Aug. 9, 1932. G. VON WEBERN ET AL 1,870,700

GRAINING MECHANISM

Filed Nov. 9, 1929 7 Sheets-Sheet 1

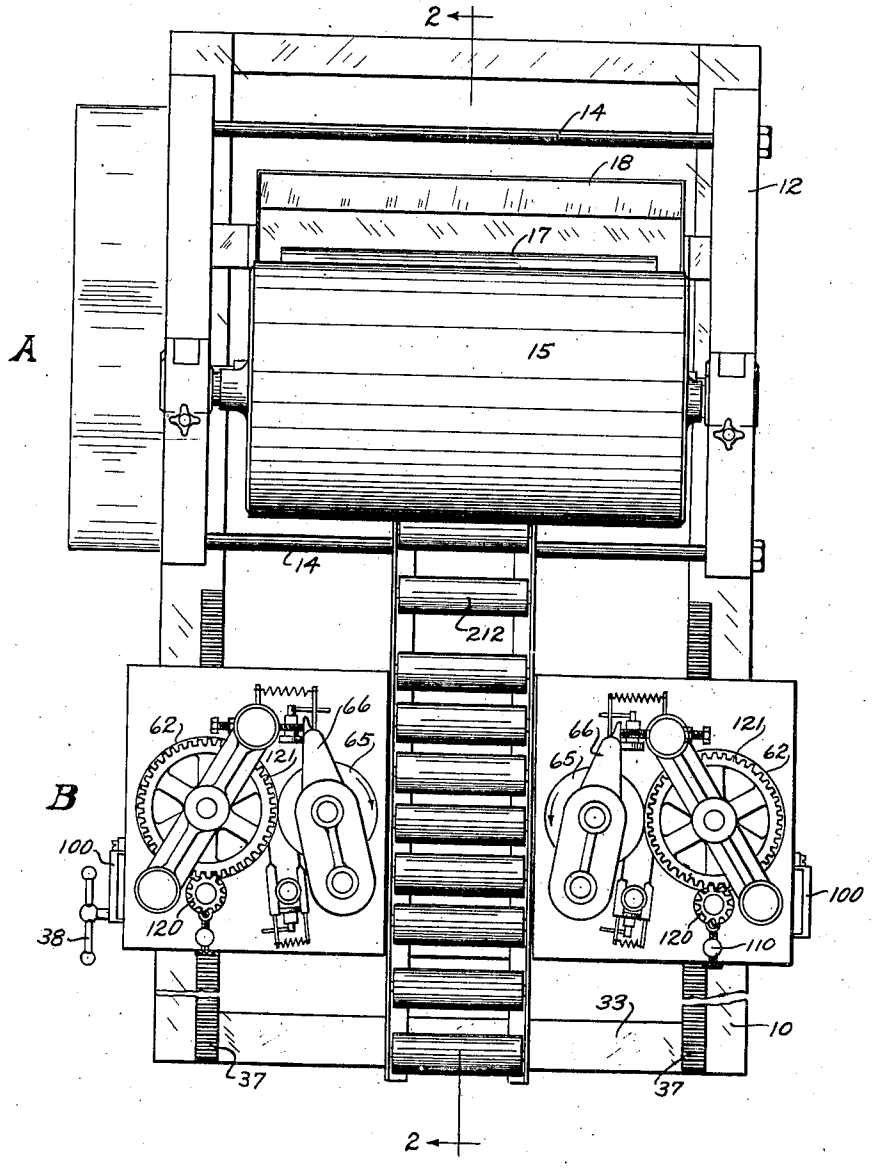

FIG. — 1

Inventors

Guido von Webern

Edward W. Kamant

By Dates Golrick & Teare

Attorney

Aug. 9, 1932. G. VON WEBERN ET AL 1,870,700

GRAINING MECHANISM

Filed Nov. 9, 1929 7 Sheets-Sheet 2

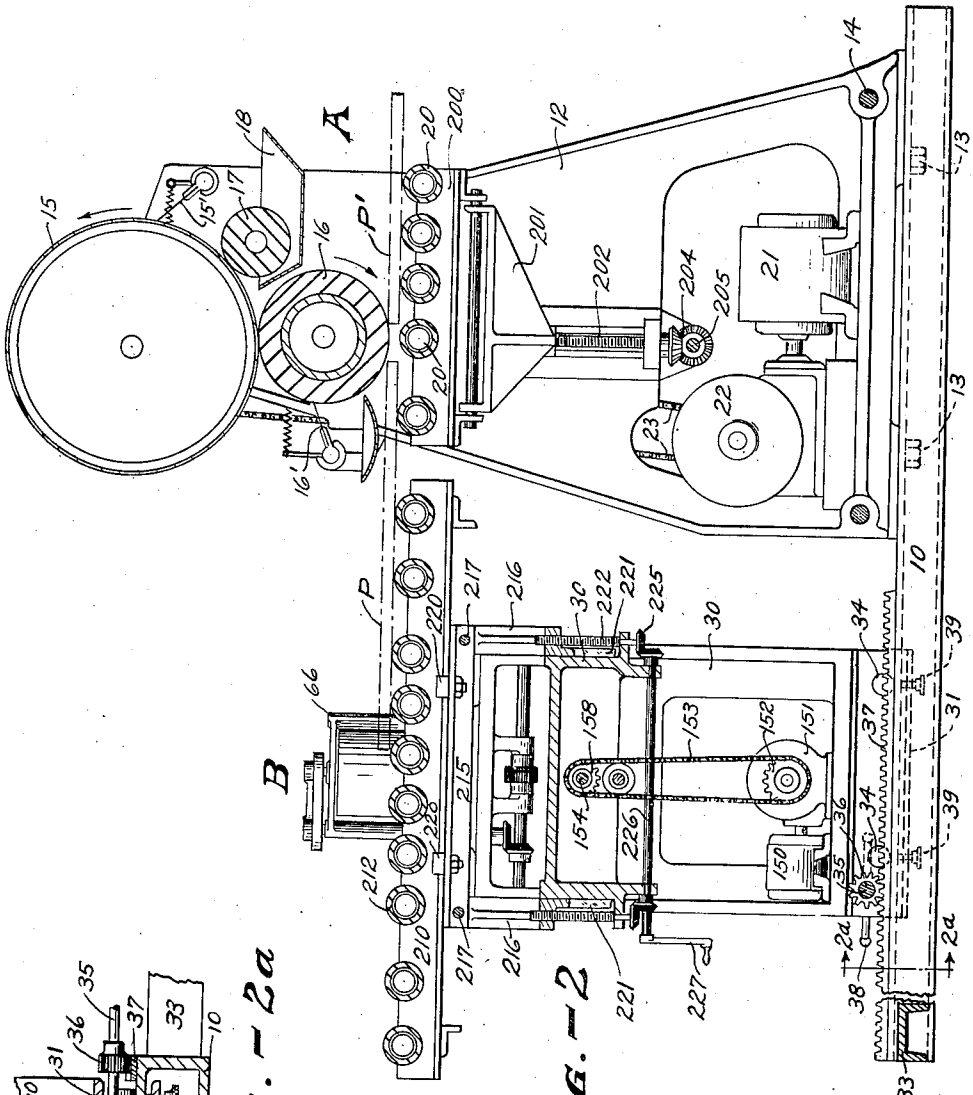

FIG. 2

FIG. 2a

Inventors

Guido von Webern

Edward W. Hamant

