

Oct. 5, 1948.

F. LAMBACH

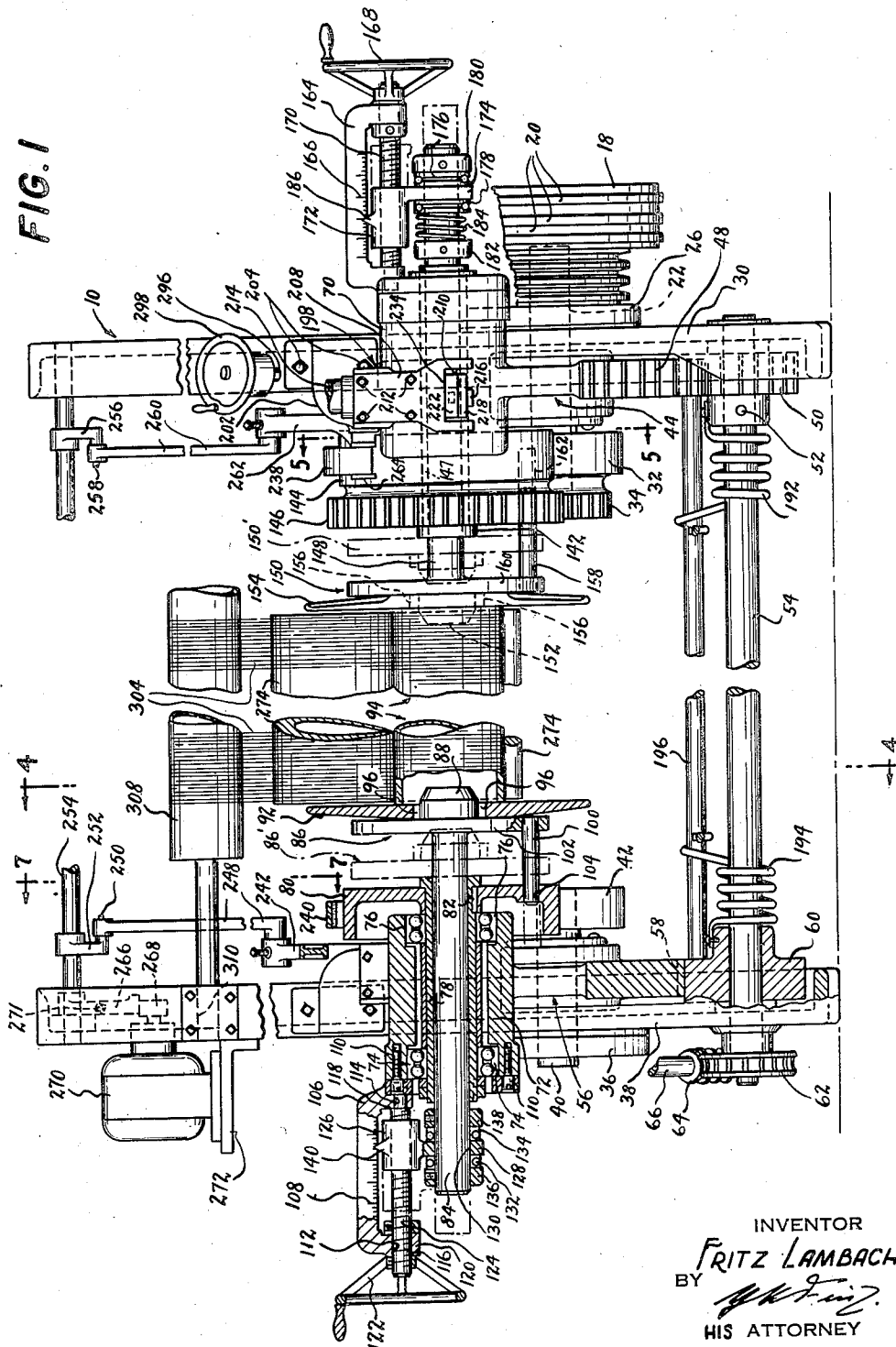
2,450,431

BEAMING OR WARPING MACHINE

Filed June 17, 1946

4 Sheets-Sheet 1

FIG. 1



INVENTOR
FRITZ LAMBACH
BY
HIS ATTORNEY

Oct. 5, 1948.

