

Nov. 3, 1925.

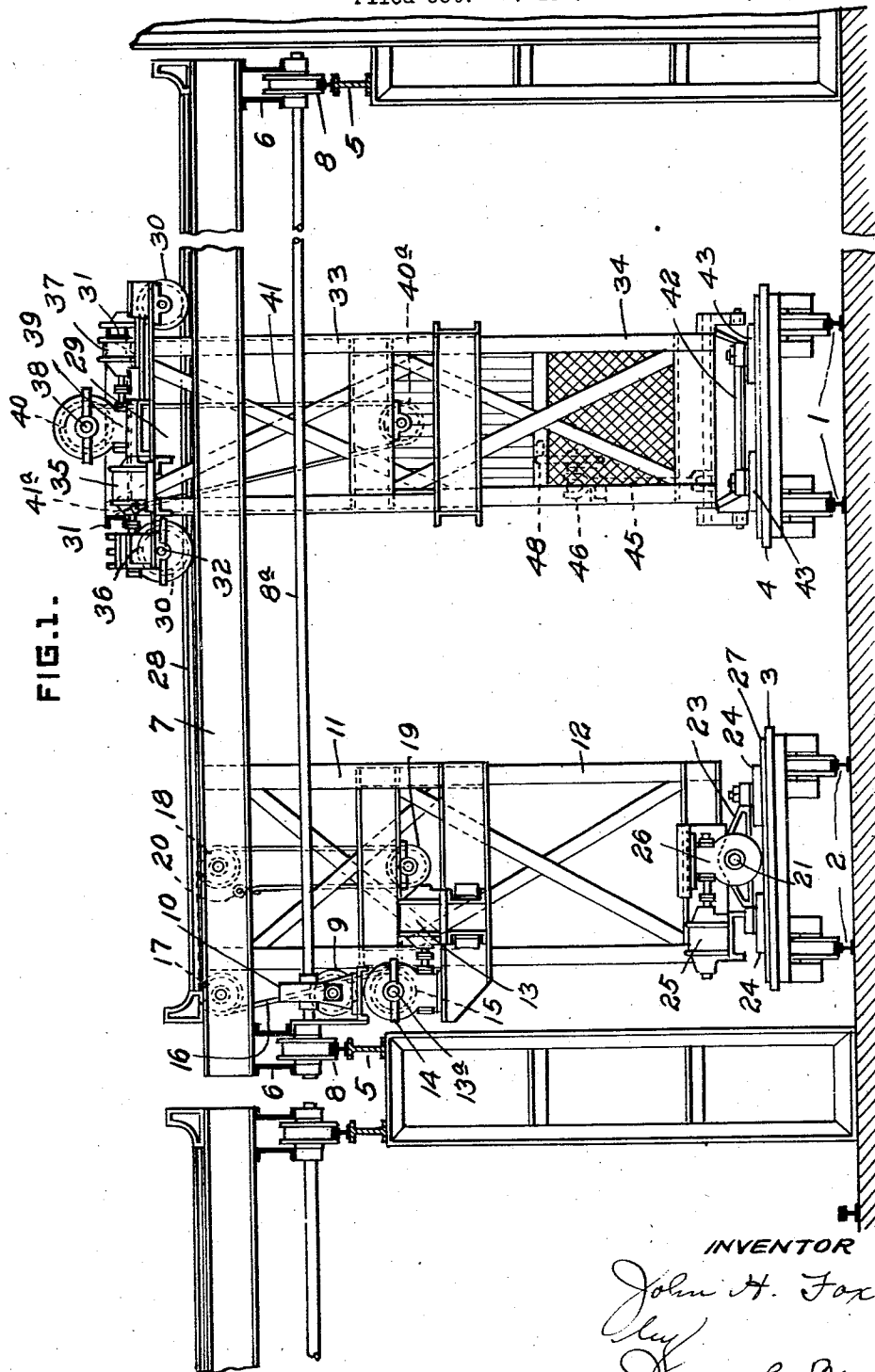
J. H. FOX

1,559,862

PROCESS AND APPARATUS FOR SURFACING SHEET GLASS

Filed Oct. 29, 1923

3 Sheets-Sheet 1



INVENTOR

John H. Fox

James C. Bradley
att

Nov. 3, 1925.

