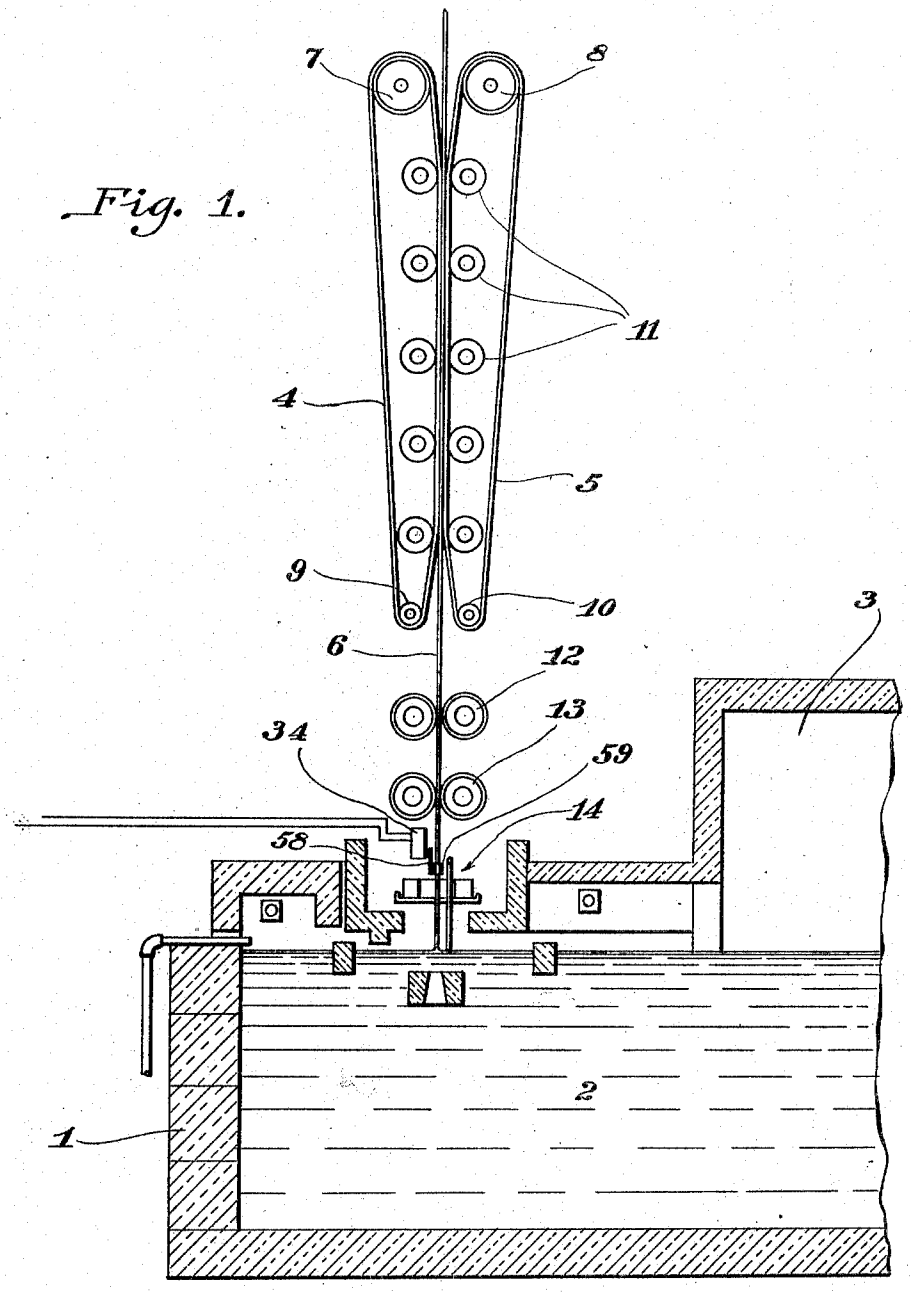
Nov. 4, 1924. 1,514,338

J. H. REDSHAW

EDGE HOLDING DEVICE FOR SHEET GLASS

Filed Sept. 11, 1923 3 Sheets-Sheet 1

Fig. 1.



