(No Model.) P. PFEIFER. 2 Sheets—Sheet 1.

DEVICE FOR CONVEYING SHEETS OF GLASS FROM THE FLATTENING WHEEL THROUGH THE ANNEALING ARCH OR TUNNEL.

No. 333,331. Patented Dec. 29, 1885.

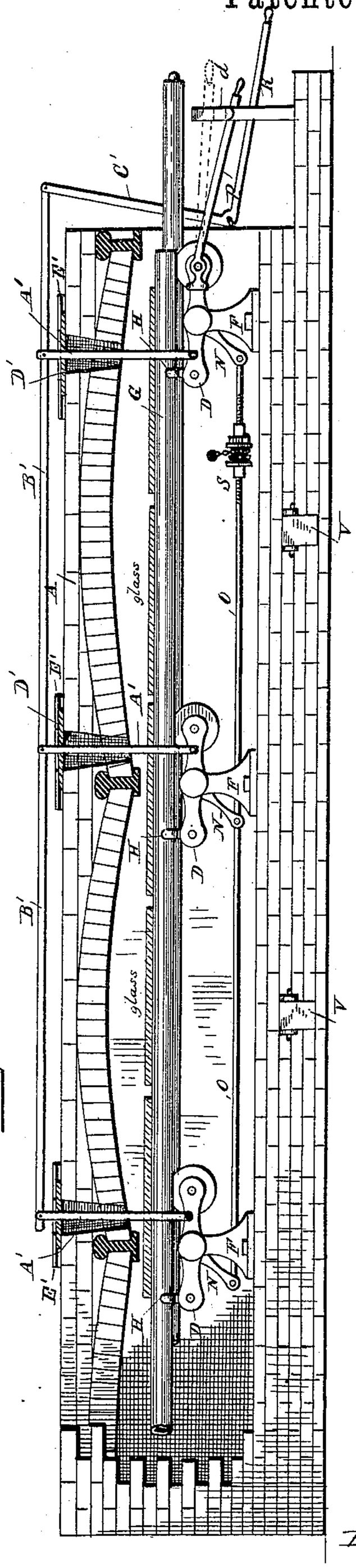

FIG. 1.

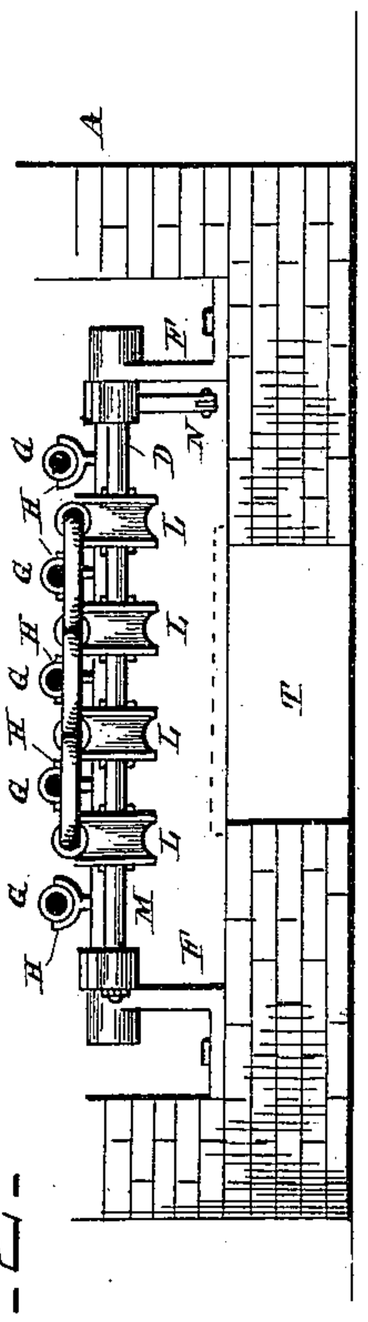

FIG. 2.