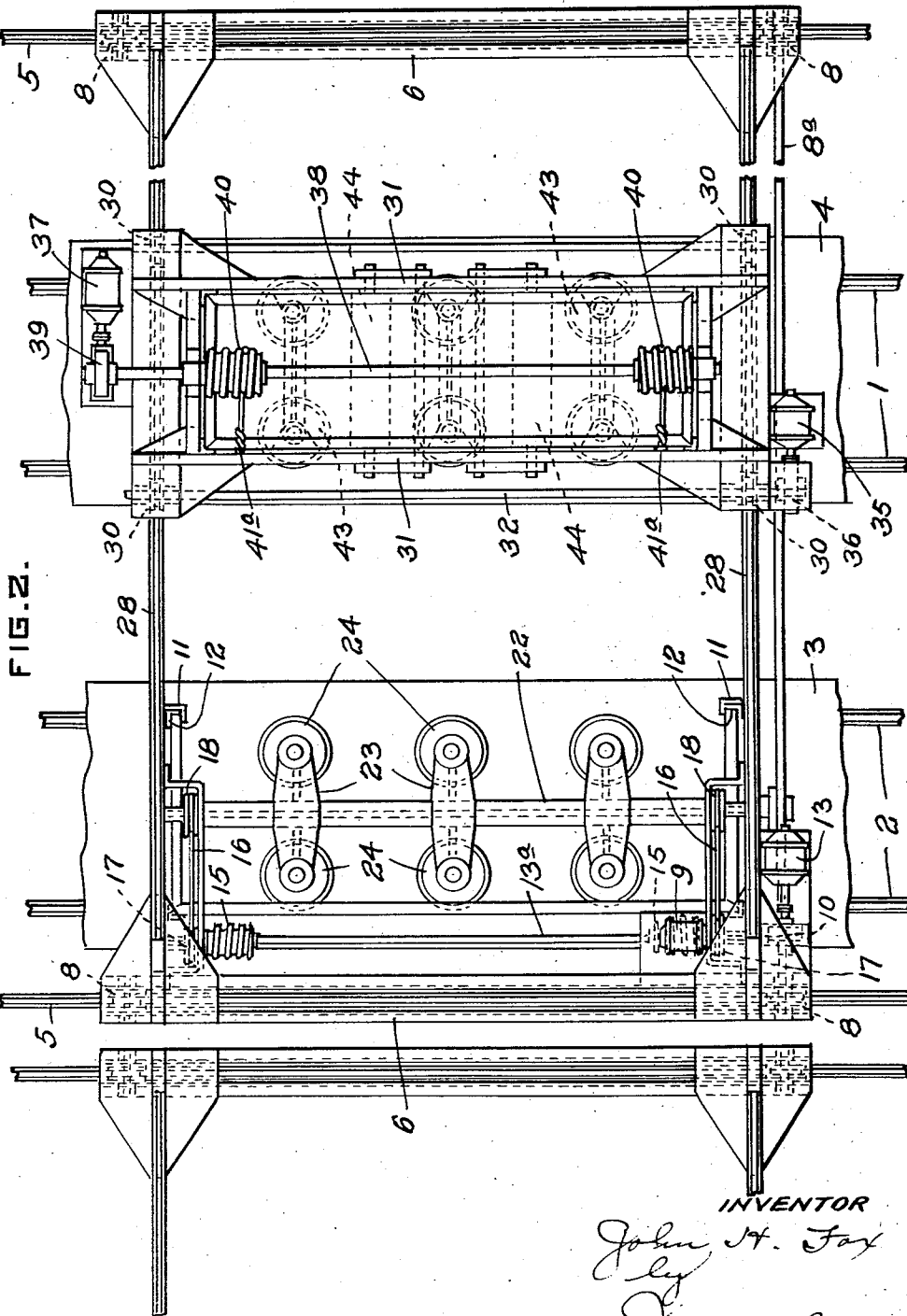
1,559,862

J. H. FOX

PROCESS AND APPARATUS FOR SURFACING SHEET GLASS

Filed Oct. 29, 1923

3 Sheets-Sheet 2



INVENTOR

John H. Fox

James C. Bradley
att'y

Nov. 3, 1925.

J. H. FOX

1,559,862

PROCESS AND APPARATUS FOR SURFACING SHEET GLASS

Filed Oct. 29, 1923

3 Sheets-Sheet 3

FIG. 3.

