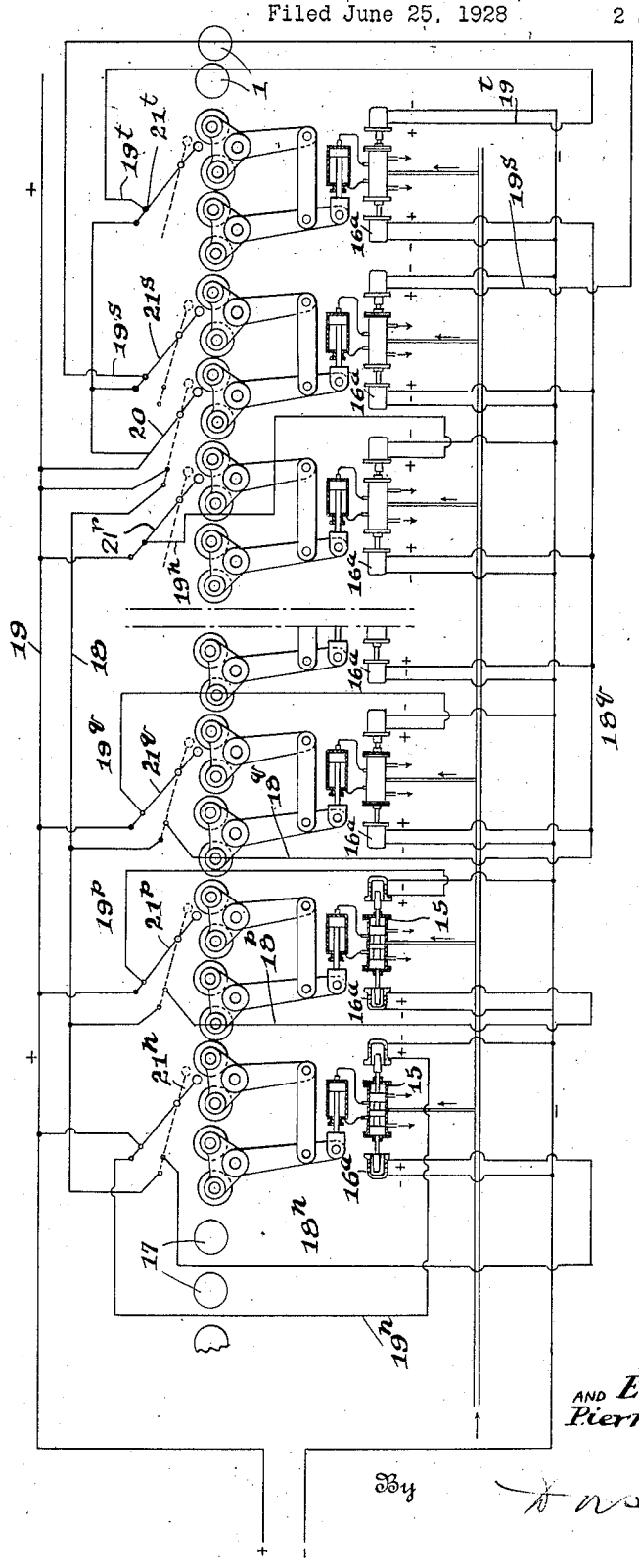
Sept. 17, 1929. E. GENTIL ET AL 1,728,538

SPEED CHANGING MECHANISM FOR GLASS SHEETS

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Fig. 1.



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Fig. 2.