F. LAMBACH

2,450,431

BEAMING OR WARPING MACHINE

Filed June 17, 1946

4 Sheets-Sheet 2

FIG. 2

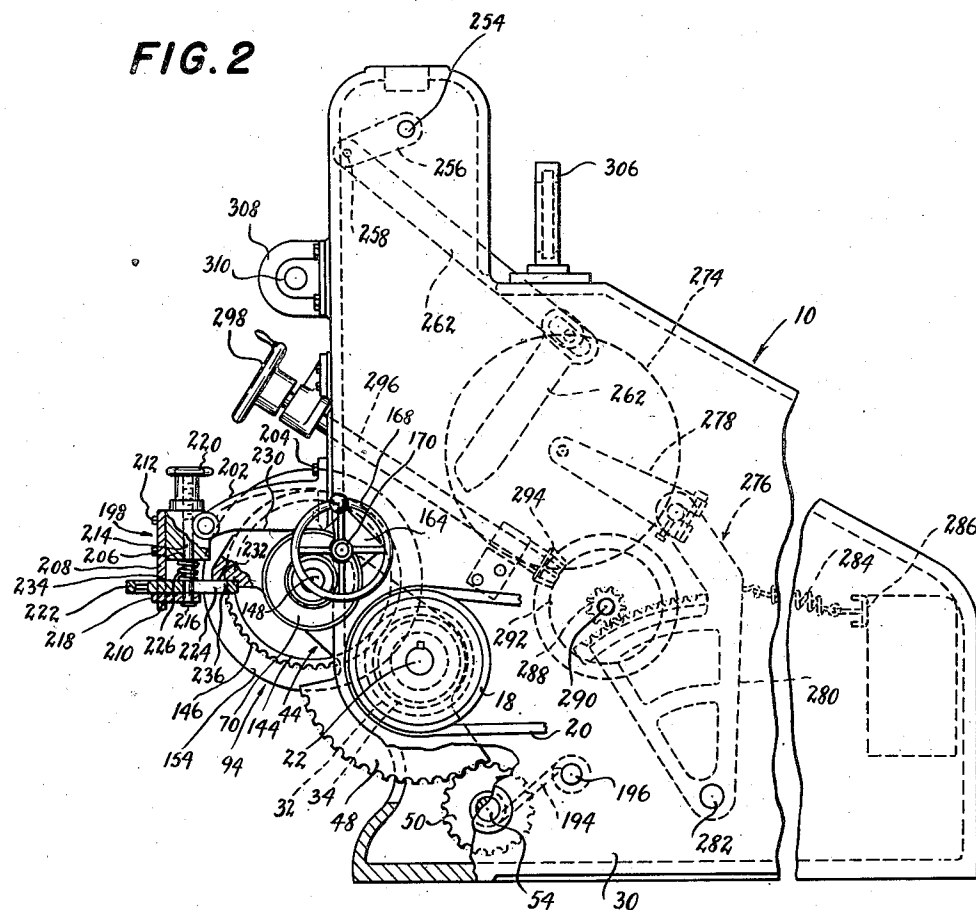
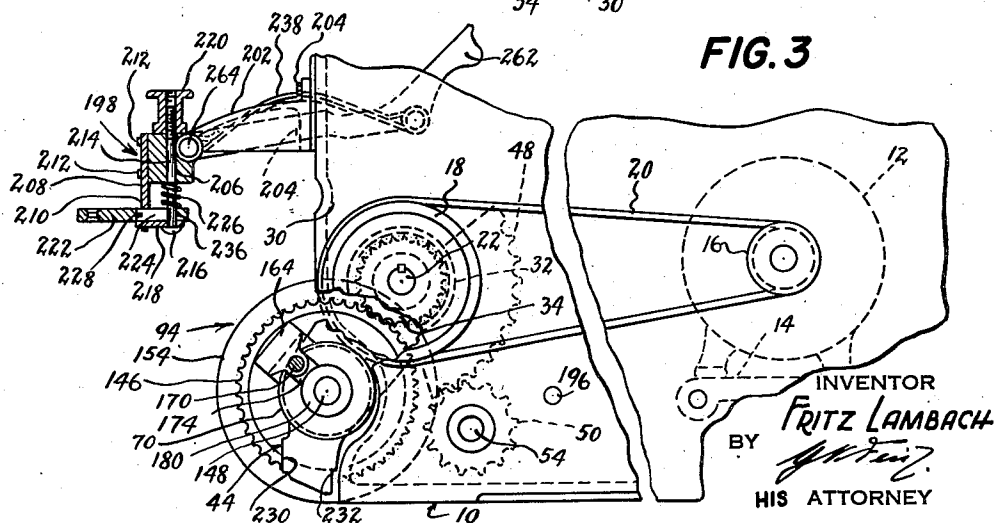


FIG. 3



INVENTOR

Fritz Lambach

BY

HIS ATTORNEY

Oct. 5, 1948.

F. LAMBACH

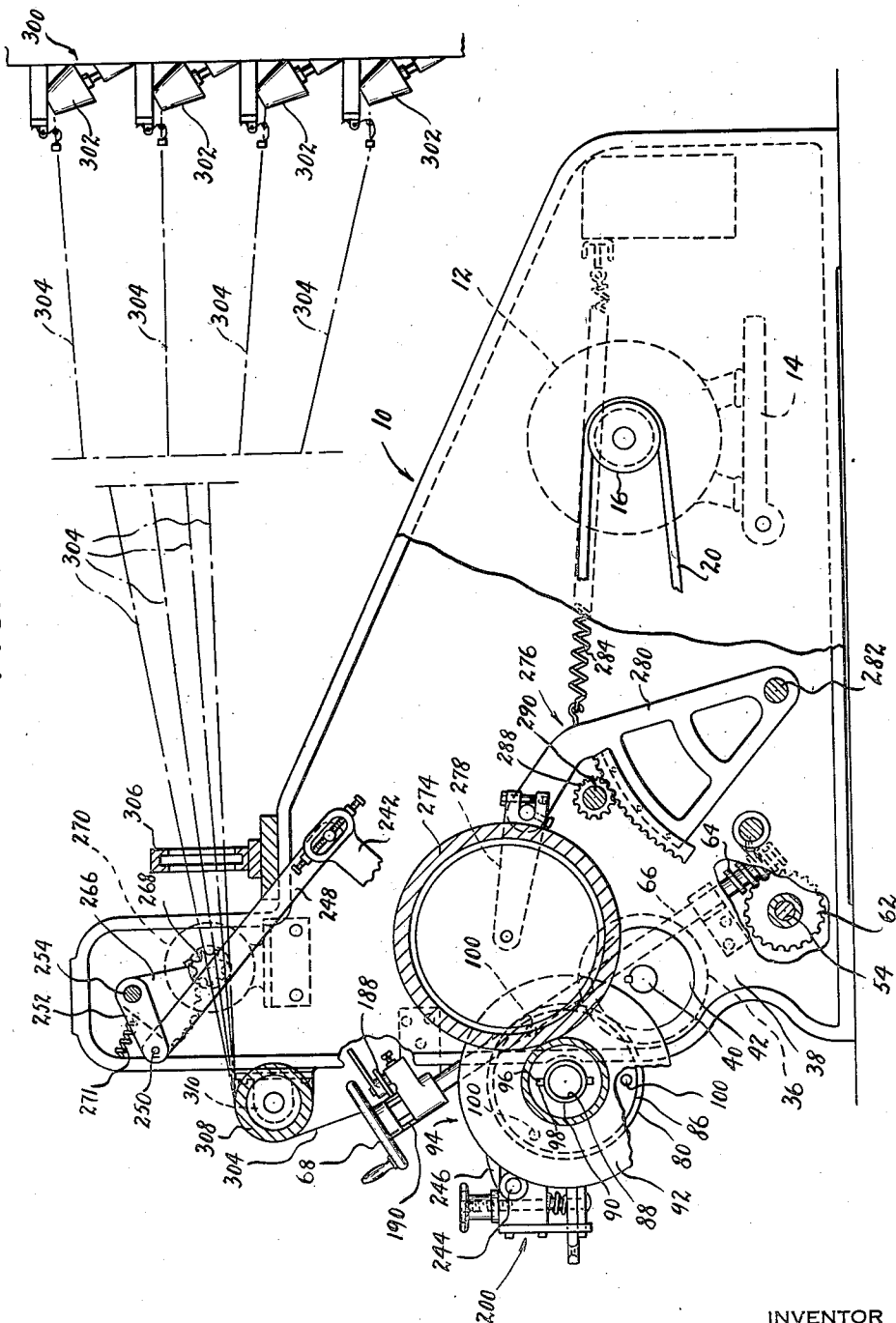
2,450,431

BEAMING OR WARPING MACHINE

Filed June 17, 1946

4 Sheets-Sheet 3

FIG. 4



INVENTOR
FRITZ LAMBACH
BY *[Signature]*
HIS ATTORNEY

Oct. 5, 1948.