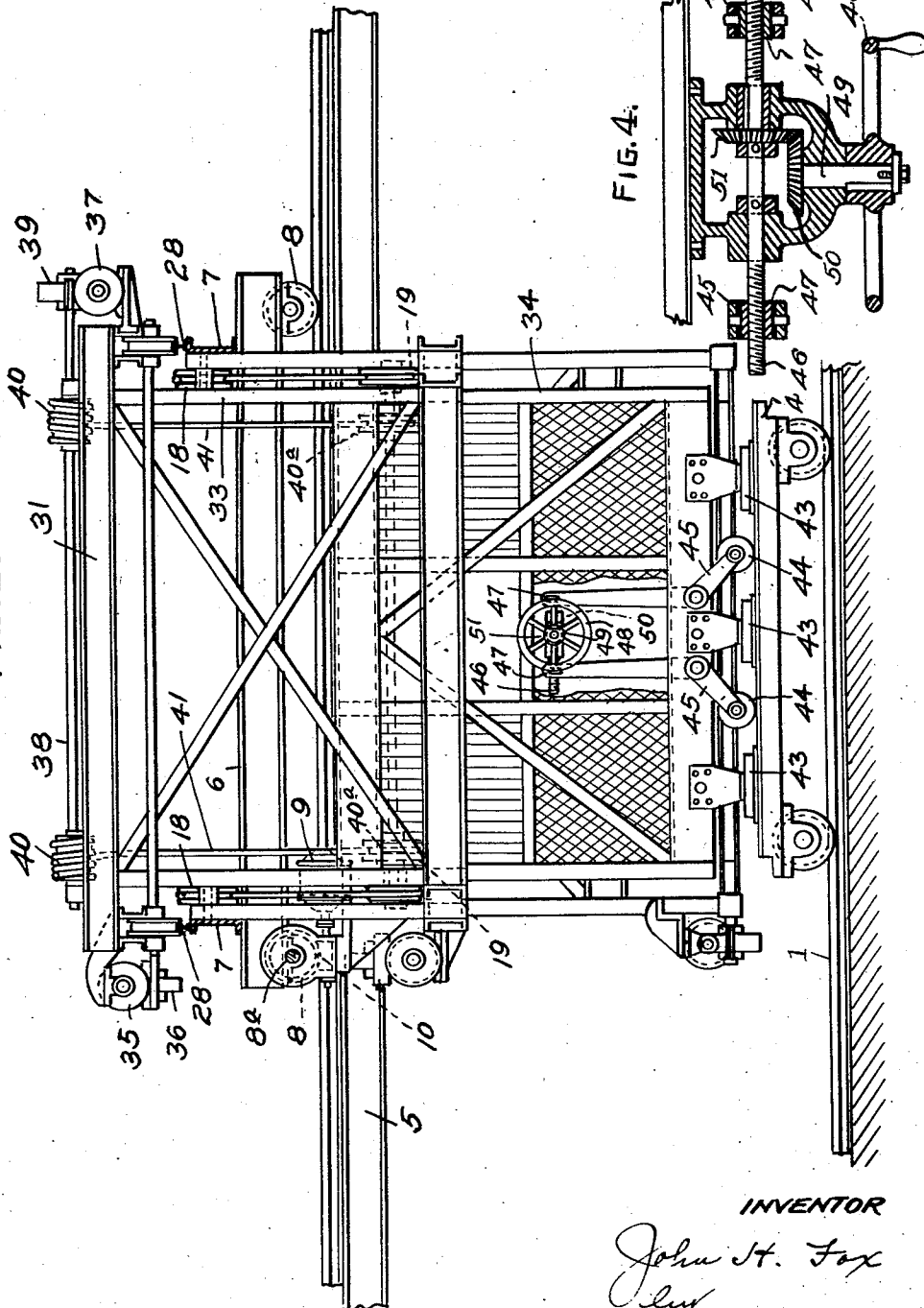
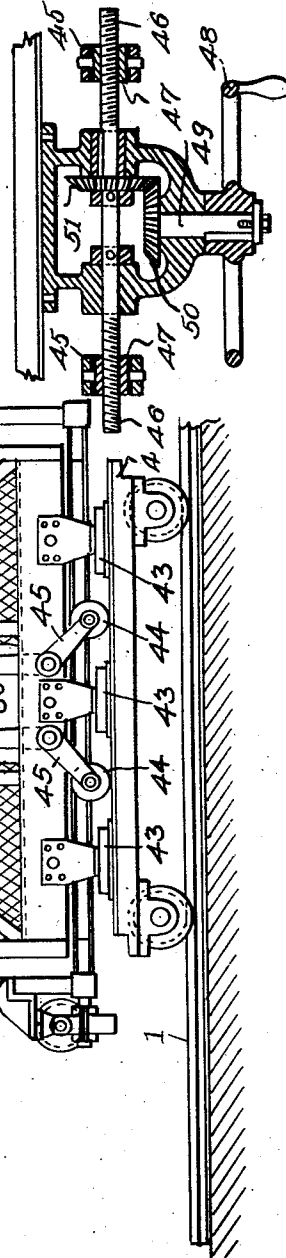


FIG. 4.



INVENTOR

John H. Fox
by
James C. Bradley
att.