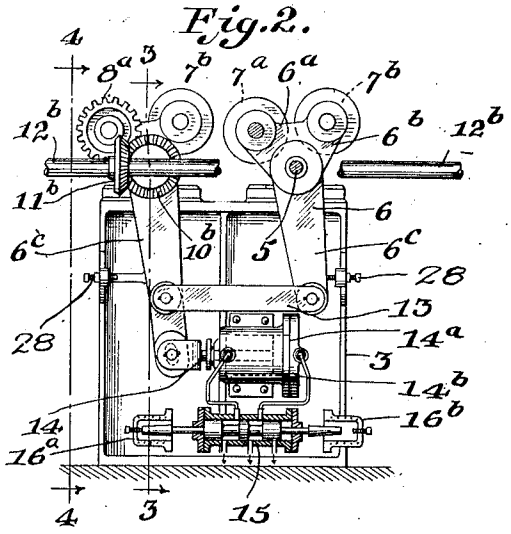
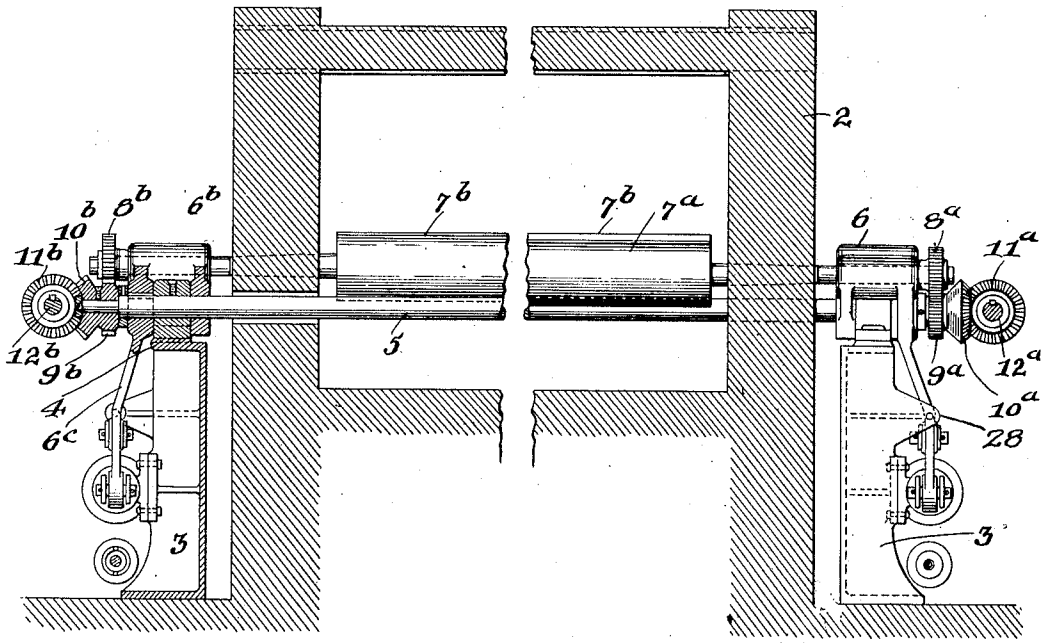


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE

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SPEED-CHANGING MECHANISM FOR GLASS SHEETS

Application filed June 25, 1928. Serial No. 288,215.

In a prior application filed by Gentil, one of the present applicants, on the 30th day of December, 1927 and Serially Numbered 243,655, is disclosed a speed changing mechanism for glass sheets specifically designed to receive the sheets from an intermittent forming machine in which they are fabricated at high linear speed, and to deliver them to a lehr conveyer moving at slower speed, this being accomplished by interposing in the path of movement of the sheet alternately arranged high speed and low speed rollers, the high speed rollers being adapted to be alternately raised and lowered, whereby the sheet delivered from the forming machine is received on the high speed rolls, and such rolls are then lowered to deposit it upon the low speed rolls, which feed it onto a lehr conveyer.

In the present application an arrangement is shown for effecting in a simple manner the alternate raising and falling of the high and low speed rolls to effect the transfer of the sheets from the former to the latter, and for controlling such movements of them. Referring to the accompanying drawings in which corresponding parts are designated by similar marks of reference,—

Figure 1 is a diagrammatic layout of a mechanism embodying our invention.

Figure 2 is a side elevation, partly broken away of a single group of rollers.

Figure 3 is a half section on line 3—3 of Figure 2.

Figure 4 is a half section on line 4—4 of Figure 2.

In these drawings our invention is shown associated with rollers 1, which may be some or all of the feed rolls of a lehr conveyer, contained in a properly heated housing 2. It is obvious that the housing may not only enclose the rollers 1 of the lehr, but may also enclose all or some of the speed changing rollers hereinafter described. It will be further obvious that so far as it concerns the uses of our invention the particular character of the lehr conveyer is immaterial.