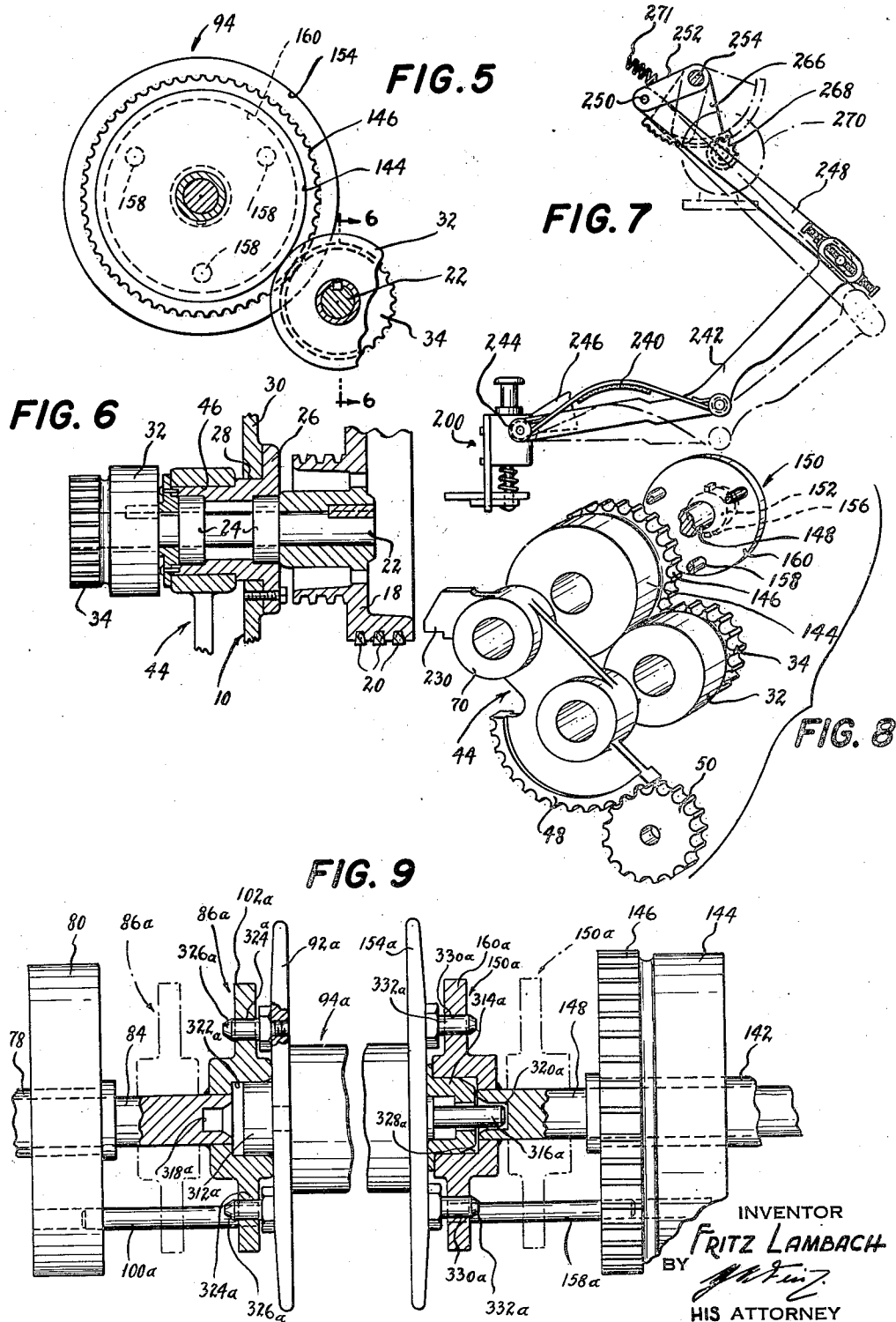
Filed June 17, 1946

F. LAMBACH

2,450,431

BEAMING OR WARPING MACHINE

4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

2,450,431

BEAMING OR WARPING MACHINE

Fritz Lambach, Tenaflly, N. J.

Application June 17, 1946, Serial No. 677,297

23 Claims. (Cl. 28—32)

1

My invention relates to textile machines, and more particularly to a beaming or warping machine.

An object of the present invention is to provide a beamer with beam engaging means, by which beams of different dimensions may be readily gripped and connected with the driving means.

A further object of the present invention is to provide a beamer with an efficient locking device for holding a swingable support carrying a beam in its upper operative position.

Another object of the present invention is to provide a beamer with means preventing a damage to the teeth of a gear drive of the beam during the lifting of its swingable support carrying the beam.

With the above and other objects of the invention in view, the invention consists in the novel construction, arrangement and combination of various devices, elements and parts, as set forth in the claims hereof, certain embodiments of the same being described in the specification and being illustrated in the accompanying drawings forming part of this specification, wherein:

Fig. 1 is a front elevational view of a beamer according to the invention, some parts being shown in section and some parts being broken away,

Fig. 2 is a side elevational view of the beamer shown in Fig. 1, wherein, however, the pressure roll is in a different position, some parts being shown in section and some parts being broken away,

Fig. 3 is a fragmentary side elevational view of the beamer shown in Figs. 1 and 2, wherein, however, the swingable support receiving the beam is in a different position,

Fig. 4 is a sectional view of the beamer shown in Fig. 1, taken on line 4—4 of Fig. 1,

Fig. 5 is a sectional view of a detail of the beamer shown in Fig. 1 taken on line 5—5 of Fig. 1,

Fig. 6 is a fragmentary sectional view taken on line 6—6 of Fig. 5,

Fig. 7 is a sectional view taken on line 7—7 of Fig. 1, said sectional view illustrating a braking mechanism,

Fig. 8 is an exploded perspective view of a detail of the beamer, and

Fig. 9 is a fragmentary front elevational view, partly in section, illustrating a different embodiment of the beam engaging means of the beamer.