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

P. PFEIFER.

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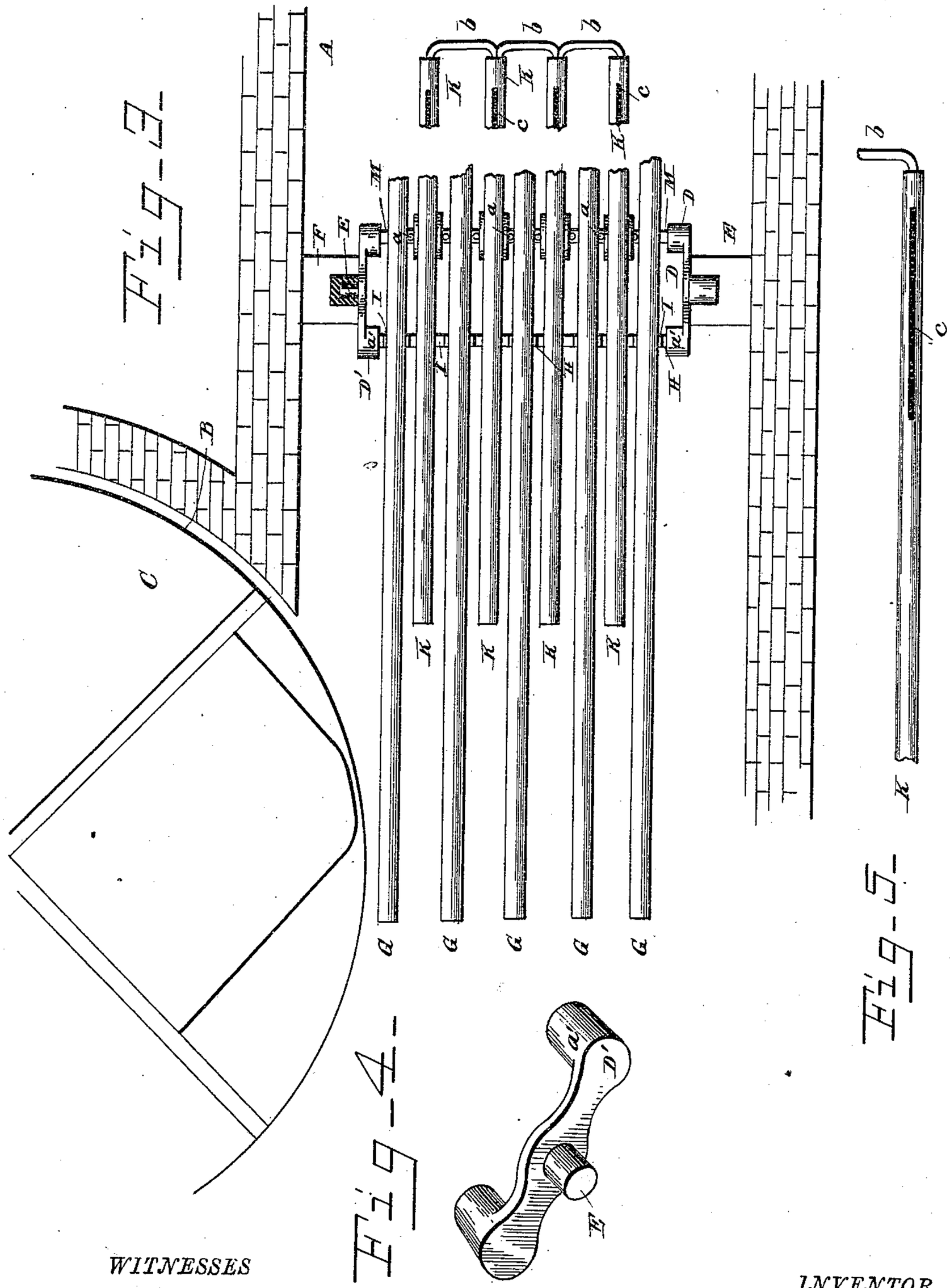

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

PETER PFEIFER, OF DURHAMVILLE, NEW YORK.

DEVICE FOR CONVEYING SHEETS OF GLASS FROM THE FLATTENING-WHEEL THROUGH THE ANNEALING ARCH OR TUNNEL.

SPECIFICATION forming part of Letters Patent No. 333,331, dated December 29, 1885.

Application filed May 11, 1885. Serial No. 165,020. (No model.)

To all whom it may concern:

Be it known that I, PETER PFEIFER, a citizen of the United States, residing at Durhamville, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Devices for Conveying Sheets of Glass from the Flattening-Wheel Through the Annealing-Arch, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in devices for conveying sheets of glass from the flattening-wheel through the annealing arch or tunnel.

The object of my invention is to arrange the devices which operate to move or convey the glass, so that they will not be bent or warped by the thermal changes in the arch, and at the same time will be more easily manipulated than heretofore.

My invention therefore consists of a series of bars made of metal tubing loosely mounted on rocking frames provided with devices which raise and lower each alternate bar simultaneously, so that the weight of the glass is transferred from one set of bars to the other by a slight rocking motion of the frames.

My invention consists, further, in providing one of the side bars of the rocking frames with clamping or retaining brackets, which steady and support one set of the parallel bars in their vertical movement, while the other side of the rocking frame is provided with grooved rollers for the support of the other set of parallel bars or tubes, which permits said bars or tubes to be moved backward and forward toward and from the flattening-wheel.

My invention consists, further, in providing the rear end of the endwise movable bars or tubes with a wooden strip or with a strip of soft metal, which will prevent the scratching or chipping off of the glass as it is raised in the act of being removed from the carrying-bars.