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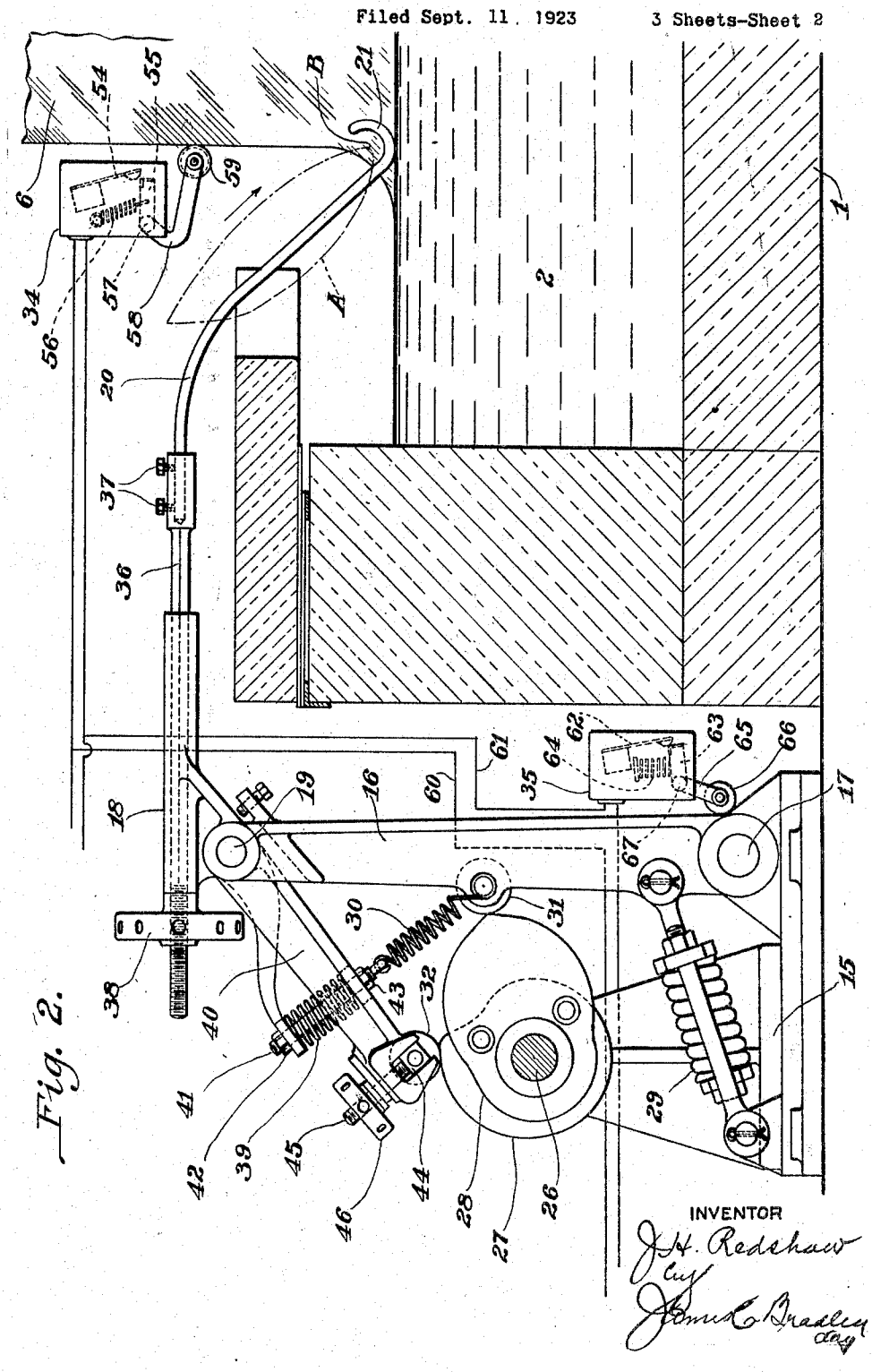


Fig. 2.

