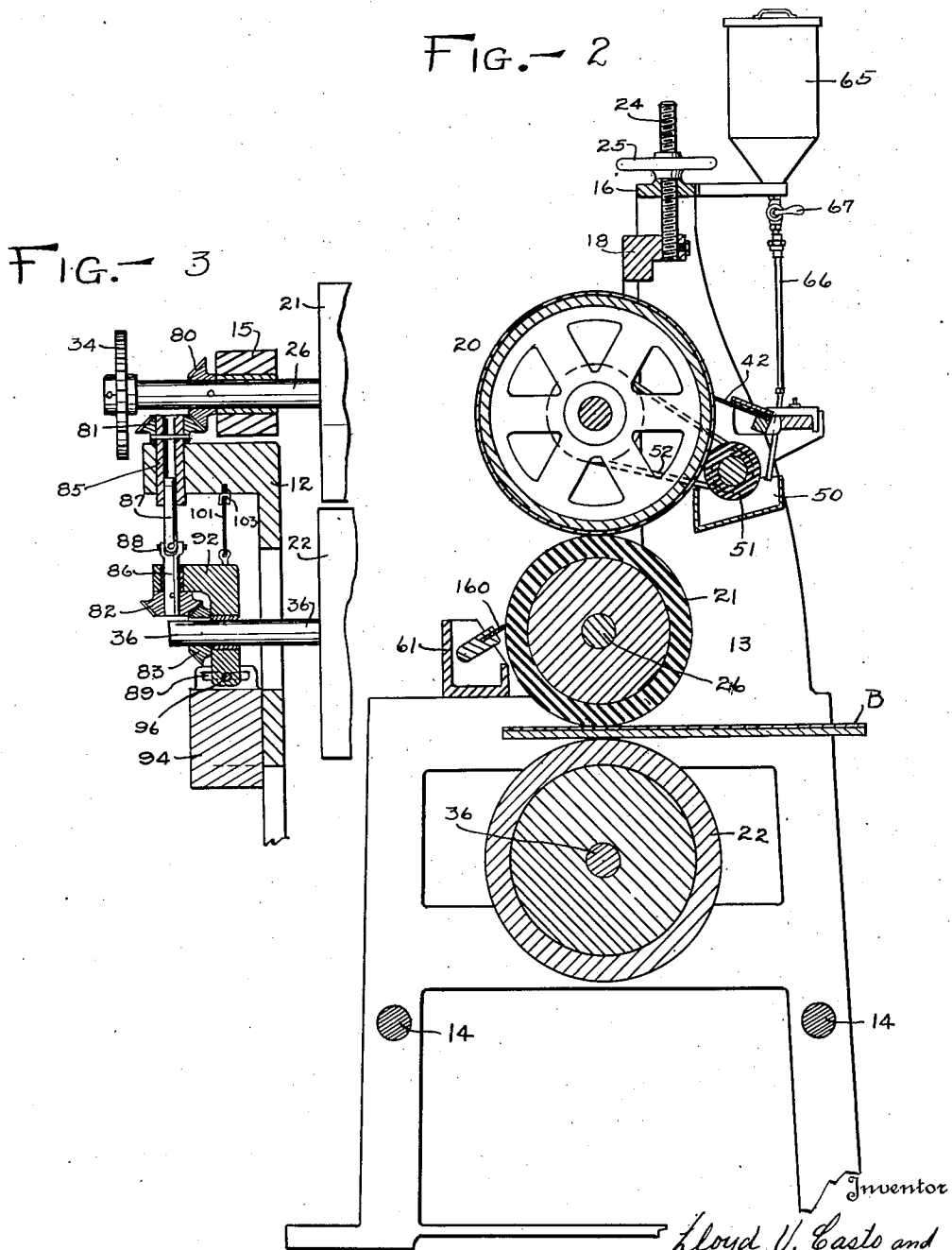
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GRAINING MACHINE

Original application filed September 11, 1926, Serial No. 134,807. Divided and this application filed April 20, 1928. Serial No. 271,533.