My invention consists, further, in locating the parallel bars on which the glass is placed at one side of the flattening-wheel, so that the glass can be taken from the flattening-wheel, swung around at an angle, and placed on said bars or tubes. Other novel and important details of construction will be fully described hereinafter, and pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation of the rear portion of my improved device, as arranged in the arch or tunnel with the front wall of the arch removed. Fig. 2 is an end view. Fig. 3 is a top or plan view of the front end of my device, showing its relation to the flattening-wheel. Fig. 4 is a view in perspective of one of the end sections of the rocking frames, which support the parallel bars or tubes. Fig. 5 is an enlarged view of the rear end of one of the endwise movable bars with the wooden strip inserted.

A indicates the tunnel or annealing-arch, the front end of which communicates with the chamber B, in which the flattening-wheel C is located, said tunnel or arch being of any desired length or width.

D are rectangular frames, made of cast-iron heads D′, said heads being provided with journals E, adapted to fit in journal-bearings formed in castings or supports F, so as to have a rocking motion, said supports being arranged at suitable intervals within the arch or tunnel, and anchored therein in any suitable manner. The heads D′ are also provided with sockets *a′* for the reception of the tube-sections I and M, which form the sides of the frame D.

G are metallic tubes adapted to rest in and be supported by the brackets or holders H, which are attached to the side bars, I, of the frame D, said tubes being designed to rest in said brackets or holders in a free and unconfined manner, in order that they may have a chance to expand, and will not be bent up or twisted out of shape when exposed to the heat of the furnace.

K are also a series of tubes, placed parallel with and intermediate of the tubes G, said tubes K being supported by the concave rollers L, mounted loosely on the tube-section M, which forms the other side of the rocking frame D, said rollers being held in their proper position on the tube M by the pins *a*. By this arrangement it will be noticed that the bars G and K rest on opposite sides of the frames D, and are supported thereon in a balanced condition, so that the frames can be

rocked to raise and lower each alternate set of tubes by a very slight exertion of the operator. The bars K are joined at their rear ends by means of the rods *b*, which also serve as handholds, to enable the operator to push or pull the bars back and forth on the rollers L. The front ends of the bars K are not connected together.

The rollers L, as before indicated, are mounted loosely on the bars M, and may be made of glass or glass and metal combined, so they will not be readily worn away by the sliding or impingement of the tubes thereon. The grooves in the rollers L are made deep enough to hold the tubes from lateral displacement, and when the frames are in a true horizontal position the tops of the tubes K will lie in a perfect line, and thus prevent the bending or breaking of the sheets of glass, as is now the case in devices of this kind. The rear sides of the tubes K are provided with an elongated slot, *c*, which may extend through from side to side, in which is inserted a strip of soft metal or wood, the wood being preferred. The object of this wooden strip is to present a soft and yielding surface to the glass, so that when the operator pulls the sheet of glass forward and turns it on its edge prior to its removal from the bars to the cutting-room the glass will not be scratched and the fragile edges will not be chipped off or broken. This is a very important feature of my invention and will effect a great saving in broken and lower-grade glass.

The rocking frames D are provided with arms N, which are connected together by the operating-bar O, a lever, P, being connected to the end of the rear frame, by which a simultaneous rocking or tilting motion is imparted to all the frames. The lever P lies in a horizontal plane parallel with the tubes K, so as to be within easy reach of the operator, thus obviating the necessity of having the operator to walk several steps to reach the lever, as is now the case in this class of devices.

R is a standard or spring-bar provided with a block or projection, *d*, which holds the lever P either in an elevated or depressed position when brought in contact therewith.

The connecting-rod O, when located on the inside of the arch, as shown in the drawings, may be supplied with any suitable means for regulating the expansion and contraction of said bar by heat. The device which I have shown consists of a swivel or right-and-left elongated nut, S, which connects two sections of the bar O, and is provided with a chain, which is wound around the nut so that both ends of the chain will pass through an opening in the wall of the arch. By this arrangement the nut can be turned in either direction to lengthen or shorten the bars O as occasion may require, and thus compensate for expansion and contraction of the bars.

T is a trench or channel running the entire length of the tunnel, which not only admits of the free passage of a person into the tunnel to make needed repairs, but also allows the heat to pass underneath the sheets of glass which rest on the tubes, and thus surround the glass with a uniform temperature, which prevents the glass from breaking, as is the case when exposed to unequal temperatures. If desired, this channel may be partially or entirely closed by placing metal plates thereon, as indicated in dotted lines in Fig. 2.

V are valves or doors, pivoted at their upper ends to the wall of the tunnel or arch, and adapted to close openings or flues made therein. These valves or doors are adapted to open outward, so as to permit the excess of heat to escape from the tunnel, said valves being automatically opened by the force of the overheated and expanded air, and to be closed again by gravity when the pressure on the inside has been diminished. Similar doors may be placed in the top or arch of the tunnel, when desired.