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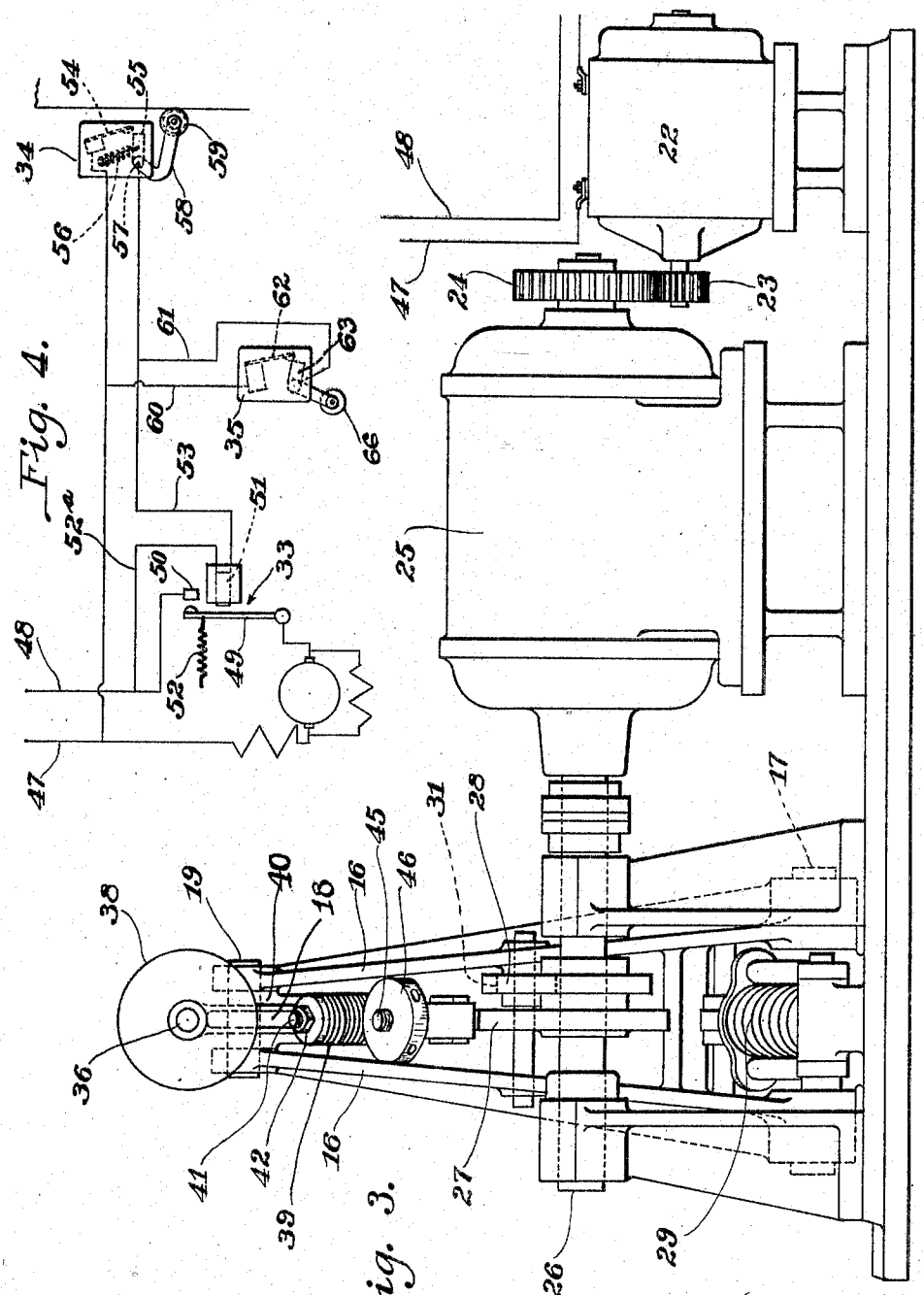


Fig. 4.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOSEPH H. REDSHAW, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO PITTSBURGH PLATE GLASS COMPANY, A CORPORATION OF PENNSYLVANIA.