As shown a suitable frame 3 is located on each side of the line of feed and on the outside of the lehr structure and carries, at its top, bearings 4, for a plurality of shafts 5. Inasmuch as the several shafts 5 and associated parts are similar, the construction of only a single shaft and its associated parts will be described. Referring to Figure 2 it will be seen that the shaft 5 has keyed on each of its ends, outside of the bearings 4, a three-armed member 6, two of the arms 6^a and 6^b of the frame extending upwardly at an angle from each other and the other arm 6^c extending downwardly. Each shaft and the two members 6 carried thereon thus forms a rocker-frame. The arms 6^a on each shaft support a roller 7^a, while the arms 6^b support a roller 7^b, the roller 7^a being the slow speed roller, the peripheral speed of which corresponds to the speed of the lehr conveyer, and the roller 7^b being a high speed roller, the speed of which corresponds to the speed at which the sheet is received, this being preferably the speed of sheet formation. Each roller 7^a or 7^b has fast on one of its ends a pinion 8^a or 8^b, the pinion being on one end of the roller 7^a and on the opposite end of the associated roller 7^b. The pinions 8^a or 8^b each mesh with a crown gear 9^a or 9^b sleeved on the corresponding end of the shaft 5 and fast to each crown gear is a bevel gear 10^a or 10^b respectively, respectively driven in turn by beveled gears 11^a or 11^b mounted on shafts 12^a or 12^b extending along the outsides of the opposite frames 3.

The arrangement is such that the shaft 12^a which imparts motion to the low speed roller 7^a is on one side of the line of feed and is driven to produce the desired speed of rotation of all the rollers 7^a and is preferably connected with the drive for the lehring rolls 1, while the shaft 12^b on the opposite side drives all the rollers 7^b is driven from the forming machine or is interconnected therewith.

Two units such as described are preferably associated in a group and the downwardly projecting arm 6^c of these units are connected by a coupling member 13. One of the arms 6^c of each group has a pivotal connection to a piston rod 14 having a piston head 14^a thereon working in a cylinder 14^b. The admission of compressed air and the escape of air from the opposite sides of the piston head

14^a is controlled by a valve structure 15, the valve being pulled by a low speed magnet 16^a at one end and a high speed magnet 16^b at the other, these magnets being so designated according to the rollers which are elevated when such magnets are energized.

It will be seen that due to the structure above described each roll 7^a or 7^b will be constantly driven by its associated shaft 12^a or 12^b at a constant speed (except in so far as this may be modified by planetary motion of the roller itself around the shaft 5) and that by proper actuation of the valve 15 either roller may be raised above the other, the arrangement being such that when a roller is raised it is substantially on the level with the high speed conveyer (shown in the form of rolls 17 by which the glass is delivered at the speed of sheet formation) and when lowered is below such level. The extent of throw of the forked members 6^c and thus the line of the upper positions of the rollers, is controlled and adjusted by means of stop screws 28, mounted in projections from the side of the bed frame.

Inasmuch as the sheet to be handled may be, and preferably is, of considerable length, and as the rollers cannot be too widely separated without causing deformation of the sheet, it is obvious that a number of groups of rollers such as before described should be employed, and on Figure 1, we have shown a number of associated groups although it will be understood that what is there represented are only certain initial and terminal rolls of a mechanism embodying this invention.

Obviously all of the rollers of the assembled groups comprising the speed change mechanism may be actuated simultaneously, all the high speed rollers being raised while all the low speed rollers are being lowered, but if such is the case the sheets passing through the lehr will be separated by a distance equal to the length of the speed change mechanisms, and thus lehr space will be wasted. In order to avoid this and to provide for an automatic raising and lowering of the rollers, we prefer to embody in our construction a control for the rolls in which, while all the high speed rollers are simultaneously lowered, the high speed rollers of each group or of several adjacent groups are individually raised as soon as the sheet has passed beyond them. Thus the apparatus is conditioned to receive a second sheet of glass at speed of sheet formation before the first sheet has entirely passed over the speed changing rollers.

To accomplish the simultaneous lowering of all the high speed rollers 7^b and the simultaneous raising of all the low speed rollers 7^a, the several low speed magnets 16^a are included in branches of an electric circuit 18 which also includes a main contact maker 20 mounted above the path of the advancing sheets near the exit end of the speed change mechanism and adapted when raised by the head of the advancing sheet to make such circuit and thus energize the low speed magnets to shift the valves 15 to raise the low speed rollers, provided that the circuits of the high speed magnets have been broken.