By Bates, Golrick & Teare

Attorney

Aug. 9, 1932. G. VON WEBERN ET AL 1,870,700

GRAINING MECHANISM

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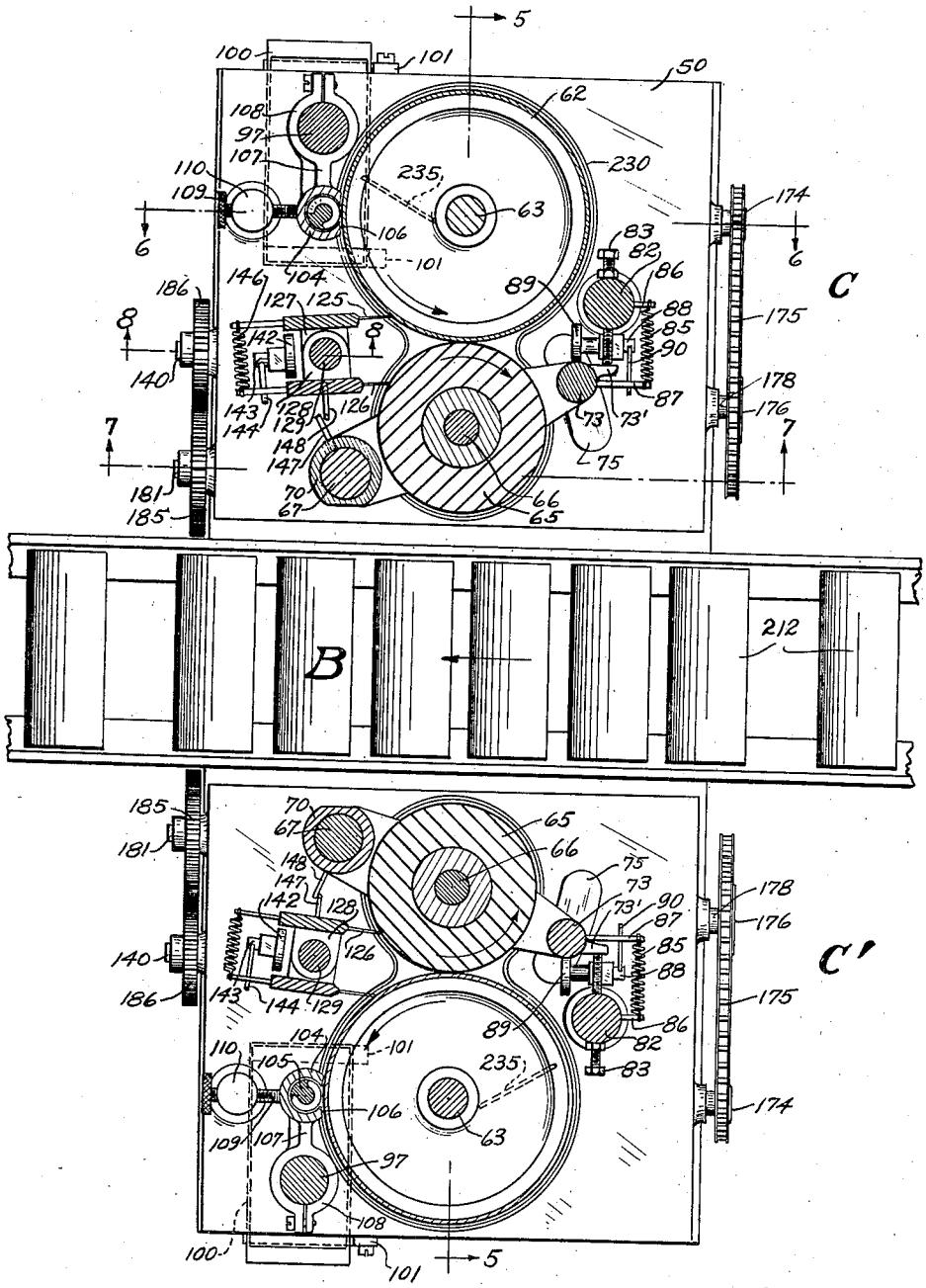

FIG. — 3

Inventors
Guido von Webern
Edward W. Hamant
By Bates, Golrick & Teare
Attorneys

Aug. 9, 1932. G. VON WEBERN ET AL 1,870,700

GRAINING MECHANISM

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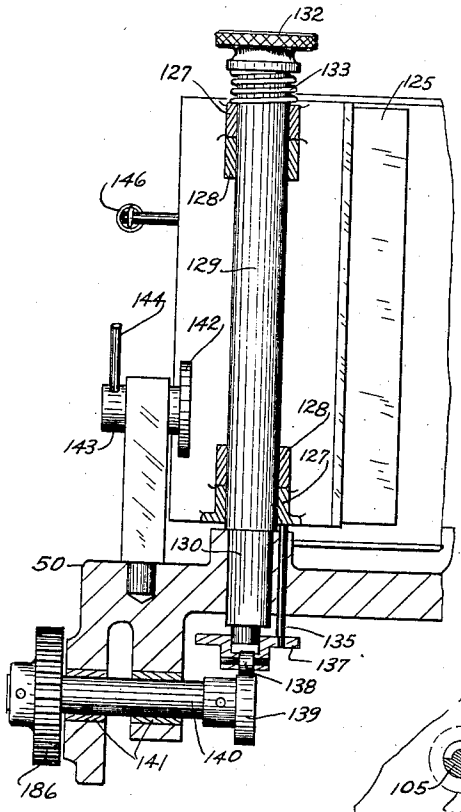