EDGE-HOLDING DEVICE FOR SHEET GLASS.

Application filed September 11, 1923. Serial No. 662,057.

To all whom it may concern:

Be it known that I, JOSEPH H. REDSHAW, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have made a new and useful invention in Improvements in Edge-Holding Devices for Sheet Glass, of which the following is a specification.

The invention relates to apparatus for use with a sheet drawing machine, and particularly to the form shown in the application of Harry G. Slingluff, Serial No. 621,186, filed February 26, 1923, which involves the use of stroking fingers operated from a suitable driving means or motor, and adapted to straddle the edges of the sheet at its base to thin them and prevent them from gradually working inward. With this form of apparatus, difficulty is experienced in adjusting the mechanism so that the stroking fingers exercise just the right amount of holding effect, as this depends more or less on the condition of the glass bath which varies, so that under some conditions the glass at the edges may be worked out and chilled to too great an extent, while under other conditions the edges may work inward despite the action of the fingers. This condition calls for a close supervision of the device and more or less adjustment of the frequency of the stroke, or of its character, from time to time. The object of this invention is to overcome this objection as to continued attention and adjustment by the provision of means whereby the actuation of the machine is controlled by the position of the edge of the glass sheet being drawn.

Briefly stated, this is preferably accomplished by the use of a device, which contacts with the edge of the sheet a short distance above the glass and which is so arranged that when the edge moves out beyond its predetermined position, the movement of the driving mechanism of the fingers is stopped and when such edge moves in beyond a predetermined point, the movement of such mechanism is started again. The invention is not restricted to means for stopping and starting the driving mechanism, (although this is the preferred method of operation), but contemplates as well, the speeding up or slowing down of the mechanism, or adjusting the stroke of the fingers by the movements of the governing device which contacts with the edge of the sheet. In this way the requirement for the continuous supervision and adjustment of the apparatus is avoided. One embodiment of the invention is illustrated in the accompanying drawings wherein:

Figure 1 is a diagrammatic side elevation showing the drawing apparatus with which the edge holding mechanism constituting the present invention is preferably used. Fig. 2 is a side elevation of the edge holding device. Fig. 3 is a rear elevation of the edge holding device. And Fig. 4 is a diagrammatic view showing the electrical connections.

Referring first to the general arrangement of parts as illustrated in Fig. 1, the principal parts of the drawing apparatus are enumerated as follows: 1 is the drawing tank or extension, carrying a molten bath of glass 2 in communication with a suitable melting tank 3; 4 and 5 are endless belts, preferably of asbestos fabric for continuously drawing the sheet of glass 6 from the molten bath; 7 and 8 are the driving pulleys for the belts, such pulleys being driven from a suitable motor, not shown; 9 and 10 are solid steel bars circular in cross section lying in the lower ends of the belts and serving by reason of their weight to hold the belts in tension; 11 are a series of rolls back of the inner flights of the belts for pressing the belts against the glass, such rolls being held inward by means of springs or weights, not shown; 12 and 13 are pairs of driven rollers covered with asbestos for assisting in the pulling of the sheet; and 14 is one of the edge holding devices to which the present invention is particularly directed, it being understood, however, that the edge holding mechanism may be used in connection with any form of drawing mechanism. It will be understood also that an edge holding device, such as that shown in Fig. 2 is applied at each side of the sheet, but for brevity of description and illustration, only one of such devices is shown. The edge holding device comprises a base 15, a pair of lever arms 16 pivotally mounted at 17 upon the base; a second lever arm 18 pivotally mounted at 19 upon the upper ends of the arms 16; a bar 20 which is forked at its lower end to provide a pair

of stroking fingers 21; a motor 22 operating through the gears 23 and 24 and suitable reduction gearing in the case 25, for rotating the shaft 26 carried by the base 15; a pair of cams 27 and 28 for rocking the lever arms 16 and 18; a pair of springs 29 and 30 for holding the rolls 31 and 32 in engagement with the cams; a switch 33 (Fig. 4) for starting and stopping the motor; and circuit breaking devices in the casings 34 and 35 for controlling the switch 33.