The operation of my device is as follows: The rocking frames being slighted tilted by the depression of the lever P, as shown in Fig. 1, the bars or tubes G are slightly raised above the bars or tubes K. The tubes K are thus relieved from the weight of the sheets of glass so that the bars or tubes K can be pushed forward toward the flattening-wheel, when the lever P is raised to the position shown in dotted lines to slightly depress the bars or tubes G and raise the bars K so they will raise the sheets of glass off of the bars G. The bars K are then drawn back a short distance, carrying with them the sheets of glass laid thereon. The sheet of glass which is on the rear end of the bars K is brought out of the tunnel or arch and removed therefrom, the lever P is again depressed to raise the bars G and the sheets of glass from the bars K, in order that said bars can be pushed forward to receive another sheet of glass, when the bars G are again lowered by raising the lever P, and the bars K again drawn back, and so the operation is repeated.

It will be noticed that by having the bars G made of tubing or gas-pipe and resting loosely on the frames D that they can be readily turned over should they become bent by being overheated, and, furthermore, that they can be readily removed when worn out and unfit for use, and replaced by new ones. The same is true of the bars K. The clamps *b* can be removed, and these bars turned over, as in the case of the bars G, or the entire frame of bars, which is made up of the tubes K and bars or clamps *b*, can be turned over. The bars or tubes G and K may be made triangular in form in cross-section, the broadsides of which will be adapted to rest in bearings in the rocking frames, thus having the narrow or pointed edge of the tubes upward, which presents only a small surface of metal for the support of the glass. The same advantage is derived by the

use of the round tubing as compared with bars having flat surfaces, for the support of the glass.

By having the bars G and K arranged by the side of the flattening-wheel and slightly above it, so as to allow a portion of the heat to pass under the bars, the operator or flattener is enabled to lift the sheets of glass from the flattening-wheel and swing them around at an angle to place them on the bars instead of having to bring the glass back and raise it onto the bars which project over the flattening-wheel, as is now the case.

In order that the connecting-bar by which all the frames are simultaneously operated may be removed from the heat of the furnace, and to dispense with the devices for compensating for the expansion and contraction, as before stated, I secure to the rocking frames the vertical arms or levers A′, which extend up through slots formed in the roof of the arch or tunnel.

B′ is a bar secured to the upper end of the levers A′, the rear end of which is connected to one arm of the bell-crank lever C′, the other end of the bell-crank lever being lengthened to form a lever, and to project rearward within easy reach of the operator, so that by raising or lowering the free arm of the bell-crank lever the frames D will be rocked to raise and lower the tubes G and K, and thus the devices for operating said frames are removed from all liability of being injured by the heat of the arch.

D′ are metal plates secured on the levers A′ in such a manner that they will move back and forth with the levers in the guides E′, to cover the slots in the roof, and thus prevent the escape of the heat from the tunnel or arch.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In devices for conveying sheets of glass through the annealing-arch, the bars G and K, made of metal tubes or gas-pipe, as set forth.

2. In devices for conveying sheets of glass from the flattening-wheel through the annealing-arch, the frames D, for supporting the parallel bars, composed of the cast-iron heads D′, with journals and sockets, as described, and the side bars, I and M, made of tube-sections, as set forth.

3. In devices for moving sheets of glass through the annealing-arch, the bars or tubes K, provided with slots *c* at their rear ends, for the reception of wooden or soft-metal strips, as described, whereby the danger of scratching or chipping and breaking the edges of the glass is obviated, as set forth.

4. In devices for moving sheets of glass through the annealing-arch, the bars or tubes K, provided at their rear ends with the wooden filling-pieces, as described, said bars or tubes being connected together by the bars *b*, as set forth.

5. A glass flattening and annealing furnace of the character described, the parallel bars of which extend along by the side of the flattening-wheel and forward of the center or axis of said wheel, whereby the glass is more readily placed on the parallel bars, as set forth.

6. A leer or arch for annealing glass, provided with gravitating or self-acting doors, as set forth, whereby the pressure of the expanded air caused by excessive heat will open said valves and reduce the temperature of the arch, as set forth.

7. A leer or arch for annealing glass, of the character described, the chamber or trench T, below the parallel bars, adapted to be closed or partially closed, as set forth, in combination with the gravitating or self-acting doors located therein.

8. In a device for conveying sheet-glass through the annealing-arch, the rocking frames D, having the lever-arms A′, which project upward through slots in the top of the arch, said arms or levers being connected together by the bar B′, and operated by the bell-crank lever C′, as set forth.

9. The operating arms or levers A′, extending through slots in the top of the arch, said arms or levers being provided with a metal plate, D′, adapted to move with the levers and cover the slot, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

PETER PFEIFER.

Witnesses:
N. D. ADAMS,
JACOBUS S. JONES.