FIG. 8

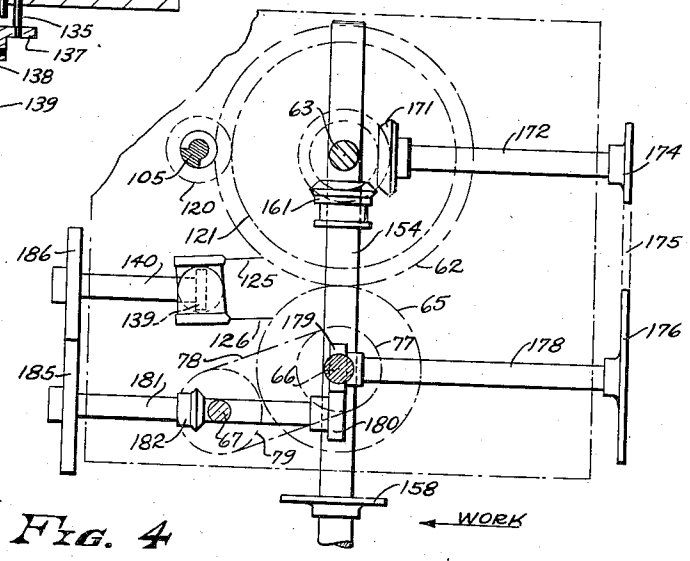

FIG. 4

Inventors

Guido von Webern

Edward W. Hamant

By Bates, Golrick & Teare

Attorney

Aug. 9, 1932. G. VON WEBERN ET AL 1,870,700

GRAINING MECHANISM

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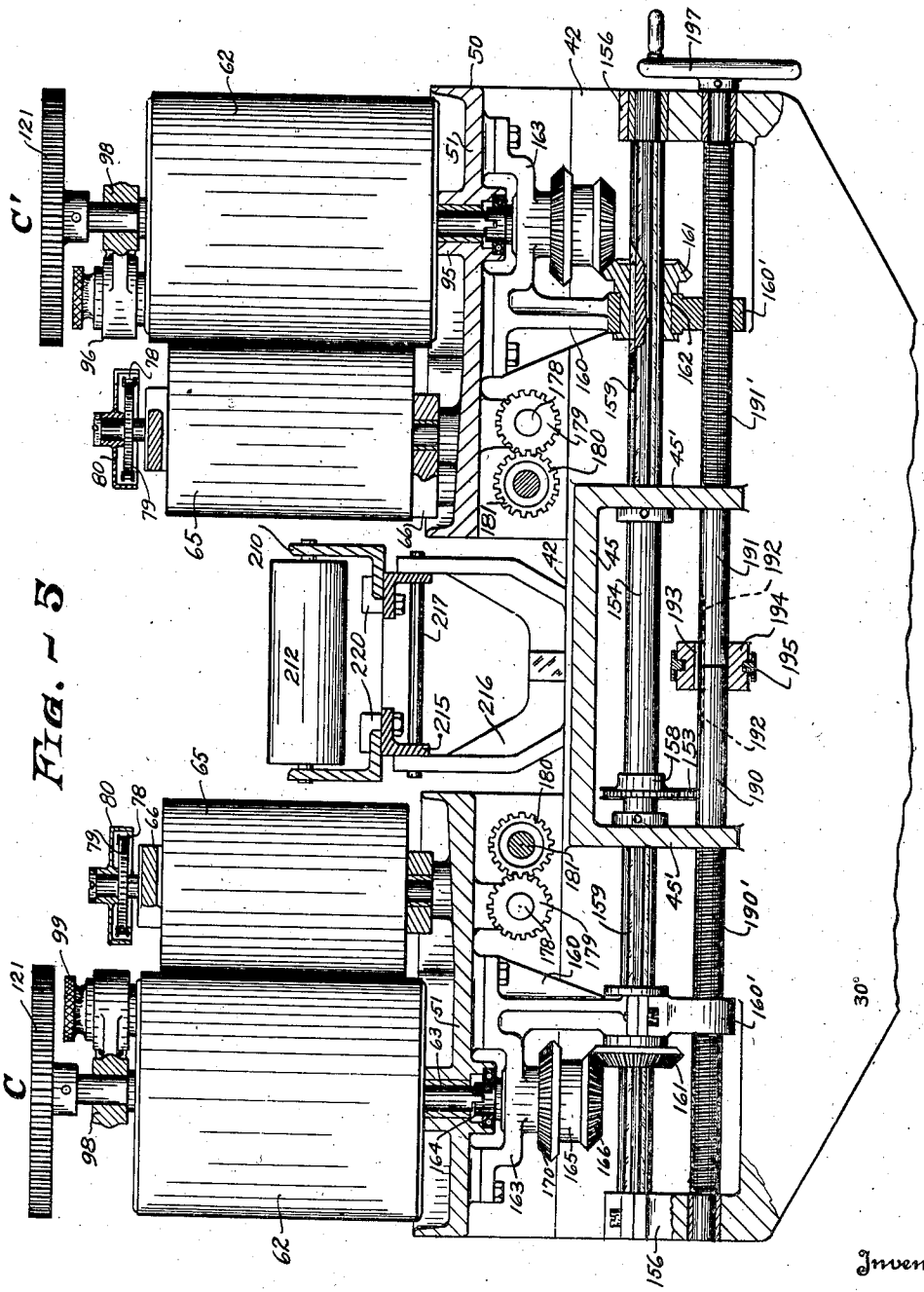

FIG. 5

Inventors
Guido von Webern
Edward W. Hamant
By Bates, Golrick & Teare
Attorney

Aug. 9, 1932. G. VON WEBERN ET AL 1,870,700

GRAINING MECHANISM

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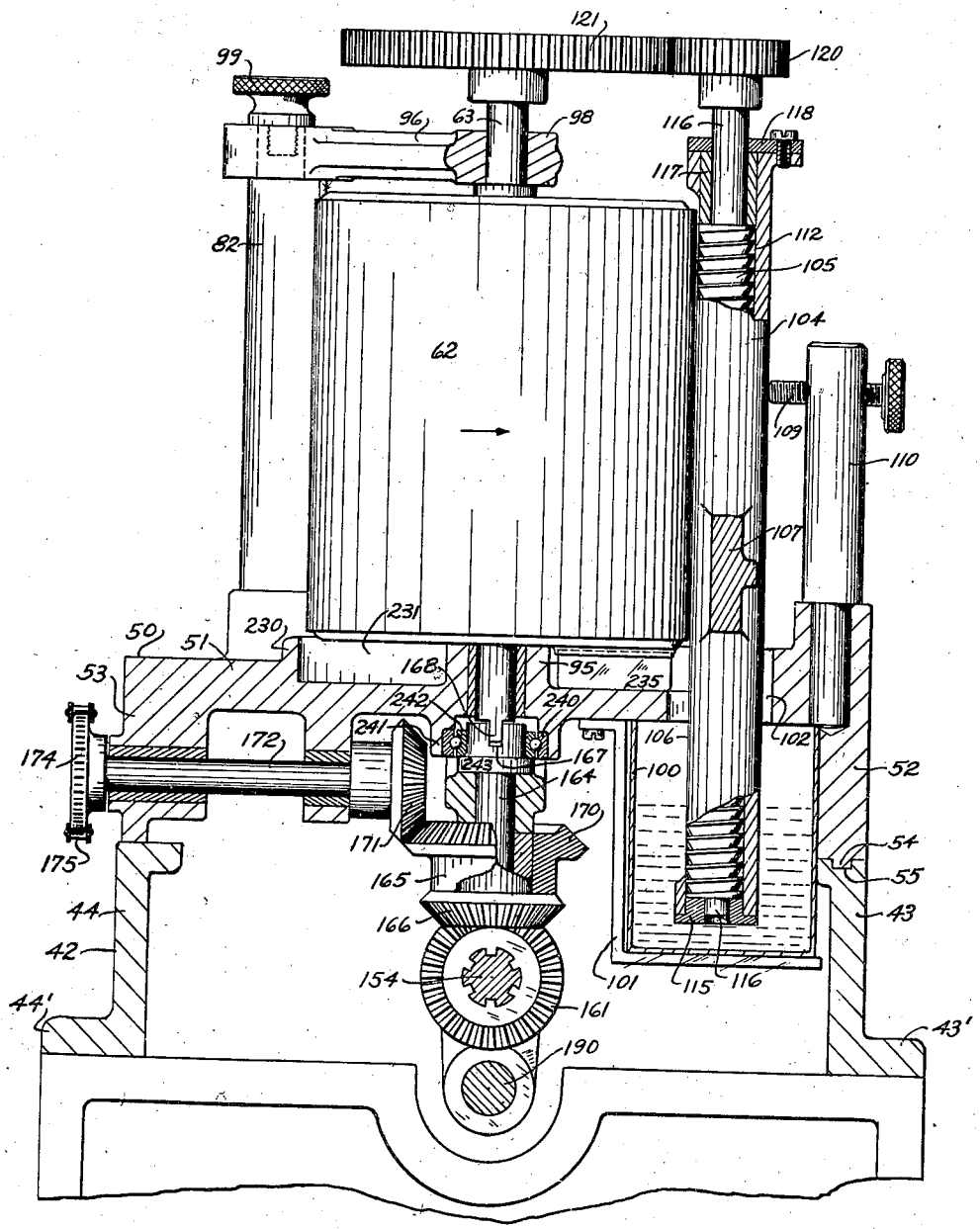