The rod 20 is detachably mounted in the end of the rod 36, being held in position by means of the set screws 37, and the rod 36 may be adjusted in the lever arm 18 by means of the handwheel 38 whose hub is threaded upon the screw threaded rear end of the rod 36. In this manner the position of the fingers 21 may be adjusted to meet requirements. In order that the fingers 21 may have a yielding engagement with the glass, the arm 18 which is pivoted upon the upper ends of the lever arms 16 is maintained in operative position by means of the spring 39 bearing against the end of the lever at one end and resting at its other end against the lever 40 also pivoted at 19 and carrying the roller 32 heretofore referred to. The spring 39 is held in position by means of the bolt 41 which extends through the two levers and is provided with the nuts 42 and 43, the lower end of the bolt being formed into an eye which is engaged by the spring 30.

The cams and levers are so proportioned that the rotation of the shaft 26 gives the fingers 21 the desired path of movement for preventing inward movement of the edge of the sheet 6 at its base. This path of movement is indicated by the dot and dash line A of Fig. 2, this being the path of the point B, which is the center of curvature of the fingers. This path of movement may be modified by shifting the position of the cams 27 and 28 about the shaft 26 or by modifying the shape of such cams. It may also be adjusted by changing the position of the roller 32 which roller is carried by the sliding blocks 44 mounted in slots in the end of the lever arm 40. A threaded stem 45 is attached to these blocks and may be adjusted by means of the hand wheel 46 swiveled on the end of the lever.

Current is supplied to the motor 22 by means of the leads 47 and 48 as illustrated in Fig. 4 and in this circuit is located the switch 33 consisting of the contact members 49 and 50, the electro-magnet 51 and the spring 52, the latter normally holding the contact members 49 and 50 apart when the magnet is not energized. The magnet is energized by a flow of current through the circuit including the wires 52^a and 53. This circuit also includes the circuit breaker 34. This circuit breaker comprises the contact members 54 and 55 normally held in contact by means of the spring 56. The member 55 is pivoted at 57 and is provided with a recurved arm 58 carrying a grooved roller 59 for engaging the edge of the sheet 6. If the edge of the glass sheet under the influence of the stroking fingers 21 moves outwardly beyond a predetermined point, the arm 58 is pushed outwardly, thus swinging the contact member 55 downward and breaking the circuit through the connections 54 and 55. This permits the spring 52 to move the contact member 49 (Fig. 4) to the left so that the flow of current through the leads 47 and 48 to the motor is discontinued. However, in order to guard against the stopping of the motor while the fingers 21 are still in the glass, another circuit including the connections 60 and 61 and the circuit breaker 35 is employed. As indicated in Fig. 1 this circuit breaker includes the contact members 62 and 63, the spring 64 normally tending to press the member 63 downward out of contact with the member 62 and the arm 65 provided with the roller 66 engaging the lever arm 16. The members 63 and 65 are integral and are pivotally supported at 67. When in its forward position as illustrated in Fig. 2, the lever arm 16 holds the member 63 in contact with the member 62 so that the circuit including the connections 60 and 61 and the connections 52^a and 53 through the electro-magnet 51 remains unbroken even though the circuit breaker 34 is opened by the edge of the glass sheet as above described. The motor, therefore, continues to run until the lever arm 16 has moved to the left sufficiently to permit the member 65 to also move to the right so that the member 63 moves downward out of contact with the member 62. At this time the fingers 21 have been moved out of the glass along the path A to their extreme left hand position. The motor now stops since the flow of current through the circuit breaker 33 is discontinued and the current is cut off from the magnet 51 so that the contact member 49 is opened by the spring 52. The parts remain in this position until the circuit breaker 34 is again closed. This will occur in due course, as the edge of the sheet 6 will tend to gradually work to the right as the drawing continues and finally the roller 59 will move in sufficiently to permit the spring 56 to bring the member 55 into contact with the member 54. The circuit through the magnet 51 is thus completed and the contact member 49 will be closed, thus completing the circuit between the leads 47 and 48 so that the motor again begins to operate. This operation will continue until the edge of the sheet again works out to a point such as to cause the breaking of the contact be-