This invention is concerned with a transfer machine suitable as a graining machine, wherein a pattern roll carrying an arcuate etched plate, cooperates with a transfer roll and work supporting roll to effect an impression on a blank, simulating wood or other graining. The process used is similar to the well known photogravure process. The present application is a division of our prior application, Serial No. 134,807, filed September 11, 1926. Reference is also directed to our copending divisional application Serial No. 271,532, filed April 20, 1928.

The general object is to provide a machine by which the transfer of the pattern from the pattern roll to the blank may be expeditiously effected irrespective of pronounced variations in the cross section of the blank.

A further object is to provide a machine wherein two of the rolls may be synchronously driven to insure accurate printing on the blank irrespective of radial displacement of one of the rolls with reference to an adjacent roll.

Further objects and features of the invention will become apparent from the following description relating to the accompanying drawings, wherein we show our preferred form. The essential novel characteristics are summarized in the claims.

In the drawings, Fig. 1 is a side elevation of a machine embodying the novel features of the present invention; Fig. 2 is a substantially central cross sectional view of the entire machine, and Fig. 3 is a fragmentary vertical cross sectional view as indicated by the line 3—3 on Fig. 1.

In the parent application there is shown a similar arrangement of rolls suitable but not essential for the present machine, which arrangement comprises a pattern roll at the top; a transfer roll in contact therewith beneath the pattern roll; and a backing roll or blank supporting roll in spaced relation to the transfer roll and mounted therebeneath.

In Figs. 1 and 2, we show our machine as comprising upright frame members 12 and 13 secured in spaced relation by cross frame members 14, and a top cross bridge member 16. Suspended from the cross frame member 16 is a bearing frame 18 upon which is rotatably mounted in suitable bearings (not shown) the etched pattern roll 20. Beneath the etched pattern roll is a transfer roll 21 formed of suitable resilient transfer material and supported by bearing blocks 15, one being shown in Fig. 3, these being secured to the frame members 12 and 13. Below the transfer roll and in spaced relation thereto is a backing or work supporting roll 22, over which the blank (such as B) passes, this roll being supported as will be hereinafter described.

The bearing bracket 18 which carries the etched pattern roll 20 is suspended on suitable screw members 24 (one only being shown) which extend through suitable openings formed in the top member 16, and the screw members are engaged by adjusting wheels 25 whereby the pattern roll may be adjusted relative to the transfer roll 21. Suitable securing means, such as bolts 18 extending through vertical slots (not shown) formed in the bearing bracket 18, serve to secure the latter in adjusted position on the machine frame.

The rolls may be driven from a motor 30 through a worm gear shown conventionally at 31. As shown, a sprocket wheel 32 is mounted on the worm gear shaft 33, which drives a chain 35 extending over a sprocket 34 drivingly rigid on one end of the transfer roll shaft 26. An idler roll 40 carried by an adjustably mounted bracket 41 secured to the side member 12 serves to take up the slack in the chain 35.

It is desired frequently to transfer the pattern or grain effect to work which is irregular in cross section, such as metal panels having unequal flanges along the edges thereof

and work constructed of metal and having surfaces which are not flat. To properly support such work as it passes through the machine and to maintain it in uniform contact with the transfer roll throughout the width of the roll, we provide the backing or work supporting roll 22 which is mounted upon floating bearings carried by the side frame members 12 and 13. This roll may have a resilient body with reliefs or indentations as shown if desired to provide for irregular back surfaces.

In the present arrangement as distinguished from that of the parent application, and that of the co-pending divisional application above referred to, the transfer roll and backing or work supporting roll are positively connected for synchronous rotation by means permitting a considerable displacement of the axis of the backing roll with relation to the axis of the transfer roll, while allowing the axes to remain parallel, or to be relatively inclined a considerable amount. This permits the machine to operate on a blank which varies greatly in transverse cross section.