In the drawings, only those parts of a beaming or warping machine are shown, which are necessary for the understanding of the invention.

2

Referring now to Figs. 1-4, 10 generally indicates the frame of a beamer according to the invention. The frame is composed of several parts in conventional manner.

As best shown in Figs. 3 and 4, a driving motor 12 mounted on a supporting member 14 inside the beamer is connected with a rotatable driving pulley 16 arranged outside the beamer. Said driving pulley 16 is connected with another pulley 18 by means of three belts 20. As best shown in Figs. 1, 2, 3 and 6, the driven pulley 18 is keyed to a driving shaft 22, rotatably arranged in roller bearings 24 of a bushing 26 mounted in an aperture 28 of a side wall 30 of the frame 10. Said bushing 26 is secured to the side wall 30 by means of a plurality of screws. A roller 32 and a driving pinion 34, forming an integral piece, are keyed to the end of the driving shaft 22, projecting from the bushing 26 toward the center of the beamer.

As best shown in Figs. 1 and 4, a second bushing 36 is mounted on the opposite side wall 38 of the frame 10 of the beamer. A shaft 40, journaled in roller bearings of said bushing 36 is co-axially arranged with above mentioned driving shaft 22, journaled in the bushing 26. A second roller 42 is keyed to the shaft 40.

As best shown in Figs. 1, 2, 3 and 6, a supporting member generally indicated by 44 is swingably mounted on a cylindrical portion 46 of the bushing 26. The axis of rotation of said supporting member 44 coincides with the longitudinal axis of the driving shaft 22. According to Figs. 1, 2, 3 and 8, said supporting member 44 is provided with a gear segment 48 in mesh with a pinion 50 secured by a pin 52 to a transverse rod 54 rotatably mounted in the side walls 30 and 38 of the frame 10.

In a similar manner, as best shown in Fig. 1, a second supporting member generally indicated by 56 is swingably mounted on a cylindrical portion of the bushing 36 in such a manner, that its axis of rotation is in line with the longitudinal axis of the shaft 40. Said supporting member 56 is provided with a gear segment 58 in mesh with a pinion 60 secured to the transverse rod 54 in any suitable manner. According to Figs. 1 and 4, a worm gear 62 keyed to a projecting end of the transverse rod 54 is in mesh with a self-locking worm 64 mounted at the lower end of a spindle 66, rotatably arranged in suitable bearings of the frame 10 of the beamer. The upper end of said spindle 66 carries a hand wheel 68, by means of which said spindle 66 may be rotated for lifting or lowering the pair of supporting members 44, 56

through the medium of the gears 64, 62, 60, 58, 50, 48.

As best shown in Figs. 1, 2, 3 and 8, the supporting member 44 is provided with a hub 70. Likewise, the opposite supporting member 56 is provided with a hub 72. As best shown in Fig. 1, said hub 72 of the supporting member 56 is provided with spaced roller bearings 74, 76. A sleeve 78 is rotatably and axially immovably arranged in said roller bearings 74 and 76. A disc 80 serving as a brake drum is keyed to said rotatable sleeve 78 by means of a key 82. A rod 84 carrying a beam engaging means generally indicated by 86 is axially movably arranged in said sleeve 78. The beam engaging means 86 is provided with a nipple 88 for engagement with a bore 90 (see Fig. 4) of a flange 92 of a beam generally indicated by 94. Furthermore, said beam engaging means 86 is provided with projections 96 on said nipple 88 for engagement with corresponding recesses 98 in the wall of the flange 92 of the beam 94. Moreover, three connecting pins 100 are rigidly connected with the disc-like portion 102 of the beam engaging means 86. Each of said connecting pins 100 is in slidable engagement with a bore 104 in the brake drum 80 so that the latter is positively connected with the beam engaging means 86 for a simultaneous rotation with the latter. As best shown in Fig. 4, the brake drum 80 is in contact with the roller 42 carried by the shaft 40.

In order to displace the rod 84 and the beam engaging means 86 mounted thereon toward and away from a beam 94, the following adjusting mechanism is arranged on the supporting member 56, as best shown in Fig. 1: A bracket 106 provided with a scale 108 is attached to the hub 72 by screws 110. Said bracket 106 has two bores 112, 114 rotatably receiving a spindle 116, prevented from axial displacement by its shoulder 118 and a set collar 120. A hand wheel 122 secured to the spindle 116 may be used for rotating same. A threaded portion 124 of the spindle 116 is in engagement with a threaded bore of an actuating member 126 having a lug 128 provided with a bore 130 in engagement with the rod 84. A roller bearing 132 is arranged on one side of said lug 128 and a roller bearing 134 is arranged on the other side of said lug 128. Set collars 136, 138 secured to the rod 84 and arranged adjacent said roller bearings 132, 134 prevent an axial displacement of the rod 84 relative to the lug 128 so that, in other words, the rod 84 and the beam engaging means 86 follow any movement of the actuating member 126 toward or away from the beam, which may be caused by a rotation of the spindle 124 by means of the hand wheel 122. A pointer 140 cooperating with the scale 108 on the bracket 106 may be used for setting the actuating member 126 and, of course, the beam engaging means 86 connected therewith, as described above, in any predetermined position.

In a similar manner, a sleeve 142 is rotatably, but axially immovably arranged in the hub 70 of the supporting member 44. Said sleeve 142 carries a brake drum 144 and a gear 146 forming an integral piece. Said integral piece 144, 146 is keyed to the sleeve 142 by a key 147. As best shown in Figs. 2, 3, 5 and 8, the brake drum 144 is in contact with the roller 32, and the gear 146 is in mesh with the driving pinion 34 secured to the driving shaft 22. As best shown in Fig. 1, a rod 148 carrying a beam engaging means 150 is axially shiftably arranged in the sleeve

142. The beam engaging means 150 has a nipple 152 for engagement with a hole in the flange 154 of the beam 94. Projecting portions 156 on said nipple 152 serve for engagement with corresponding recesses in the flange 154, so that the beam engaging means 150 may be positively connected with the flange 154 of the beam 94. Three connecting pins 158, rigidly connected with a disc-like portion 160 of the beam engaging means 150, are in slidable connection with bores 162 in the member forming the brake drum 144 and gear 146. Thus, the beam engaging means 150 is positively connected with the gear 146, so that it may be rotated for a rotation of the beam 94 when the gear 146 is driven by the driving pinion 34, connected with the motor of the beamer.