FIG. - 6

Inventors

Guido von Webern

Edward W. Hamant

By Bates, Golrick & Teare

Attorney

Aug. 9, 1932. G. VON WEBERN ET AL 1,870,700

GRAINING MECHANISM

Filed Nov. 9, 1929 7 Sheets-Sheet 7

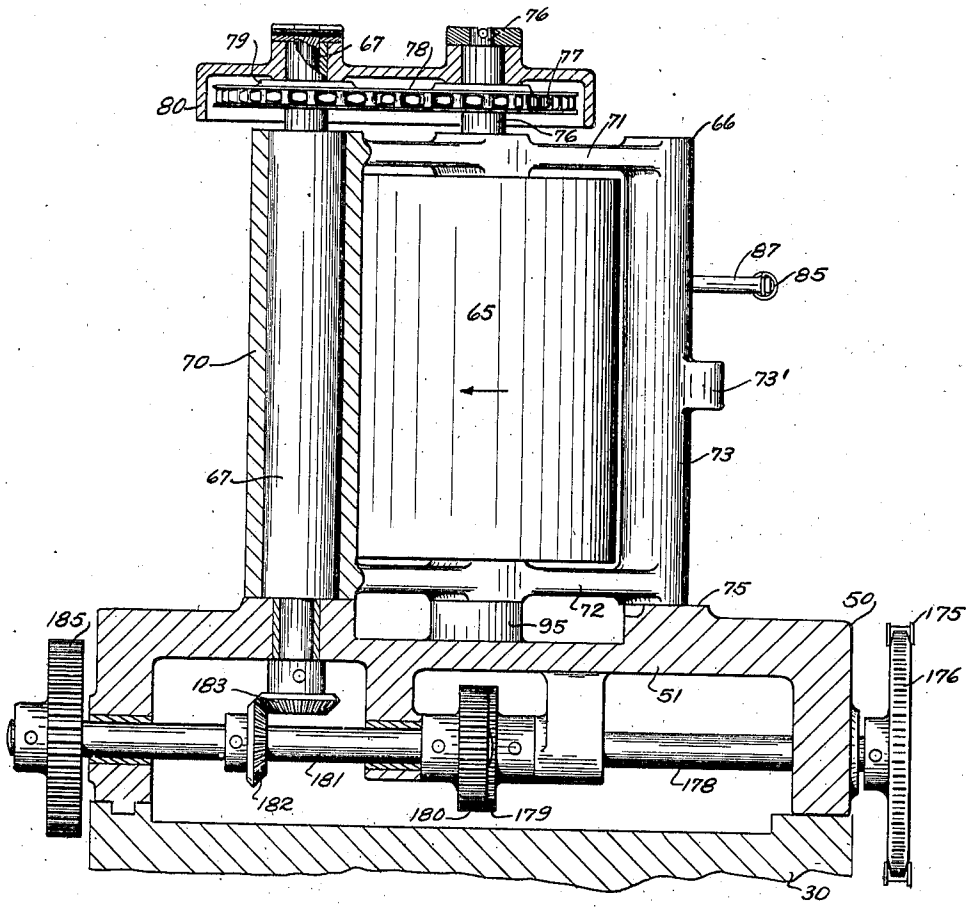

FIG — 7

Inventors

Guido von Webern

Edward W. Hamant

By Bates Golrick & Teare

Attorney

Patented Aug. 9, 1932 1,870,700

UNITED STATES PATENT OFFICE

GUIDO VON WEBERN AND EDWARD W. HAMANT, OF DAYTON, OHIO, ASSIGNORS TO OXFORD VARNISH CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

GRAINING MECHANISM

Application filed November 9, 1929. Serial No. 406,018.

The primary object of this invention is to provide an efficient graining mechanism by which a plurality of surfaces, such for example as main and edge surfaces of panels or the like, may be effectively grained.

A specific object is to coordinate two or more roll type graining machine units in such manner that a plurality of surfaces disposed normal to each other may be grained in substantially one operation without manual handling of the blanks as an intermediate step.

A specific object is to provide an efficient, simple and effective graining unit for graining substantially vertically disposed surfaces.

A further object is to provide a machine in which two substantially unitary graining mechanisms are arranged with relation to each other in such manner that blanks of various lengths will be fed from one mechanism to another, in carrying out a complete graining process, without loss of time irrespective of whether or not the graining roll elements of the two machines are synchronized.

A further object is to provide an improved method and apparatus for graining blanks on two or more surfaces, substantially normal to each other in one continuous operation.

Still another object is to provide an improved method and apparatus for supplying ink to substantially vertical graining elements such as rolls.

A still further object is to provide a compact and simple graining roll driving mechanism, particularly for vertically or substantially vertically disposed rolls.

Still another object is to provide a machine for simultaneously graining oppositely disposed surfaces, for example opposite side edges of a blank, the elements of which machine will be capable of rapid and simple adjustment to enable blanks of varying widths to be effectively grained on such oppositely disposed surfaces.

Further objects and features of the invention will become apparent from the following description relating to the accompanying drawings, showing a suitable form of the invention. The essential characteristics are summarized in the claims.

Briefly, the illustrated embodiment of the invention comprises two coordinated graining mechanisms; one being adapted to transfer a design, such as wood, marble or like grain patterns to a major surface of a blank, such as a sheet metal panel; the other mechanism being adapted to transfer a similar pattern effect to one or more edge surfaces of the same blank. The terms "edge", "side", etc. surfaces are, as a general rule, used herein merely as a matter of convenience and are not intended to limit the invention to specific relationships shown, since such terms are merely relative.

As shown in the drawings, there is a mechanism for graining the top surfaces of a panel in substantially horizontal position, and the blank to be grained passes from this mechanism to the second mechanism which grains the vertically disposed surfaces of the blank. There is a conveyer arrangement for carrying the blank from the horizontal graining mechanism to the vertical graining mechanism, but obviously, by simple modifications, the direction of feeding of the blank may be reversed. For example, the vertical surfaces may be grained first by the vertically disposed rolls and afterward the horizontal surface or surfaces may be grained.

The horizontal surface graining mechanism is shown as adapted to grain but one major surface, namely, the top surface of the blank supported in the machine, but this may be modified so that both horizontal surfaces of the blank may be simultaneously grained if desired. The horizontal surface graining mechanism herein shown is substantially the same as that shown in our prior application Serial No. 374,100, filed June 27, 1929.

The conveyer arrangement herein shown consists of a series of rollers on suitable adjustable supports. These may or may not be positively driven, depending largely on the character of the work to be performed with the mechanism. As shown, the conveyer rolls are not driven but reference is directed to application Serial No. 129,443, filed August

16, 1926, owned by the assignee hereof, in which similar conveyer roll arrangements are driven from the power drive of a machine similar to the major surface graining mechanism shown herein.

The previous practice in graining has been to grain the main and edge surfaces of blanks as entirely different operations, largely due to the fact that the pigment material used in graining is of sticky consistency and the blanks are hard to handle until dried. Further, as far as we known, there has been no effective way of graining surfaces in vertical or steeply inclined position for which reason the surfaces were previously turned to substantially horizontal position before commencing a second operation on the blanks. With the present arrangement, the difficulties in this respect heretofore encountered are overcome, as will be hereinafter shown.

In the drawings, Fig. 1 is a plan view of the entire machine; Fig. 2 is a central sectional view of the entire machine as indicated by the line 2—2 on Fig. 1; Fig. 2*a* is a detail sectional view as indicated by the line 2*a*—2*a* on Fig. 2; Fig. 3 is a sectional plan view of the essential parts of the vertical surface graining mechanism; Fig. 4 is a diagrammatic view of the driving gearing of one of the units comprising the vertical surface graining mechanism; Fig. 5 is a transverse cross sectional view through the vertical surface graining mechanism, as indicated by the line 5—5 on Fig. 3, and Figs. 6, 7 and 8 are longitudinal cross sectional views taken on respective substantially vertical planes as indicated by the corresponding section indicating lines on Fig. 3.

Referring in detail to the drawings, A (Figs. 1 and 2) indicates the graining mechanism for the horizontal surface of the panel to be grained, and B the mechanism for graining the edge or vertical surfaces. C and C′ indicate substantially identical graining units comprised in the mechanism B.

Both mechanisms, A and B, rest on a common sub-base 10 (see particularly Figs. 2 and 2*a*). The base 10 is of sufficient longitudinal extent to enable the two mechanisms to be accurately and easily separated convenient distances to enable panels of any desirable lengths to be grained in substantially one operation. A suitable frame for the graining mechanism A comprises spaced standard members 12 secured to the sub-base structure 10 as by attaching bolts 13. The members 12 have suitable cross bracing members, such for example, as shown at 14 (Fig. 2). The pattern transferring parts of the mechanism A comprise, as shown, a pattern roll 15, a transfer roll 16, an ink supply roll 17 and suitable doctor and scraper blades indicated at 15′ and 16′ for the pattern and transfer rolls respectively. The mountings for the various rolls are not shown but may comprise the usual bearing blocks in the members 12, together with suitable adjustment devices, permitting the rolls to be separated when the machine is idle and for fine contact adjustment between the rolls.