The present arrangement is similar to the parent application in that the machine is adapted for use with a pattern roll having a continuous design, by which we mean that the pattern roll carries a pattern such as an etched plate, the meeting ends of which match in such manner that there is no beginning or ending of the pattern. This being true, it is immaterial either from the standpoint of a specially adapted supporting roll arranged to support a blank having transverse irregularities, or from the standpoint of marking the backing roll in order to accurately place the blank with reference to the design transferred from the transfer roll onto the blank, whether the backing roll and pattern roll are synchronized. It is important however, in the case of printing a blank whose surfaces are to be imprinted are not uniform and by reason of which frictional contact between the backing and transfer roll cannot be depended upon to prevent relative slippage between the two rolls, that the transfer roll and supporting roll be synchronized.

As shown, the shaft 36 which carries the roll 22 is supported by bearing members 92 at either end thereof, (one being shown in Fig. 3), which bearing members are pivotally mounted on vertically movable bearing blocks 94 formed to comprise slide members suitably supported by the side frame members 12 and 13. As shown in Fig. 3, one of the bearing members 92 is pivotally connected to its slide block 94 by a pin 96 extending transversely of the axis of the roll shaft 26, and the bearing member 92 is suitably formed on its lower side to have a downwardly extending portion which accurately fits be-

tween upwardly extending ears 94a on the slide block 94, whereby the axis of the work supporting roll 22 will be maintained in a plane common to the axis of the transfer roll 21 while permitting the ends of the work supporting roll shaft 36 to float in a vertical plane. Suitable means (not shown) may be provided for preventing longitudinal shifting of the roll 22 and its supporting shaft relative to the bearings.

The work supporting roll is urged upwardly through the reaction of weight members 100 (one only being shown) disposed at each side of the machine and attached to the bearing members 92 by cable stretches 101 which may extend over pulleys 102 and 103 (Figs. 1 and 3). We also provide an adjusting means in the form of screw members 104 (one being shown) in threaded engagement with ears on respective frame members 12 and 13. These screws adjustably limit the upward movement of respective slides 94 so as to leave a space between the transfer and backing rolls sufficient to permit the insertion of work of a given size. This prevents the roll 22 from contacting with the roll 21 and deforming it when no work is being passed through the machine.

The means for driving the transfer roll in synchronism with the backing roll while permitting radial displacement of the backing roll axis at various angles to the axis of the transfer roll comprises, as shown, a pair of bevelled gears secured at the ends of the shafts 26 and 36, these gears being designated 80 and 83, and connecting gears 81 and 82 respectively meshing with the aforementioned gears and connected together in direct driving relation. The gear 81 is pinned onto a hollow sleeve 85 extending through a bearing bracket rigid with the frame member 12, and the gear 82 is pinned onto a shaft section 86 which, as shown, is connected to the hollow member 85 through a shaft section 87. The shaft sections 86 and 87 are in turn connected by a universal joint 88. The section 87 is splined to the hollow member 85 so as to always rotate therewith, but permit relative longitudinal movement between the members 87 and 85.

When the end of the roll 22 adjacent the gearing is lowered with reference to the roll 21, while leaving the other end of the roll 22 substantially in its original position, the members 87 and 85 will tend to separate and the shaft section 86 will incline with reference to the section 87. This inclination is permitted by the universal joint 88, the bearing member 92 being allowed to move somewhat transversely of the machine by reason of a loose connection with the slide block 94 at the pin 96 (see slot 89) and a splined connection between the shaft 36 and the gear 83 and bearing member 92.

Suitable means for applying pigment to

the pattern roll is shown in Fig. 2. This includes a fountain tray 50 and a fountain roll 51 arranged adjacent the pattern roll 20. The fountain roll dips into liquid pigment and transfers this to the pattern roll, there being a suitable drive shown as a belt 52 for causing the fountain roll to be rotated from the pattern roll shaft. Above the fountain roll is a doctor blade 42 contacting with the surface of the pattern roll. This may be mounted to oscillate in the manner shown by our prior application Serial No. 134,807.