The sheet is now advanced at low speed onto the rollers 1 and when the tail of the sheet has passed the contact maker 20 the latter drops, breaking the low speed contacts. Obviously the high speed circuit 19 may be broken by a contact maker 21 included therein and located in advance of the contact maker 20 and adapted to break such circuit during the presence of a sheet on the part of the speed change mechanism in advance of the contact maker 20, and to be made by a similar contact maker when the tail of the sheet has been advanced beyond such mechanism, but in order to permit a progressive lifting of the high speed rollers as the sheet passes from over them, and to thus condition the apparatus the sooner for the reception of a fresh sheet, we prefer to arrange the controls for such movements in section. An example of this sectional arrangement is shown in the drawing in which the low speed branches 18^n, 18^p . . . for the rollers of the initial sections, have each included therein an individual contact maker 21^n, 21^p, . . ., each of which completes its corresponding circuit when a sheet is over such section, and which at the same time opens the branches 19^n, 19^p in which the high speed magnet of such section is contained. The rollers of the section following these initial rollers have their low speed magnets 16^a all in a single low speed branch 18^q controlled by a contact maker 21^q located above an early part of such section. The circuits 19^q, 19^r, 19^s and 19^t of the high speed magnets 16^b of this section are each broken by contact levers 21^q, 21^r, 21^s and 21^t when a sheet of glass is over the rollers corresponding to such magnets. The high speed circuits 19^s, 19^t of the elements beyond the main contact maker 20 are also broken by the presence of a sheet beneath such contact maker.

With a construction such as shown and with the parts in the position shown in Figure 1 in which there is no glass on the speed change mechanism, all contact makers will be down and all of the low speed branches 18 will be broken at the contact makers 21^n, 21^p and 21^q and also at contact maker 20. All of the high speed branches will be energized due to the aforesaid position of the named contact makers and of the contact makers 21^s and 21^t. Hence all the high speed rollers will be up. Upon a sheet of glass entering the mechanism it will successively lift the contact makers 21^n, 21^p, 21^q and 21^r. The lifting of the first three will not energize the corresponding low speed magnets, although closing the branches 18^n, 18^p and 18^q, because the main low speed circuit will be still broken at contact maker 20,

and hence although the high speed branches 19^n, 19^p, 19^q and 19^r will be broken, the valves 15 will not be shifted. However, as soon as the head of the sheet enters beneath the contact maker 20 the main low speed circuit 18 will be completed and all its branches energized, causing all of the rollers to shift position, so that the glass will now be supported on the low speed rollers by which it will be fed towards the lehr rollers 1. The lifting of the contact maker 20 also breaks the high speed circuits 19^s and 19^t of the terminal sections, so that the valves of these will also be actuated by a subsequent closing of the main low speed circuit.

As the sheet is slowly fed at lehring speed its tail will successively pass beyond the initial sections, and will permit the successive dropping of contacts 21^n and 21^p, thereby breaking the low speed branches of these sections and completing the high speed branches so that the rollers of these sections are raised into position to receive a fresh sheet fed at lehring speed. As the tail of the sheet then passes under contact maker 21^q (which should be at a distance from the main contact maker 20 less than the length of the sheet to be treated) the dropping of that contact maker breaks the low speed branches of all of the remaining groups of rollers and completes the high speed branch 19^q of that particular section of rollers, which are thus shifted to high speed position.

When the tail of the sheet has passed under 21^r and has completed the high speed branch of the last of the rollers in advance of the main contact maker these rollers return to high speed position.

When the advancing of the glass has moved its tail from under the main contact maker 20 the latter falls, completing the main circuit for the low speed magnets, the branches of which for the initial sections will have been broken by the individual contact makers, in advance of the main contact maker unless a new sheet of glass by advancing has lifted them, and will close the main high speed circuit of the groups of rollers beyond the main contact maker, the branches 21^s and 21^t of which are still held open by the tail of the glass sheets which we have been considering. As that sheet advances beyond the main contact maker 20 the contact makers 21^s and 21^t will be successively lowered, as the sheet passes from under them and the high speed rollers corresponding thereto will be lifted, thus restoring the whole of the transfer mechanism to its initial position unless a sheet has already entered the forward end of such mechanism.