As shown, there is a pigment supply tank 18 from which the roll 17 dips the pigment material for transfer to the plate of the pattern roll 15. The plate preferably comprises a suitable etched member, such as a copper shell, bearing an intaglio design, representing the wood or other grain which it is desired to simulate on the blanks. Such blanks are shown as P and P′.

In operation, the scraper blade 15′ removes the excess pigment material from the high surfaces of the intaglio plate on the roll 15 as this rotates in the direction of the arrow (Fig. 2), and when the plate contacts with the roll 16, the latter picks up the remaining pigment (that in the depressed portions of the plate) and the pattern of the plate is thus transferred to the blank which rides into contact with the roll 16 supported as on suitable conveyer rollers, designated 20, to be hereinafter more fully described.

A suitable driving device for the mechanism A may comprise a motor 21, a reduction gearing 22 and a sprocket chain 23 which may pass over a suitable sprocket (not shown) on the pattern roll. A similar driving arrangement from such motor and reduction gearing is shown in the previously mentioned prior application, Serial No. 374,100, filed June 27, 1929.

The standard of the mechanism B comprises a hollow frame structure 30 having its lower end adapted to rest on the sub-base 10 as a slideway. A convenient arrangement of slideway and sub-base structure is shown in Fig. 2*a*.

As shown in this figure, the side members of the standard 30 have attached to their lowermost surfaces inturned channel members 31, the flanges of which freely embrace the respective top flanges of structural channels 32 comprised in the sub-base 10. These channels 32 may be connected by cross members of any suitable shape, designated 33. If desired, we may provide a series of rollers, one being shown in Fig. 2*a* at 34 which ride on top of the upper respective flanges of the members 32. With such guiding arrangement, the standard 30 and the graining mechanisms carried thereby may be easily moved toward and away from the major surface graining machine, the unit A.

The members 32 may be of any desired length so that the unit B may be moved as close to the unit A as may be desired for the shortest panels and may likewise be moved away from the unit A in graining the longest panels or parts; long door frame members for example.

To facilitate moving the unit B, there is

shown a cross shaft 35 mounted near the lower portion of the standard 30 and provided with pinions 36 adapted to mesh with fixed racks 37 which may be supported on the top side of the members 32. The shaft may be turned by a hand wheel arrangement, such as 38 and the standard 30 may be locked in adjusted position by any convenient means, such for example, as set screws 39 carried by the lower flanges of the members 31 and adapted to clamp against the upper flanges of the members 32.

Surmounting the standard 30 in a bed 42, the cross sectional shape of which is shown best in Figs. 5 and 6. The bed comprises spaced members 43 and 44 which are flanged as at 43′ and 44′ to rest on and be secured rigidly to the standard 30 at its top side. The bed is open at its ends but has a cross piece intermediate its ends shaped similar to an inverted channel. This is designated 45 and its purpose is to support certain shafts, to be hereinafter described. The graining units C and C′ have bases 50 and the bases have relatively thin floor portions 51 for supporting the various graining machine elements (the rolls, etc.), and downwardly extended side members 52 and 53 (see Fig. 6 particularly). One or both of these downwardly extending members may have a tongue 54 riding in a channel 55 in the adjacent bed member, 43 for example. This tongue and channel arrangement guides both members 50 for parallel right line movement transverse to the path of the grained panels passing through the entire mechanism.

Suitable means will be hereinafter described for moving the two bases 50 simultaneously toward and away from each other in order to variably position the units C and C′ equal distances from the longitudinal center of the machine, or for moving the supports individually toward and away from the center of the machine.

The two supports 50 are substantially alike and carry complete graining units, each including a vertically disposed pattern roll, a transfer roll, scraper or doctor blades and pigment supplying and applying devices. Only one of these units, namely that designated C, will be described in detail, but the similar parts of the other unit will be similarly indicated.

The support 50 is preferably a casting, arranged to carry the driving shaft of a pattern roll 62, the shaft being designated 63. Mounted alongside the pattern roll is a transfer roll 65 and this is carried on a pivoted frame 66 supported, as shown particularly in Fig. 7, about a shaft 67 which forms one of the driving elements for the transfer roll 65. It is to be understood that the pattern roll 62 may have the usual etched plate, preferably of the continuous pattern type, arranged for contact with the transfer roll 65, the outer portion of which is preferably formed of highly resilient material, such as glue and glycerine compound. This is the usual so called "composition" roll.

The transfer roll supporting frame comprises, as shown, a tubular side member 70 through which the shaft 67 passes, and extending outwardly in horizontal planes from this tubular member 70 are upper and lower arms 71 and 72. The extremities of the arms are joined by a vertical bar 73, the lower end of which rests on a boss formation 75 on the floor portion of the support member 50, which boss may be shaped arcuately, as shown in Fig. 3. The drive shaft of the transfer roll 65 is designated 76 and extends through suitable boss formations in the arms 71 and 72, the upper end of the shaft 76 being extended beyond the arm 71 to support a driving sprocket 77 connected as by means of a suitable chain 78 to a similar sprocket 79 on the shaft 67. The means for driving the shaft 67 will be hereinafter described. A suitable guard 80 is supported by the upper ends of the shafts 67 and 76, which guard is in overlying relation to the chain 78 and the sprockets.

It is necessary to finely adjust and maintain the desired contact pressure between the two rolls 62 and 65. To effect this, a set screw 83 is mounted in a vertical post 82 extending alongside the pattern roll, which screw bears against a projection 73′ on the vertical member 73 of the transfer roll supporting frame. The screw may be locked in adjusted position to limit the movement of the transfer roll toward the pattern roll. Suitable means for yieldingly maintaining contact between the two rolls may comprise a tension spring 85 arranged on suitable outstanding pins 86 and 87 on the post and frame respectively for drawing the free end of the frame toward the set screw and holding it there with the transfer roll in operating contact with the pattern roll.

A suitable device for manually separating the pattern roll and transfer roll may comprise a rock shaft 88 mounted in a suitable bracket rising from the support 50, the rock shaft having a cam 89 at one end and an operating member 90 at the other, which member may be turned to cause the cam to ride against the transfer roll carrying frame 73 to push the same outwardly away from the adjusting screw 83 and hold it in idle position.

The pattern roll shaft 63 is removably arranged on the machine so that the pattern roll may be taken out and replaced quickly, as when it is desired to change the pattern or design. The lower end of the shaft extends into a bearing boss 95 on top of the base member 50. The upper end of the shaft is carried on a removable bearing bar 96 having

a central boss 98 embracing the upper end of the shaft and guiding it for rotation. The bar passes diagonally across the top of the roll 62. The ends of the bar are apertured to fit over reduced upper ends of fixed posts, one being the post 82, previously mentioned, and the other being a post 97 diametrically opposite the post 82 with reference to the pattern roll axis. The apertured ends of the bar 96 are held on the reduced upper ends of the posts 82 and 97 by suitable means, such as hand screws 99, engaging threaded openings in the tops of the posts and shouldered to lie on top of the bearing bar.

To supply pigment to the pattern rolls 62, I provide devices comprising essentially, pigment raising means in the nature of a pump for conveying pigment material from a reservoir to alongside the pattern roll and distribute an adequate quantity of the same uniformly on the pattern. This method of supplying pigment to vertical rolls, etc. may be used in any equivalent arrangement where the printing member to be supplied is vertical or generally upright. The pigment supplying device is best shown in Figs. 3 and 6 and will now be described.

In the last mentioned figures, there is shown an ink supply tank 100 removably carried on the under side of the base member 50 as on L-shaped brackets 101, these bracket arrangements permitting the tank to be slid beneath the base member 50, like the drawer of a cabinet. The tank may be withdrawn from beneath the base 50 sufficiently to allow the pigment supply to be replenished, from time to time, notwithstanding the fact that, as shown, the tank cannot ordinarily be fully withdrawn.