The reservoir for the ink fountain tray is preferably a tank shown at 65 from which depends a conduit or pipe 66 which permits the pigment to flow from the reservoir to the fountain tray, as determined by the adjustment of the valve 67 in the pipe line 66. The fountain tray may be drained by any suitable means including an overflow pipe (not shown) extending into the fountain tray. Any suitable pump arrangement and pipe lines (not shown) may be provided for maintaining a circulation of pigment drained from the fountain tray in order to maintain a supply of pigment in the reservoir.

The transfer roll 21 may be cleaned during each revolution thereof by a scraper blade 160, shown as pivotally mounted on a shaft 161 yieldingly urged into engagement with the surface of the transfer roll by any suitable means, for example, gravity. The pigment scraped or removed by this blade 160 may be collected in a trough or tray 61, cleaned and used over again. Any suitable conduit means may serve to permit the pump to collect the pigment in the trough and force it upwardly to the reservoir 65.

We claim:

1. In a machine of the class described, a transfer roll and a backing roll, the transfer roll being disposed between the other two rolls and in driving contact with the pattern roll, bearings for the backing roll and guiding means therefor arranged to permit the axis of the backing roll to be displaced either at an angle to or in parallelism with the axis of the transfer roll, and a positive driving connection between the backing roll and one of the other rolls arranged to function irrespective of such displacement of the backing roll.

2. In a machine of the class described, a pattern roll, a transfer roll and a backing roll, the latter being for supporting a blank in contact with the transfer roll, a shaft for the transfer roll, a shaft for the backing roll, bevel gears carried on said shafts, respectively cooperating bevel gears and a connection between the said cooperating bevel gears including a universal joint for permitting individual floating movement of the ends of the backing roll shaft whereby the positive driving connection by the transfer roll and

backing roll is maintained irrespective of angular displacement of said shafts.

3. In a graining machine, a plurality of rolls, there being a pattern roll, a transfer roll and a resilient backing roll, vertically movable bearing supporting members for the backing roll, the backing roll having a shaft and there being a pair of shaft bearings pivotally mounted on the bearing supporting members to permit unequal raising and lowering of said members, the pivot axes being transverse to the axis of the shaft, a positive driving connection between the said roll shaft and one of the other rolls whereby the connected rolls are driven in synchronism, said connection including relatively slidable shaft sections to permit the vertical movement of the bearings.

4. In a machine of the class described, a transfer roll and a resilient backing roll for supporting a blank in contact with the transfer roll, a shaft for the backing roll, bearings for the shaft individually movable transversely of the axis of the shaft, means for individually urging the bearing members in a direction to cause movement of the backing roll toward the transfer roll, and a positive driving connection between the transfer roll and backing roll including two pairs of cooperating bevel gears and longitudinally extensible shaft sections, incorporating a universal joint.

5. In a machine of the character described, a pattern transfer mechanism, including a transfer roll, pigment applying means associated with said mechanism and a backing roll disposed beneath the transfer roll, there being means for yieldingly supporting the backing roll to thereby hold a blank of non-uniform cross section in contact with the transfer roll, there being a positive driving connection between the transfer roll and the backing roll.

6. In a machine of the character described, in combination, a pattern transfer mechanism, including a transfer roll, a work supporting roll disposed beneath the transfer roll, means for yieldingly supporting the work supporting roll in such manner that the axis of the roll may tilt with relation to the axis of the transfer roll to enable the work supporting roll to maintain a blank of non-uniform cross section in printing contact with the transfer roll, there being means positively and drivingly connecting the transfer roll and work supporting roll to maintain substantially identical surface speeds of the two rolls in a plurality of relatively tilted positions, as aforesaid.

7. Mechanism according to claim 6, wherein the work supporting roll comprises a substantially solid core with a relatively heavy work contacting and supporting layer of yielding material, such as rubber.

8. In a machine of the class described, pat-

tern transfer means, including a transfer roll and a backing roll, the transfer roll being disposed operatively adjacent the backing roll, bearings for the backing roll and guiding means therefor arranged to permit the axis of the backing roll to be displaced either at an angle to or in parallelism with the axis of the transfer roll, and a positive driving connection between the backing roll and the transfer roll arranged to function irrespective of such displacement of the backing roll.

In testimony whereof, we affix our signatures.

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