The beam engaging means 150 may be displaced relative to the beam engaging means 86 toward and away from the beam 94 by an adjusting mechanism. Said adjusting mechanism comprises a bracket 164 provided with a scale 166 and attached to the hub 70. A hand wheel 168 is secured to a spindle 170 rotatably but axially immovably mounted on said bracket 164. The threaded portion of said spindle 170 is in engagement with a threaded bore of an actuating member 172 having a lug 174 provided with a bore receiving the rod 148 carrying the beam engaging means 150. A roller bearing 176 is arranged on one side of said lug 174, and a roller bearing 178 is arranged on the other side of said lug 174. A set collar 180 is secured to the rod 148 adjacent the roller bearing 176. Another set collar 182 secured to the rod 148 is arranged at a certain distance from the roller bearing 178, and a spring 184 is interposed between said set collar 182 and the roller bearing 178. A rotation of the hand wheel 168 causes an axial displacement of the actuating member 172 having a pointer 186 for cooperation with the scale 166 so as to permit an adjustment of the actuating member 172 in a pre-determined position. If the actuating member 172 is displaced in a left-hand direction, (as viewed in Fig. 1) the rod 148 and the beam engaging means 150 will follow such a movement of the actuating member 172, until the beam engaging means 150 engages the beam 94 preventing a further movement thereof in left-hand direction; thereupon, the spring 184 will be compressed, if the left-hand movement of the actuating member 172 continues. If the actuating member 172 is moved in right-hand direction, at first the spring 184 will expand, if said spring was in a compressed condition, whereupon the rod 148 and the beam engaging means 150 will follow the movement of the actuating member 172 in right hand direction.

The above described swingable support 44, 56 may be swung from its lower beam receiving position shown in Fig. 3 into its upper operative position shown in Fig. 2 by a rotation of the hand wheel 68 (Fig. 4) arranged on the spindle 66 (Figs. 1 and 4) carrying the worm 64 in mesh with the worm gear 62 keyed to the rotatable transverse rod 54 carrying the pinions 50 and 60 in mesh with the gear segments 48 and 58. A spring-loaded pawl 188 cooperating with a ratchet wheel 190 mounted on the spindle 66 and the self-locking worm 64 prevent an undesired drop of the beam loaded support into a lower position thereof. Compensating means or springs 192, 194 wound around the transverse rod 54 and connected with a stationary transverse bar 196 and the pinion 50 and pinion 60 respectively

are arranged for compensating the weight of the support carrying an empty beam.

The swingable support 44, 56 may be held in its upper operative position by means of the following locking means: A locking mechanism generally indicated by 198 (Figs. 1, 2 and 3) is arranged on one side of the beamer for cooperation with the supporting member 44, and a locking mechanism generally indicated by 200 (Fig. 4) is arranged on the other side of the beamer for cooperation with the supporting member 56. As both locking mechanisms 198 and 200 are of the same construction, only one of them, the locking mechanism 198, will be described hereinafter. A bracket 202 attached to the frame 10 by screws 204 is provided with a vertical bore 206. A plate 208 having a recess 210 is attached to the bracket 202 by means of screws 212. A bolt 214 slidably inserted into the bore 206 of the bracket 202 is provided with a head 216 carrying a supporting element 218, which may be moved upwardly and downwardly in the recess 210 of the plate 208. The upper threaded end of the bolt 214 is in engagement with the threaded bore of a locking knob 220 resting on the upper surface of a portion of the bracket 202. The supporting element 218 carries a locking slide 222 provided with a longitudinal slot 224 in engagement with the bolt 214. The locking slide 222 may be moved along the supporting element 218 in a horizontal direction toward and away from the front side of the beamer. A spring 226 is interposed between the lower surface of a portion of the bracket 202 and the upper surface of the locking slide 222. When the swingable support 44, 56 is in the lower beam receiving position shown in Fig. 3, the supporting element 218 and the locking slide 222 of the locking mechanism 198 are in the position shown in said Fig. 3. Thus, the locking slide 222 is out of the path of the supporting member 44, when the latter is lifted into the upper operative position shown in Fig. 2, wherein its edge 230 abuts against the bracket 202. When said supporting member 44 is in said upper operative position, the locking slide 222 may be moved toward the front wall of the beamer until the edge 228 of the slot 224 abuts against the bolt 214. Thereupon, the locking knob 220 may be tightened whereby the supporting element 218 carrying the locking slide 222 is lifted against the action of the spring 226, until the locking slide is firmly held against a recess 232 of the supporting member 44 and the edge 234 of the recess 210 of the plate 208 as shown in Fig. 2. Thus, the swingable support 44, 56 is firmly held in its upper operative position by means of the locking mechanism 198, 200, so that the support 44, 56 and the beam 94 carried by the support are not subject to undesired vibration during the operation of the beamer.

If it is desired to swing the support 44, 56 in its lower position after a winding has been applied to the beam, the locking knob 220 is loosened whereby the locking slide 222 and its supporting element 218 are lowered under the action of the spring 226. At this time, the support 44, 56 will be held in an upper position by means of the pawl 188 in engagement with the ratchet wheel 190. After the disengagement of the locking slide 222 from the recess 232 of the support 44 by means of above described loosening of the locking knob 220, the locking slide 222 may be readily moved into the position shown in Fig. 3, which is limited by an engagement of the edge 236 of the slot 224 with the bolt 214. Thereupon,

after a release of the pawl 188 from the ratchet wheel 190, the swingable support 44, 56 may be readily lowered into the position shown in Fig. 3 by turning the hand wheel 68.

As the supporting member 44 is swingable about the axis of the driving shaft 22 carrying the driving pinion 34, the gear 146 positively connected with the beam engaging means 150 will be permanently in mesh with the driving pinion 34, whether the supporting member 44 is in its lower position or in its upper position or in any intermediate position, as may be readily gathered from Figs. 2, 3 and 4. For the same reason, the brake drum 144 will be permanently in contact with the roller 32. Likewise, as the supporting member 56 is swingable about the axis of the shaft 40 carrying the roller 42, the brake drum 80, positively connected with the beam engaging means 86, will be permanently in contact with said roller 42. Thus, the rollers 32 and 42 being in engagement with the brake drums 144 and 80 may act as supporting rollers supporting said brake drums 144 and 80, which in turn support the shiftable rods 148 and 84 carrying the beam engaging means 150 and 86 being under the load of the beam 94.