Above the pigment supply tank, the body portion 51 of the base member has an opening 102 through which extends a tube 104. The tube contains the pumping element shown as a screw 105 which lifts the pigment along the tube and spreads the pigment onto the pattern roll. The tube 104 is faced off on one side, namely, that adjacent the pattern roll, and preferably this face, designated 106, is substantially complementary to the curve or arc of the outer surface of the pattern roll. The face 106 is spaced apart from the pattern plate a distance determined by the thickness of the layer of pigment it is desired to place on the pattern plate. This distance may be varied, as will be hereinafter shown.

The tube is supported in vertical position by a rigid arm 107 extending laterally from the tube and having at one end a clamping yoke 108 embracing the previously mentioned shaft 97, which supports one end of the pattern roll supporting arm 96. The adjustment to determine the distance between the face 106 of the tube and the surface of the pattern roll, may be effected by a set screw 109 supported in a suitable post 110 back of the tube, the screw having its working end bearing against the tube, as shown in Fig. 6.

The pigment lifting screw 105 is preferably formed, as shown in Fig. 6, wherein it will be seen that the thread faces which are uppermost are substantially flat, while the under faces of the screw threads are steeply beveled to provide a coarse thread. The screw fits the inside surface 112 of the tube with very little clearance, the surface of the tube being broken at one side of the tube by reason of the face 106 intersecting the cylinder on which the inside surface 112 is formed. This leaves an elongated opening substantially the length of the pattern roll through which the pigment carried up by the screw is spread onto the pattern roll.

The screw 105 has a bearing at its lower end which, as shown, comprises a removable apertured insert 115 of suitable bearing forming material, the aperture receiving the reduced end 116 of the screw. At its upper end, the screw has a reduced shaft portion 116 which extends through a suitable bearing insert 117 held in place by a cover plate 118. At its upper end, the shaft 116 carries a spur gear 120, which meshes with a spur gear 121 surmounting and fixed to the pattern roll driving shaft 63. When the pattern roll 62 is taken out by lifting the same upwardly, with the cross bar 96 as described, the gears are simply slid out of mesh.

In a graining machine wherein the graining rolls are vertical, or nearly so, the matter of reclaiming the used pigment material presents quite a problem. As shown, there is a continuous wall effect 230 rising from the base 50 and surrounding the pattern roll the transfer roll and pigment applying device. Within the wall is a substantial depression 231 which receives all the pigment material scraped or otherwise ejected from the rolls and which conveys this pigment material back to the pigment supply tank 100. Preferably, the floor of the depression slopes generally toward the opening 102 through which the screw tube 104 extends loosely.

To favor the discharge of used pigment toward the opening and to prevent accumulation of pigment beneath the pattern roll, the latter may have a depending wiping blade 235, as shown in Fig. 6. The wiping blade is arranged to contact with the floor of the depression formed by the wall 230 to urge the pigment material lying upon the bottom of the depression toward the opening 102. The blades 235 of the two units C and C′ may be tangentially arranged in accordance with the rotation of the rolls 62, as indicated in broken lines in Fig. 3.

The pattern and transfer rolls are equipped with scraper blades and it is highly desirable, if not essential, to reciprocate the scraper blade which contacts with the pattern plate of the pattern roll so as to prevent wearing

grooves in the etched surface thereof. It is practically essential to separate the scraper blade of the transfer roll from this roll whenever the machine is left standing idle so as to prevent the scraper blade from leaving a permanent depression in the transfer roll surface. The scraper devices are arranged to fill these requirements in an efficient manner and will now be described, with reference particularly to Figs. 3 and 8.

The scraper blade for the pattern roll is indicated at 125 and the scraper blade for the transfer roll at 126. The mountings for these blades include mutually overlying ears 127 and 128 which have openings receiving a shaft or post 129 secured in fixed position in an opening 130 in the base member 50. The shaft 129 (see Fig. 8) carries a head 132 beneath which and bearing against the upper ear member 127 is a compression spring 133 which forces both blades downwardly toward the base 50, since both blades by reason of the overlying ear arrangement must move together in the arrangement shown. Slidable within suitable through openings in the base member 50 are a series of pins, one being shown at 135, the lower ends of which are secured to a cam follower 137 having a roller 138 adapted to engage an eccentric cam 139. The cam is mounted on a shaft 140 which is carried in suitable bearing members 141 in the base, and which is adapted to be driven by the roll driving means as will be presently shown.

To manually move the scraper blades away from the respective rolls 62 and 65, we provide a cam arrangement (see Figs. 3 and 8). This comprises an eccentric cam 142 on a suitable shaft 143 having an operating member 144 thereon, the cam being shaped in such manner that upon rotation of the shaft 143, the cam will bear outwardly on both blade supports to thereby move the blades toward each other and away from the respective rolls. The blades may be normally borne into scraping contact with the respective rolls by means of a tension spring 146 connecting the two mountings.

As previously mentioned, it is important to remove the scraper blades of the transfer rolls from these rolls whenever the machine is left standing. As a matter of training, the operator always moves the transfer roll away from the pattern roll. In the present machine, the transfer roll carrying frame is swung in a direction away from the pattern roll in order to separate the transfer roll from the pattern roll, as previously described, and when this is done an arm 147 on the tubular member 70 of the transfer roll carrying frame engages an arm 148 on the mounting for the blade 126 and thus rotates the mounting in a direction to force the blade away from the transfer roll.

Power for driving all of the elements of the mechanism B may be supplied by a motor 150 on the standard 30. Suitable reduction gearing 151 driven by the motor terminates in a driving sprocket 152. The driving sprocket, as shown, is connected by means of a chain 153 to a counter shaft 154 supported at its ends in upstanding bracket members 156 on the standard 30 and supported intermediate of its ends on depending portions 45′ of the cross member 45 which joins the side portions of the bed 42.

It will be understood that as a matter of fact, the mechanism B may be driven from the power device 21, 22, etc. of the mechanism A. The individual power unit for the mechanism B is, however, more convenient on account of the adjustability of the two mechanisms A and B with reference to each other longitudinally of the machine. Where the two mechanisms are synchronized, in accordance with a contemplated arrangement, not shown, there would, of course, be a common power unit.

The shaft 154 has a sprocket wheel 158 preferably between the portions 45′ of the cross member 45 (see Fig. 5) which is driven by the chain 153. The end portions of the shaft 154 are shown as splined at 159, in order that the units C and C′ may be slid along the bed 42, as previously mentioned, toward and away from each other while maintaining the driving connection from the shaft 154 to these units. Depending from each base 50 is a bracket 160 which supports a beveled gear 161 connected, by means of the spline mentioned, with the shaft 154. As shown, the gear has a reduced neck portion 162, so that the bracket 160 may embrace the gear in such manner as to draw it along when the bracket is moved with reference to the shaft 154. This is shown in detail in Fig. 5. To facilitate assembly, the bracket 160 has a removable part 160′ secured in the usual manner to the upper portion of the bracket. The bracket 160 has a lateral extension 163 arranged to support a shaft 164 to which a double beveled gear 165 is secured, the gear having teeth at 166 meshing with the slidable gear 161. The upper end of the shaft 164 has a slot at 167 embracing a flattened reduced extension 168 of the pattern roll driving shaft 63. This coupling arrangement effects a drive from the gear 165 and shaft 164 to the pattern roll but permits the pattern roll to be easily removed together with its shaft 63, as previously described.

As shown particularly in Fig. 6, an additional bearing may be provided for the upper end of the shaft 164. This comprises simply an antifriction bearing assembly, including an outer race 240 seated in a boss formation 241 on the under side of the base casting 50, there being an inner race 242 embracing the upper end of the shaft 164 and resting on a

shoulder 243 thereof. The races support, between them, the usual series of balls or equivalent rolling elements.