tween the members 54 and 55 when the machine will again be stopped until the edge of the sheet works back to its proper position.

What I claim is:

1. The combination with apparatus for drawing a sheet of glass from a molten bath, of means for preventing the inward movement of the edge of the sheet comprising a pair of fingers spaced apart to receive the edge of the sheet, and driving means for moving the fingers at intervals downward into the glass bath and outward, and a device controlled by the position of the edge of the sheet for governing the actuation of said driving means.

2. The combination with apparatus for drawing a sheet of glass from a molten bath, of means for preventing the inward movement of the edge of the sheet comprising a pair of fingers spaced apart to receive the edge of the sheet, and driving means for moving the fingers at intervals downward into the glass bath and outward, and a device controlled by the position of the edge of the sheet for starting and stopping the actuation of said driving means.

3. The combination with apparatus for drawing a sheet of glass from a molten bath, of means for preventing the inward movement of the edge of the sheet comprising a pair of fingers spaced apart to receive the edge of the sheet, and driving means for moving the fingers at intervals downward into the glass bath and outward, and a device controlled by the position of the edge of the sheet for governing the actuation of said driving means, said device including a member yieldingly held against such edge of the sheet.

4. The combination with apparatus for drawing a sheet of glass from a molten bath, of means for preventing the inward movement of the edge of the sheet comprising a pair of fingers spaced apart to receive the edge of the sheet, and driving means for moving the fingers at intervals downward into the glass bath and outward, and a device controlled by the position of the edge of the sheet for starting and stopping the actuation of said driving means, said device including a member yieldingly held against such edge of the sheet.

5. The combination with apparatus for drawing a sheet of glass from a molten bath, of means for preventing the inward movement of the edge of the sheet comprising a pair of fingers spaced apart to receive the edge of the sheet, and driving means including an electric motor for moving the fingers at intervals downward into the glass bath and outward, and a device controlled by the position of the edge of the sheet for governing the supply of current to said motor.

6. The combination with apparatus for drawing a sheet of glass from a molten bath, of means for preventing the inward movement of the edge of the sheet comprising a pair of fingers spaced apart to receive the edge of the sheet, and driving means including an electric motor for moving the fingers at intervals downward into the glass bath and outward, and a device comprising a member yieldingly pressed against the edge of the sheet and a switch operated therefrom for governing the supply of current to said motor so that the motor is stopped when the edge moves out beyond a predetermined point and is started when it moves in beyond a predetermined point.

7. The combination with apparatus for drawing a sheet of glass from a molten bath, of means for preventing the inward movement of the edge of the sheet comprising a pair of fingers spaced apart to receive the edge of the sheet, and driving means including an electric motor for moving the fingers at intervals downward into the glass bath and outward, a device comprising a member yieldingly pressed against the edge of the sheet and a switch operable therefrom for governing the supply of current to said motor so that the motor is stopped when the edge moves out beyond a predetermined point, and is started when it moves in beyond a predetermined point, and means for preventing the stopping of the motor until said fingers are withdrawn from the glass bath.

In testimony whereof, I have hereunto subscribed my name this 28th day of August, 1923.

JOSEPH H. REDSHAW.