A brake band 238 (see Figs. 1 and 3) is arranged for cooperation with the brake drum 144. Furthermore, a brake band 240 (see Figs. 1 and 7) is arranged for cooperation with the brake drum 80. According to Fig. 7, the ends of the brake band 240 are mounted on a lever 242 swingably arranged on a stud 244 arranged on the stationary bracket 246 carrying the locking mechanism 200. According to Figs. 1, 4 and 7, the other end of said lever 242 is rotatably and adjustably connected with one end of a link 248, the other end of which is pivoted at 250 to a crank 252 rigidly connected with a transverse rod 254 rotatably arranged in the frame of the beamer. As best shown in Fig. 1, a second crank 256 is secured to said rotatable transverse rod 254. Said crank 256 is pivoted at 258 to one end of a link 260, the other end of which is rotatably and adjustably connected with one end of a lever 262. As best shown in Figs. 1 and 3, said lever 262 carries the brake band 238 and is swingably mounted on a stud 264 arranged on the bracket 202 carrying the locking mechanism 198. Furthermore, as best shown in Figs. 1, 4 and 7, a gear segment 266 meshing with a pinion 268 keyed to the shaft of a torque motor 270 is secured to the rotatable transverse 254. The torque motor 270 is mounted on a bracket 272 attached to the frame of the beamer. A spring 271 stretched between the gear segment 266 and the frame 10 tends to hold the gear segment in the full line position shown in Figs. 4 and 7. When the beamer is in operation, above described braking mechanism is in the position shown in full lines in Fig. 7. When the torque motor 270 is energized for a stoppage of the beamer, the gear segment 266 is swung into the position shown in dash and dot lines in Fig. 7, against the action of the spring 271, whereby the lever 242 carrying the brake band 240 is likewise brought into the dash and dot line position, so that the brake band 240 is applied to the brake drum 80. In the same manner, the brake band 238 will be applied to the brake drum 144, as the lever 262 carrying said brake band 238 is connected through the link 260 with the crank 256 secured to the rotatable transverse rod 254 actuated by a rocking movement of the gear segment 266 driven by the torque motor 270.

As best shown in Figs. 1, 2 and 4, the beamer

is provided with a pressure roll 274 rotatably mounted on a support generally indicated by 276. Said support 276 comprises on each side of the beamer an arm 278 rigidly connected with a gear segment 280 swingably mounted at 282 on the frame of the beamer. A spring 284 counteracting the weight of the pressure roll 274 to a certain degree is stretched between each gear segment 280 and a stationary part 286 of the beamer. Each gear segment 280 is in mesh with a pinion 288 keyed to a transverse shaft 290 journaled in the side walls of the frame 10 of the beamer. A bevel gear 292 keyed to said transverse shaft 290 is in mesh with a bevel gear 294 keyed to a spindle 296 journaled in suitable bearings of the frame 10. Said spindle 296 may be rotated by means of a hand wheel 298 secured to the upper end thereof, so that the pressure roll 274 may be lowered for engagement with the beam 94 as shown in Fig. 4 or may be lifted for disengagement from said beam, as shown in Fig. 2.

In Fig. 4, 300 generally indicates a creel carrying a plurality of bobbins 302. Only the end portion of said creel 300 is diagrammatically shown in Fig. 4. When the motor 12 is energized for rotating the beam 94, yarns 304 drawn from the bobbins 302 are wound on the beam. The yarns 304 pass through a reed 306 mounted on the frame 10 and travel over a guiding roller 308 rotatably arranged in bearings 310 secured to the frame.

Above described beamer may be operated as follows: Assume the motor 12 is at a stand-still, the pressure roll 274 is in the position shown in Fig. 2, the support 44, 56 is in its lower beam receiving position shown in Fig. 3, and the beam engaging means are in the position 86', 150' shown in dash and dot lines in Fig. 1.

Now, an empty beam 94 may be rolled on the ground into the space between the beam engaging means 86, 150. Thereupon, at first the right hand (as viewed in Fig. 1) hand wheel 168 is rotated, until the actuating member 172 reaches a pre-determined position relative to the scale 166. Such a rotation of the hand wheel 168 causes an axial displacement of the beam engaging means 150 for engagement with the flange 154 of the beam 94. Furthermore, during such a displacement of the beam engaging means 150, the spring 184 between the roller bearing 178 and the set collar 182 may be compressed as soon as the flange 154 of the beam 94 prevents a further axial displacement of the beam engaging means 150. Thereafter, the left hand (as viewed in Fig. 1) hand wheel 122 is rotated until the actuating member 126 reaches a pre-determined position relative to the scale 108. Such a rotation of the hand wheel 122 causes an axial displacement of the beam engaging means 86 for engagement with the flange 92 of the beam 94. The pre-determined positions of the actuating members 126 and 172 relative to the scales 108 and 166 respectively are selected in such a way, that the beam 94 may be held in proper registering position relative with the pressure roll 274. The spring 184 takes care automatically of a slight displacement of the beam 94, if the beam was not placed exactly in register with the pressure roll 274 between the beam engaging means 86 and 150 prior to the engagement of the latter with the beam.

After the engagement of the beam engaging means 86 and 150 with the beam 94 by means of above described rotation of the hand wheels

122 and 168, the swingable support 44, 56 may be lifted into its upper operative position shown in Fig. 2 by means of a rotation of the hand wheel 68 shown in Fig. 4. The support 44, 56 is locked in said upper operative position by means of the locking mechanisms 198, 200 in the manner described above. Thereupon, the pressure roll 274 is lowered by means of a rotation of the hand wheel 298 from the position shown in Fig. 2 into the position shown in Figs. 1 and 4, so as to come in engagement with the cylindrical main body of the beam 94. If a slight axial displacement of the beam 94 should still be necessary to have the beam in the proper registering position with the pressure roll 274, such a slight axial displacement may be readily carried out by a slight rotation of the left hand (as viewed in Fig. 1) hand wheel 122 one way or the other. During such a slight rotation of the hand wheel 122 either the spring 184 will automatically urge the beam engaging means 150 and the beam 94 into the proper position or the spring 184 will be somewhat compressed.