UNITED STATES PATENT OFFICE.

JOHN H. FOX, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO PITTSBURGH PLATE GLASS COMPANY, A CORPORATION OF PENNSYLVANIA.

PROCESS AND APPARATUS FOR SURFACING SHEET GLASS.

Application filed October 29, 1923. Serial No. 671,400.

To all whom it may concern:

Be it known that I, JOHN H. FOX, 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 Processes and Apparatus for Surfacing Sheet Glass, of which the following is a specification.

The invention relates to apparatus for handling and turning over glass plates. The apparatus is designed particularly for picking up glass from one car or carrier upon a track, turning it over, carrying it to another car or carrier on a second parallel track and depositing it upon such other car or carrier. The invention has for its objects the provision of improved means for accomplishing the function as above set forth, and the provision of means operating in conjunction with the turnover apparatus for pressing the glass sheets, which have been turned over, down into the plaster which secures them to the cars or carriers. One embodiment of the invention is illustrated in the accompanying drawings wherein:

Figure 1 is a side elevation of the apparatus. Fig. 2 is a plan view. Fig. 3 is an end elevation. And Fig. 4 is an enlarged horizontal section showing a detail of construction.

Referring to the drawings, 1 and 2 are a pair of parallel tracks upon each of which is mounted a series of cars or carriers 3 and 4, such cars serving as a means for carrying the sheets of glass secured to their tops beneath a series of grinding and polishing machines as set forth in my application, Serial No. 658,890. The track 2 is a return track, upon which the cars carrying the glass, one side of which has been ground and polished, are returned to the starting end of the system, while the track 1 extends beneath a second series of grinding and polishing machines. The apparatus of the present application is designed to lift the sheets having their upper sides ground and polished from the cars 3, turn them over, and transfer them to the cars 4, where they are set in plaster of Paris in the usual manner.

Extending longitudinally of the tracks is a crane runway consisting of the beams 5, 5, and upon this runway or track is mounted a crane framework consisting of the longitudinal beams or girders 6, 6 and the trans-

verse beams 7, 7. The framework is supported upon suitable wheels, one pair of which, 8, 8, are connected by the transverse shaft 8^a driven from a suitable motor 9 through the intermediary of a worm and worm wheel in the casing 10.

At the left hand end of the crane is the vacuum device for lifting the glass from the tables 3 and turning it over, such device including a framework 11 depending from the crane framework and secured rigidly thereto and a lower framework 12, which carries the vacuum frame and which fits telescopically into the frame 11, so that it may be moved vertically to provide room for turning the vacuum frame over. This frame 12 is raised by means of a motor 13 mounted upon the fixed framework 11. The motor actuates a transverse shaft 13^a through the intermediary of a worm and worm wheel in the casing 14, and this shaft is provided at its ends with drums 15, 15 secured to the cables 16, 16 which raise the frame 12. These cables pass over the pulleys 17 and 18 mounted upon the crane framework and around the pulleys 19 secured to the upper end of the framework 12, the ends of the cable being attached to the beams 7 as indicated at 20 in Fig. 1.

In the lower end of the framework 12 is mounted the shaft 21, to which is secured the vacuum frame consisting of the transverse beam 22, the arms 23 and the suction cups 24. Provision is made for exhausting the air from the cups in order to cause them to engage the upper surface of the glass sheet upon the table 3, such means being well known in the art and not being shown. The shaft 22 is rotated to turn the vacuum frame upside down by means of the motor 25 operating through suitable reducing gearing in the form of a worm and worm wheel in the casing 26. It will be seen that this device provides means for lifting the glass plate 27 from the table 3 and turning it over preliminary to transferring it to the car 4, by the second vacuum device which will now be described.

Extending longitudinally of the beams 7, 7 are the rails 28, 28 upon which are mounted a second crane 29 having the wheels 30 engaging the rails. This crane comprises transverse frame members 31 carrying the axles 32 upon which the wheels are mounted and a depending framework 33 in which is

mounted for vertical movement the lower framework 34 which carries the second vacuum frame.

The crane 29 is moved along the rails 28 by means of the motor 35 which drives the axle 32 through the intermediary of a worm and worm wheel in the casing 36. The lower framework is moved up and down by means of the motor 37 which drives the shaft 38 through the intermediary of a worm and worm wheel in the casing 39, the worm wheel being keyed to the axle 38. This axle extends transversely of the crane and carries at its ends the drums 40 to which are secured the cables 41 for lifting the framework 34. These cables extend downwardly around pulleys 40^a carried by the lower framework 34, their upper ends being secured to the crane at 41^a. Secured to the bottom of the framework 34 is a second vacuum frame 42 similar to the first vacuum frame as heretofore described except that it is not mounted for reversal, such framework being provided with the suction cups 43.