Referring particularly to Figs. 4 and 6, it will be seen that the gear 165, has additional beveled gear teeth 170 meshing with a beveled gear 171 on a shaft 172. The latter shaft extends outside of the base member 50 and may be secured in suitable bearings thereunder. The outer end of the shaft 172 supports a sprocket wheel 174 which is connected by means of a suitable chain 175 to a sprocket 176 on a counter shaft 178. The latter may be supported, as shown particularly in Fig. 7, by suitable bracket formations on the under side of the base member 50. The shaft 178 has on its inner end a spur gear 179 meshing with a spur gear 180. The spur gear 180 is carried on a shaft 181, also mounted in bracket formations on the under side of the base member 50 and in parallel but offset relation to the shaft 178. This shaft 181 has a bevel gear 182 thereon meshing with a bevel gear 183 on the shaft 67, previously mentioned, which, through the medium of the sprocket arrangement 77—79, previously described, drives the transfer roll 65.

The shaft 181 of the unit C is extended outside of the base member 50 in order to drive the cam shaft 140, previously mentioned, (see Fig. 4) for oscillating the scraper blade mounting of this unit. The connection from the shaft 181 to the shaft 140 may comprise a pair of spur gears; there being a gear 185 fast on the outer end of the shaft 181 and a gear 186 fast on the shaft 140.

It will thus be seen that the single counter shaft 154 drives all the rotating elements previously described, notwithstanding the fact that the two units C and C′ may be moved to various positions transversely of the machine in general, in order to accommodate panels or blanks of various widths, as these are carried from one machine to another on the conveyer arrangement.

A convenient means for adjusting the two units with reference to each other comprises a right and left hand screw which may, if desired, be formed on a single shaft, but which, as shown, comprises separate sections 190 and 191. These sections are similarly supported in suitable bearings in the bracket members 45′ and 156, as clearly shown in Fig. 5. The threads 190′ of the section 190 engage threads in the removable bracket member 160′ of the unit C and the threads 191′ engage threads in the bracket member 160′ of the unit C′.

The two screw sections at their adjacent ends, as shown, have key slots 192 and these are adapted to receive a slidable key 193 in a movable collar 194, arranged to be adjusted lengthwise of the shafts by any suitable arrangement, such as a shipper fork 195, suitably supported as on a pivoted arm (not shown) extending outwardly through either wall 52 or 53 of the base member 50, whichever is most convenient. Normally, the collar 194 is left in the position illustrated in Fig. 5, in which case the screw sections 190 and 191 are virtually one section. By this arrangement, the screw sections may be simultaneously turned, as by means of the crank 197, attached at the outer end of the section 191, resulting in moving the units toward and away from each other, depending on the direction of rotation of the coupled screw sections. In the event it is desired to move both sections to the right, for example, the unit C would be placed in the desired position by turning the shaft sections simultaneously, then the collar 194 would be shifted so as to disconnect the sections, and the unit C′ would then be shifted to its desired position by further turning of the crank.

This arrangement, it will be seen, provides great flexibility, since the two vertical surface graining units may be adjusted for distance simultaneously and in constant relation to the center of the machine, or the two units may be moved in any other desired manner to enable different portions of the roll elements of the major surface grainer to be used at different times. This is not only valuable in order to relieve one portion of the plate on the roll 15, to prevent unequal wear, but is also valuable in order to select different portions of the pattern on the roll 15 to thereby turn out work with greater variation in pattern.

Referring again to the conveyer arrangements of the two mechanism, it is desirable that both conveyer arrangements be supported for vertical movement. In the case of the conveyer arrangement of the mechanism A, this vertical adjustment is provided in order to accommodate blanks of varying thickness. The vertical adjustment of the conveyer of the mechanism B is mainly in order that the blanks will not have to travel upwardly or downwardly going from one mechanism to the other as the blank thickness varies. The vertical adjustment of the conveyer rollers 20 of the mechanism A is shown in our prior application Serial No. 374,100, filed June 27, 1929, heretofore mentioned and will not therefore be described in detail.

Briefly, there is a supporting frame 200 for the rollers 20 which is removably carried on sliding carriers 201, one only being shown. These sliding carriers are engaged by vertical screws 202, arranged to be simultaneously raised and lowered by means of beveled gearing 204, one element of each gearing being supported on a cross shaft 205, so that both carriers 201 may be raised and lowered simultaneously.

The conveyer arrangement for the mecha-

nism B is somewhat similar to that of the mechanism A, there being side frame members 210 for suitable rollers 212 carried in suitable openings or slots in upwardly extending flanges of the members 210. In order that the conveyer of the mechanism B may be always positioned with its receiving end in close proximity to the conveyor of the mechanism A the members 210 are longitudinally adjustable on slide forming supports 215 of raisable carriers 216. There are fastening members in the nature of clamps 220 for holding the members 210 in fixed position when adjusted. The supports 215 may be attached to the carriers 216 by cross bracing bars 217 and the carriers 216 are vertically adjustable in slideways 221 on the standard 30, so as to vary the height of the conveyer rollers. There is an adjusting mechanism comprising vertical screws 222 threaded into the carriers 216. Turning the screws obviously raises and lowers the conveyer. Means for simultaneously turning the screws may comprise beveled gear units 225, including gear elements secured to a common operating shaft 226 extending lengthwise of the machine and turnable manually as by means of a crank 227 on one end of the shaft.

In associating the two mechanisms, A and B, we propose to drive the mechanism B faster than the mechanism A; that is to say, the peripheral speed of the transfer roll of the mechanism A will be less than the peripheral speed of the transfer roll or rolls of the mechanism B. This may include simply an adjustment of the motor speed for either mechanism and is therefore not illustrated. A suitable means may comprise a current control rheostat for either motor whereby one of these motors may be made to operate faster than the other.

Referring to Fig. 2, it will be seen that the blank at P is in the position in which the transfer roll 16 has completed a graining operation on the blank. The blank P′, as shown, is just entering the bite of the transfer roll 16 and the nearest adjacent conveyer roll 20. As this blank P′ now passes under the transfer roll, it will be gripped and fed by the transfer roll and adjacent conveyer roll. As soon as the front edge of the panel P′ engages the rear edge of the blank at P, the latter blank will be shoved into the bite of the transfer rolls of the mechanism B. Now if the transfer rolls of the mechanism B are operating at a slower surface speed than with the surface speed of the transfer roll 16, the transfer rolls of the mechanism B will impede the progress of the blank P, resulting in a blurred transfer on the side edges of the blank. However, with the surface speed of the mechanism B increased over the surface speed of the mechanism A, the blank P will be drawn away from the blank P′ and no blurred image will result. There is a further advantage in having the mechanism B operate at greater graining speed, namely, when the blanks are thus separated they are more easily removed from the mechanism B.

While we have described the mechanism B as taking work from the mechanism A, it is obvious that the mechanism B may be placed on the opposite end of the mechanism A so that blanks will be fed from the mechanism B to the mechanism A. This requires no essential modification of the machine since both mechanisms may be simply turned end-for-end and resecured in place on the sub-base.

A further obvious change may consist in providing the horizontal graining mechanism A with a sliding arrangement, so that the latter mechanism may be moved along the sub-base toward and away from the mechanism B which would, in that event, be stationary.

While we have shown in detail a machine operating on the offset printing principle; that is to say, with a pattern roll carrying a primary pattern element, the etched plate, and a transfer roll for taking the pigment from such pattern roll, it is obvious that, insofar as the general arrangements are concerned, the transfer or "composition" roll may carry the pattern. In such event, the pigment applying device would operate directly on the tarnsfer roll and the pattern roll would be omitted.

Further, attention is called to the fact that in the mechanism B either unit, C or C′, may be omitted and replaced by an ordinary platen or backing roll, or for that matter, a vertical conveyer. This needs no illustration since, as a matter of course, the transfer roll of either unit C or C′ may be replaced by a rubber roll which would serve in place of a special backing roll support and/or conveyer.