While we have described in detail a particular circuit arrangement which we have found useful it will be understood that we do not limit our invention to such particular circuit arrangement, as it is obvious that the rollers may be differently sectionalized.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:—

1. In a speed changing apparatus for glass sheets, the combination of two rollers mounted to rock around a common center to raise and lower the same reversely, a separate drive for each roller whereby the rollers are driven at different speeds, the said drives being transmitted to the rollers through the common center around which they rock, and means for rocking the rollers around such center.

2. In a speed changing apparatus for glass sheets, the combination of a rocking frame, a plurality of drive wheels mounted to turn about the rocking center of the frame, a plurality of rollers carried by the frame and each engaging one of the wheels, means for separately driving the wheels and means for rocking the frame.

3. In a speed changing apparatus for glass sheets, the combination of a rocking frame including a shaft having arms on the ends thereof, rollers mounted in the arms, a wheel mounted on each end of the shaft, a wheel mounted on each roller, the wheels on the rollers engaging the wheels on the opposite ends of the shaft, separate drives for the wheels on the opposite ends of the shaft and means for rocking the frame.

4. In a speed changing device for glass sheets, the combination of a plurality of sections each having a high speed and a low speed condition, means actuated by the presence of a glass sheet for simultaneously putting such sections into a low speed condition, and means actuated by the passage of a sheet from over an individual section for putting such section into a high speed condition.

5. In a speed changing device for glass sheets, the combination with alternate high and low speed rollers, means for simultaneously and reversely raising and lowering said rollers, a control for simultaneously lowering all of the high speed rollers by the presence of a sheet over them and means for progressively and separately raising high speed rollers by the passage of a sheet from over each of such rollers.

6. In a speed changing device for glass sheets, the combination of a plurality of sections, each having a high speed and a low speed condition, a high speed and a low speed magnet for each of such sections, a control actuated by the presence of a sheet near the exit end of the assembly of the several sections for energizing the low speed magnets of the several sections and a control actuated by the passage of a sheet from over the rollers of the individual section for energizing the high speed magnet of such section.

7. In a speed changing device for glass

sheets the combination with a plurality of sections, each having a high speed and a low speed condition, a high speed and a low speed mechanism for each of such sections, a control actuated by the presence of a sheet near the exit end of the assembly of the several sections tending to energize the low speed magnet of the several sections, and a control actuated by the passage of a sheet from over the rollers of the individual sections for energizing the high speed magnet of each of such sections and tending to deenergize the low speed magnet of such section.

8. In a speed changing device for glass sheets, the combination of a plurality of sections, each having a high speed and a low speed condition, a high speed and a low speed magnet for each section, circuits for controlling all of the low speed magnets including a contact made by the presence of a sheet near the end of the assembly of the sections and by the absence of a sheet over the individual sections and separate circuits for controlling the several high speed magnets energized by the absence of a sheet over the several sections corresponding to such magnets.

9. In a speed changing device for glass sheets, the combination of a plurality of sections, each having a high speed and a low speed condition, a high speed and a low speed magnet for each section, a circuit for controlling the low speed magnets including a main contact made by the presence of a sheet near the end of the assembly of the sections having branches for controlling the several low speed magnets by the absence of a sheet over the individual sections corresponding to the said several magnets, circuits for controlling the several high speed magnets of the sections in advance of the main contact energized by the absence of a sheet over the individual sections in advance of the main contact, and a circuit for controlling the high speed magnet of a section in the rear of the main contact deenergized by the simultaneous presence of a sheet at the main contact maker and over such last named section.

10. In a speed changing device for glass sheets, the combination of a plurality of sections each having a high speed and a low speed condition, means for simultaneously shifting the said sections to a low speed condition and means actuated by the passage of the sheet from over the individual sections for shifting such individual sections to the high speed condition.

11. In a speed changing device for glass sheets, the combination with high speed and low speed rollers, of a speed changing device interposed between the said two series of rollers, the speed changing device consisting of a plurality of sections each having a high speed and a low speed condition, means for simultaneously shifting the said sections to a low speed condition and means actuated by the passage of the sheet over the individual sections for successively shifting such individual sections to the high speed condition.

In testimony whereof we hereunto affix our signatures.

EUGENE GENTIL.
PIERRE LOUIS AIMÉ MATHÉ.