Upon an energization of the motor 12, the beam 94 will be rotated through the belt drive 16, 18, 20, the pinion 34 in mesh with the gear 146, and by the beam engaging means 150 positively connected with said gear 146 through the connecting pins 158. The locking means 198, 200 firmly holding the swingable support 44, 56 in its upper operative position and the spring 184 tightly urging the disc-like portions 102 and 160 of the beam engaging means 86 and 150 against the flanges 92 and 154 of the beam 94 eliminate an undesired vibration of the beam during the operation of the beamer, so that the latter may be operated at a high speed.

When, for any reason whatsoever, the operation of the beamer is to be stopped, the motor 12 is de-energized and the torque motor 270 is energized by an electrical control mechanism, which may be of any conventional construction. The energization of the torque motor 270 causes an immediate application of the brake bands 238, 240 on the brake drums 144, 80 positively connected with the beam engaging means 86 and 150 with the result of an immediate stoppage of the beam 94. After the stoppage of the beam 94, the torque motor 270 is automatically de-energized, so that the spring 271 may return the gear segment 266 into the full line position shown in the drawings for a disengagement of the brake bands 238 and 240 from the brake drums 144 and 80.

Now, after a release of the swingable support 44, 56 by rendering ineffective the locking means 198, 200, the swingable support 44, 56 may be lowered into the position shown in Fig. 3, whereupon the beam engaging means 86 and 150 may be brought into the positions 86' and 150' for a release of the full beam 94.

The beam engaging means 86 and 150 shown in Fig. 1 are for use in cooperation with a beam having a hole on each of its flanges. There are also beams on the market, which are of different construction.

Fig. 9, for example, illustrates a beam 94a having a nipple 312a on its flange 92a and a nipple 314a on its flange 154a. Furthermore, said beam is provided with an axle 316a projecting from its nipple 314a. If the beamer, according to the invention, is to be used for such a type of beams 94a, the beam engaging means 86a carried by the rotatable rod 84 and the beam engaging means 150a carried by the rotatable rod 148 are made of

9

a somewhat different construction. Furthermore, the rod 84 is provided with a recess 318a and the rod 148 is provided with a recess 320a. Otherwise, all elements of the beamer may be of the same construction as shown in Figs. 1-8.

According to Fig. 9, the beam engaging means 86a comprises a disc-like member 102a rigidly connected with the rod 84 by welding, for example. Said disc-like member 102a has a recess 322a for engagement with the nipple 312a of the beam 94a. Furthermore, said disc-like member 102a is provided with a plurality of holes 324a, which may be engaged with a corresponding number of bolts 326a screwed into the flange 92a of the beam 94a for a positive connection of the beam engaging means 86a with the beam 94a. A plurality of connecting pins 100a (only one being shown in Fig. 9) rigidly connected with the disc-like member 102a and slidably connected with the brake drum 80 serve for a positive connection of the beam engaging means 86a with said brake drum 80.

Likewise, the beam engaging means 150a comprises a disc-like member 160a rigidly connected with the rod 148 by welding, for example. Said disc-like member 160a is provided with a recess 328a for engagement with the nipple 314a of the beam 94a. Moreover, said disc-like member 160a has a plurality of holes 330a for engagement with a corresponding number of bolts 332a screwed into the flange 154a of the beam 94a, whereby the beam engaging means 150a may be positively connected with the beam 94a. A plurality of connecting pins 158a (only one being shown in Fig. 9) rigidly connected with the disc-like member 160a are in slidable engagement with the gear 146 for a positive connection of the beam engaging means 158 with said gear 146, which is driven by the motor of the beamer, as described above. The recess 320a of the rod 148 receives the axle 316a of the beam 94a. In a similar manner, the recess 318a of the rod 84 would receive an axle of the beam, if such an axle would be arranged on the left hand side of the beam (as viewed in Fig. 9). The beam engaging means 86a and 150a may be axially displaced relative to each other by means of the adjusting mechanisms associated with the rods 84 and 148, as described above in connection with Fig. 1. For example, the beam engaging means may be brought into the positions 86a' and 150a' for a disengagement from the bolts 324a and 330a of the beam 94a.

I have described preferred embodiments of my invention, but it is understood that numerous changes and omissions may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

For example, the locking mechanisms 198 and 200 may be arranged for cooperation with a swingable support on a beamer, wherein the driving pinion is arranged for cooperation with a gear connected with the beam, and wherein said gear is not permanently in mesh with said driving pinion. Likewise, the compensating springs 192 and 194 could be arranged on a beamer having a different type of driving connection between the motor and the beam.

What I claim is:

1. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said

swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, and coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position.

2. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, at least one of said adjusting means being directly connected with one of said beam engaging means, resilient means interposed between the other adjusting means and the other beam engaging means, and coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position.

3. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, compensating means associated with said swingable support for counteracting its weight under load of a beam in all of its intermediate positions to a substantially constant degree, and coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position.

4. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, resilient means arranged between a stationary part of the machine and said swingable support for counteracting the weight of the support under load of a beam in all of the intermediate positions of the support to a substantially constant degree, and coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position.

5. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means asso-

ciated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position, and braking means including at least one brake drum rotatably arranged on said swingable support, said brake drum being positively connected with a beam engaging means.

6. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, said beam engaging means being adjustable relative to each other for engagement with a beam placed between same, coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position, braking means including at least one brake drum rotatably arranged on said swingable support, said brake drum being positively connected with a beam engaging means, and at least one supporting roller rotatably arranged in a stationary part of the machine, said supporting roller being in contact with said brake drum for supporting the latter when the support is in its upper operative position.

7. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, said beam engaging means being adjustable relative to each other for engagement with a beam placed between same, coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position, braking means including at least one brake drum rotatably arranged on said swingable support, said brake drum being positively connected with a beam engaging means, and at least one supporting roller rotatably arranged in a stationary part of the machine, said supporting roller being coupled with said drive and being in driving contact with said brake drum for supporting and driving the latter when the support is in its upper operative position.

8. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, said beam engaging means being adjustable relative to each other for engagement with a beam placed between same, a gear rotatably arranged on said swingable support, said gear being positively connected with a beam engaging means, a driving pinion rotatably ar-

ranged in a stationary part of the machine, said driving pinion being in mesh with said gear when the support is in its upper operative position, braking means including at least one brake drum rotatably arranged on said swingable support, said brake drum being positively connected with a beam engaging means, and at least one supporting roller rotatably arranged in a stationary part of the machine, said supporting roller being coupled with said drive and being in driving contact with said brake drum for supporting and driving same when the support is in its upper operative position.

9. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, a gear rotatably arranged on said swingable support, said gear being positively connected with a beam engaging means, and a driving pinion rotatably arranged in a stationary part of the machine, said driving pinion being in mesh with said gear when the support is in its upper operative position.

10. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position, and locking means associated with said swingable support and the machine for holding said support in its upper operative position.

11. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position, and a locking element movably mounted on a stationary part of the machine, said locking element being capable of locking engagement with said swingable support when the latter is in its upper operative position.

12. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from

a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, said beam engaging means being adjustable relative to each other for engagement with a beam placed between same, coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position, a locking slide displaceably arranged on a stationary part of the machine, said locking slide being capable of engagement with said swingable support when the latter is in its upper operative position, and clamping means associated with said locking slide for urging same against said stationary part and said swingable support so as to hold the latter in its upper operative position.

13. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, said beam engaging means being adjustable relative to each other for engagement with a beam placed between same, coupling means associated with at least one of said beam engaging means for coupling same with said drive when the support is in its upper operative position, a locking slide displaceably arranged on a stationary part of the machine, said locking slide being capable of engagement with said swingable support when the latter is in its upper operative position, clamping means associated with said locking slide for urging same against said stationary part and said swingable support so as to hold the latter in its upper operative position, and resilient means associated with said locking slide for disengaging same from said swingable support upon a release of said clamping means.

14. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, and a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, and at least one of said beam engaging means being permanently coupled with said drive.

15. A beaming or warping machine comprising: a drive for rotating a beam, said drive including a driving shaft rotatably mounted in a stationary part of the machine, a support swingably mounted on the machine, said support being swingable about an axis coaxial with the axis of said driving shaft, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, a coupling element rotatably arranged on said swingable support, said coupling element being positively connected with at least one of said

beam engaging means, and a driving element mounted on said rotatable driving shaft for permanent operative engagement with said coupling element.

16. A beaming or warping machine comprising: a drive for rotating a beam, said drive including a driving shaft rotatably mounted in a stationary part of the machine, a support swingably mounted on the machine, said support being swingable about an axis coaxial with the axis of said driving shaft, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, each of said beam engaging means being shiftable in the direction of the longitudinal axis of a beam placed between same, adjusting means associated with each of said beam engaging means for setting same in engagement with such a beam, a gear rotatably arranged on said swingable support, said gear being positively connected with at least one of said beam engaging means, and a driving pinion secured to said rotatable driving shaft, said driving pinion being in permanent mesh with said gear.

17. A beaming or warping machine comprising: a drive for rotating a beam, a support swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, said beam engaging means being adjustable relative to each other for engagement with a beam placed between same, at least one of said beam engaging means being permanently coupled with said drive, braking means including at least one brake drum rotatably arranged on said swingable support, said brake drum being positively connected with a beam engaging means, and at least one supporting roller rotatably arranged in a stationary part of the machine, said supporting roller being in permanent contact with said brake drum for supporting the latter.

18. A beaming or warping machine comprising: a drive for rotating a beam, said drive including a driving shaft rotatably mounted in a stationary part of the machine, a support swingably mounted on the machine, said support being swingable about an axis coaxial with the axis of said driving shaft, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, said beam engaging means being adjustable relative to each other for engagement with a beam placed between same, a coupling element rotatably arranged on said swingable support, said coupling element being positively connected with at least one of said beam engaging means, a driving element mounted on said rotatable driving shaft for permanent operative engagement with said coupling element, braking means including at least one brake drum rotatably arranged on said swingable support, said brake drum being positively connected with a beam engaging means, and at least one supporting roller rotatably arranged in a stationary part of the machine, said supporting roller being secured to said driving shaft and being in permanent contact with said brake drum for supporting the latter.

19. A beaming or warping machine comprising: a drive for rotating a beam, a support for carrying

15

the beam, said support being swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, compensating means associated with said swingable support for counteracting its weight under load of a beam in all of its intermediate positions to a substantially constant degree, and means for coupling said beam with said drive when the support is in its upper operative position.

20. A beaming or warping machine comprising: a drive for rotating a beam, a support for carrying the beam, said support being swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, resilient means arranged between a stationary part of the machine and said swingable support for counteracting the weight of the support under load of a beam in all of the intermediate positions of the support to a substantially constant degree, and means for coupling said beam with said drive when the support is in its upper operative position.

21. A beaming or warping machine comprising: a drive for rotating a beam, a support for carrying the beam, said support being swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, means for coupling said beam with said drive when the support is in its upper operative position, a locking slide displaceably arranged on a stationary part of the machine, said locking slide being capable of engagement with said swingable support when the latter is in its upper operative position, and clamping means associated with said locking slide for urging same against said stationary part and said swingable support so as to hold the latter in its upper operative position.

22. A beaming or warping machine comprising: a drive for rotating a beam, a support for carrying the beam, said support being swingably mounted on the machine, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, means for coupling said beam with said drive when the support is in its upper operative position, a locking slide displaceably arranged

16

on a stationary part of the machine, said locking slide being capable of engagement with said swingable support when the latter is in its upper operative position, clamping means associated with said locking slide for urging same against said stationary part and said swingable support so as to hold the latter in its upper operative position, and resilient means associated with said locking slide for disengaging same from said swingable support upon a release of said clamping means.

23. A beaming or warping machine comprising: a drive for rotating a beam, said drive including a driving shaft rotatably mounted in a stationary part of the machine, a support swingably mounted on the machine, said support being swingable about an axis coaxial with the axis of said driving shaft, lifting means associated with said swingable support for lifting same from a lower beam receiving position into an upper operative position, a pair of spaced beam engaging means rotatably arranged in said swingable support, a gear rotatably arranged on said swingable support, said gear being positively connected with at least one of said beam engaging means, a driving pinion secured to said rotatable driving shaft, said driving pinion being in permanent mesh with said gear, and a locking element movably mounted on a stationary part of the machine, said locking element being capable of locking engagement with said swingable support, when the latter is in its upper operative position.

FRITZ LAMBACH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
444,562	Wickers et al.	Jan. 13, 1891
557,468	Woodman	Mar. 31, 1896
1,431,449	Garnett	Oct. 10, 1922
2,356,365	Wiggermann	Aug. 22, 1944
2,384,474	Lambach	Sept. 11, 1945

FOREIGN PATENTS

Number	Country	Date
17,296	Great Britain	1892
646,071	Germany	June 10, 1937
783,984	France	Apr. 15, 1935