We contemplate providing the units C and C′ with adjustment devices permitting the graining rolls of one or both of these units to be inclined from the vertical in order to grain edge surfaces which are not strictly vertical.

We claim:

1. A graining machine, comprising, a main graining mechanism including a roll adapted and arranged to transfer a pattern to one surface of a blank, a second graining mechanism, including a roll, adapted and arranged to transfer a similar pattern to another surface of the blank substantially normal to the aforesaid surface, means to adjust the two mechanisms toward and away from each other for graining blanks of different lengths, and a longitudianlly adjustable conveyer interposed between the two mechanisms for carrying the blank from one mechanism to the other.

2. A graining machine, comprising, a

graining mechanism adapted to operate on one surface of a blank to transfer a pattern thereto, a second graining mechanism adapted and arranged for graining a surface of the same blank which is disposed substantially normal to the aforesaid surface, a conveyer for leading the blank from one graining mechanism to the other, said mechanisms being arranged with relation to the blank lengths in such manner that the second mechanism will start graining a blank only after the first mechanism has completed its operation, whereby the two mechanisms may operate at different graining speeds.

3. In a graining machine, a main graining mechanism adapted and arranged to grain a substantially horizontal surface of a blank supported in substantially horizontal position, another mechanism adapted to grain the edges of such blank which are substantially normal to the horizontal surface, a conveyer for leading the blank from one mechanism to the other, and means for bodily adjusting the two mechanisms with relation to each other in a direction lengthwise of the blank, whereby blanks of different lengths may be grained in the machine, one graining operation starting after the other is entirely completed, thereby obviating the necessity for synchronizing the two mechanisms.

4. In combination, a graining mechanism adapted to transfer a pattern to the major surface of a blank in substantially horizontal position, means for conveying the grained blank from such mechanism, and a second graining mechanism, including a substantially vertically roll arranged to contact with and grain the side edge of such blank as the same is carried from said first mechanism to the second on said conveying means.

5. In a graining machine, a graining mechanism, including a roll adapted to transfer a pattern to a substantially horizontal surface of a substantially horizontally disposed blank, an edge graining mechanism comprising a pair of rolls, each adapted to transfer a pattern to the blank, and conveyer means for conveying the blank from one mechanism to the other, said rolls of the edge graining mechanism being movably mounted for relative adjustment transversely of the path of movement of the blank, whereby the edges of blanks of different widths may be grained.

6. In an edge graining machine, a base, a power shaft on said base, two graining units surmounting the base and relatively adjustable along the same, said graining units comprising individual rolls adapted to contact with a blank supported between said units to grain the opposite edges of such blanks simultaneously, driving mechanisms for said rolls, and individual connections from both driving mechanisms to said main shaft, one of said connections comprising a bevel gear slidable on said shaft to various positions, and a cooperating bevel gear in fixed position on one of the units, the cooperating bevel gear being included in said driving mechanism, whereby the peripheral speeds of the two rolls may be maintained constant, irrespective of movement of the rolls, toward and away from each other for graining different width blanks.

7. An edge graining machine, comprising, two substantially vertical graining rolls arranged to simultaneously grain the opposite surfaces of a blank disposed between them, a bed, and individual base supports for said rolls on said bed, gearing in said bases for driving the respective rolls, a power shaft on said bed extending beneath both base supports, and gears on the power shaft respectively driving the aforesaid gearing, one of said base supports being shiftable along the bed toward and away from the other base, the driving gear on said shiftable base being slidable on the shaft but drivingly rigid therewith, whereby the rolls may be driven from said power shaft, notwithstanding variation in adjustment between the rolls for blanks of different widths.

8. In a machine of the kind described, a bed, two graining units, including substantially vertical graining rolls and individual bases on said bed, means to convey blanks between said rolls for simultaneously graining on opposite surfaces thereof, and a device carried on said bed with connections to both bases arranged to move the bases in opposite directions simultaneously to thereby adjust the distance between said rolls equally with reference to the conveying means.

9. In a graining machine, two graining units, comprising, substantially vertical graining rolls, individually movable bases supporting said rolls, a common bed supporting said bases, means on the bed for conveying blanks between the rolls of said units for simultaneously graining opposite surfaces thereof, and means to adjust the bases simultaneously, comprising, a right and a left hand screw carried on said bed and threaded members on said bases engaging the screws.

10. Mechanism according to claim 9, wherein the screw comprises separate sections and there is a coupling device for connecting and disconnecting said sections, whereby the bases may be adjusted simultaneously and/or individually.

11. In a machine of the class described, a graining mechanism adapted to grain one surface of a blank supported in substantially horizontal position, graining mechanism adapted to grain another surface of such blank disposed substantially normal to the aforesaid surface, conveyer means for carrying a blank from one mechanism to another, and a sub-base for the two mechanisms, comprising a slideway upon which one mecha-

nism is mounted for longitudinal movement toward and away from the other mechanism, whereby the two mechanisms may operate effectively on blanks of different lengths.

12. A machine according to claim 11, wherein there is a rack on the sub-base and a gear on one of said mechanisms in mesh with the rack, and means for turning the gear to move one mechanism with reference to the other on said sub-base.

13. In a machine of the class described, graining mechanism, including a roll adapted to transfer a pigment pattern to a blank, a conveyer on said mechanism, including a series of rollers, and a positioning frame therefor, adjustably arranged to be raised and lowered with reference to the roll to accommodate blanks of different vertical dimensions, a graining mechanism adjacent the aforesaid mechanism and comprising a substantially vertically disposed roll, and means associated therewith, whereby the roll will transfer a pigment pattern to a surface of such blank disposed substantially normal to the aforesaid surface, and a conveyer on said second mechanism arranged for vertical adjustment whereby the blank may travel from one mechanism to the other along a substantially horizontal plane.

14. In a machine of the class described, a substantially vertical pattern roll and means for supplying pigment material thereto, a substantially vertical transfer roll, a common base for the two rolls, a driving gearing for both rolls located beneath said base, there being a frame for one of said rolls movable in a substantially horizontal plane and pivoted on the base about an axis substantially parallel to said roll axes, there being a drive shaft connected with said gearing and located on said pivot axis and forming part of the pivot, and a roll driving device connecting the frame supported roll with the said shaft, whereby the two rolls may be separated and their contact relationship adjusted without disturbing the driving connection to the frame supported roll.

15. In a graining machine, a substantially vertically disposed graining roll, a base supporting said roll and driving gearing for the roll supported by the base, removable means for supporting the upper end of the roll, said means being normally rigid with the base, there being a driving coupling between the roll and driving gearing, the elements of the coupling being detachable by endwise movement of the roll, whereby the roll may be easily removed from the base.

16. In a graining machine, a substantially vertically disposed roll, means to supply pigment material to the roll for subsequent transfer to a blank to be grained, a base supporting said roll, driving gearing for the roll in said base, upstanding frame members rising from the base and disposed alongside the roll, a cross bar forming a bearing for the roll, said bar being removably attached to said frame members whereby the roll may be removed from the machine, the said roll and driving gearing including separable coupling parts permitting the roll to be disconnected from the driving gearing when the roll is removed as aforesaid.

17. A graining machine, comprising a graining mechanism adapted to transfer a pattern to one surface of a blank in substantially horizontal position, a second graining mechanism adapted to transfer a similar pattern to the same blank at a surface thereof substantially normal to the first mentioned surface, and a conveyer for leading a blank from one said mechanism to the other, where in the second mechanism operates to feed the blank, received from the first mechanism, faster than the first mechanism feeds such blank, whereby the successive blanks will be spaced from each other and blurring of the graining of the second machine, due to overfeeding by the first mechanism will be prevented.

In testimony whereof, we hereunto affix our signatures.

GUIDO VON WEBERN.
EDW. W. HAMANT.