Also carried by the lower framework 34 are a pair of rolls 44 for pressing the sheet of glass down into the plaster on the table 4 after it has been positioned thereon by the vacuum frame. These rolls extend across the width of the table and are mounted upon the ends of the bell crank levers 45. The upper ends of these levers 45 are moved back and forth by means of the screw 46 mounted in suitable bearings and extending through nuts 47 carried by the ends of the levers. The screw 46 is rotated from the hand wheel 48, such hand wheel having the transverse shaft 49 provided with a bevel pinion 50 which engages a similar pinion 51 on the shaft 46.

In operation, in order to transfer a sheet from the table 3 to the table 4 and reverse it in position, the framework 12 is lowered to bring the vacuum cups 24 into engagement with the plate 27, such plate having been previously loosened from the plaster of the table. The frame 12 is then raised to provide clearance for turning the vacuum frame over. The vacuum frame is then turned over to bring the glass sheet 27 on the upper side thereof. The sheet is now in position for engagement by the second vacuum frame. The second vacuum frame is brought into position over the glass sheet by moving the crane 29 along the rails 28 until the vacuum frame carried thereby is in position over the vacuum frame carried by the frame 12. The framework 34 is then lowered until the vacuum cups 43 come into engagement with the upper surface of the sheet 27. Air is exhausted from these vacuum cups and the cups 24 are released. The crane 29 is now moved laterally until it arrives over the table 4, where it is lowered on to the table and the vacuum cups re-

leased. The frame is now lifted again and the rollers 44 lowered on to the sheet in order to press it into the plaster, the crane 29 being moved back and forth over the table in order that the rolls may apply effective pressure over a considerable area of the sheet.

The apparatus may also be equally well employed to transfer a glass sheet from the carrier or table 4 to the carrier or table 5. In carrying out this operation, the glass sheet on the table 4 is lifted by the vacuum frame 42 and carried laterally to a position over the vacuum frame 22, 23, which at this time will be spaced above the table 3 with the vacuum discs or cups 24 facing upward. The glass will be deposited upon these discs 24 from the frame 42, after which the frame 42 will be moved back over the table 4 and the frame 22, 23 inverted to place the glass upon the table 3, thus completing the operation.

What I claim is:

1. In combination in apparatus for transferring glass sheets from one carrier or car to another carrier or car lying to the side thereof and turning it over, which comprises a vacuum frame mounted for vertical movement above the first carrier, a pivotal support for the frame whereby it may be inverted to bring the glass sheet carried thereby up, a second vacuum frame mounted for lateral movement from a position over the first carrier and vacuum frame to a position over the other carrier, and means whereby the second frame may be moved up and down.

2. In combination in apparatus for transferring glass sheets from one carrier or car to another carrier or car lying to the side thereof and turning it over, which comprises, a vacuum frame mounted for vertical movement above the first carrier, a pivotal support for the frame whereby it may be inverted to bring the glass sheet carried thereby up, a second vacuum frame mounted for lateral movement from a position over the first carrier and vacuum frame to a position over the other carrier, means whereby the second frame may be moved up and down, presser roll means carried by the second vacuum frame, and means for moving the rolls vertically with respect to such frame.

3. In combination in apparatus for transferring glass sheets from one carrier or car to another carrier or car lying to the side thereof and turning it over, which comprises, a vacuum frame mounted for vertical movement above the first carrier, a pivotal support for the frame whereby it may be inverted to bring the glass sheet carried thereby up, a crane mounted for movement from a position over the first carrier and the vacuum frame to a position over the second

carrier, and a second vacuum frame mounted for vertical movement on the crane.

4. In combination in apparatus for transferring glass sheets from one carrier or car to another carrier or car lying to the side thereof and turning it over, which comprises, a crane mounted for movement longitudinally of the path of movement of said carriers, a vacuum frame pivotally supported upon the crane over the first carrier whereby the frame may be inverted to bring the glass sheet above it, means whereby the frame may be moved vertically with respect to the crane, a second crane mounted on the first crane and movable transversely thereof from a position over the said vacuum frame to a

position over the second carrier, and a second vacuum frame mounted for vertical movement on said second crane.

5. In combination in apparatus for handling and seating plate glass, a crane mounted for lateral movement, a framework carried by the crane, vacuum lifting devices on said framework, presser roll means carried by the framework, and means for moving the roll means vertically with respect to said framework.

In testimony whereof, I have hereunto subscribed my name this 24th day of Oct., 1923.

JOHN H. FOX.