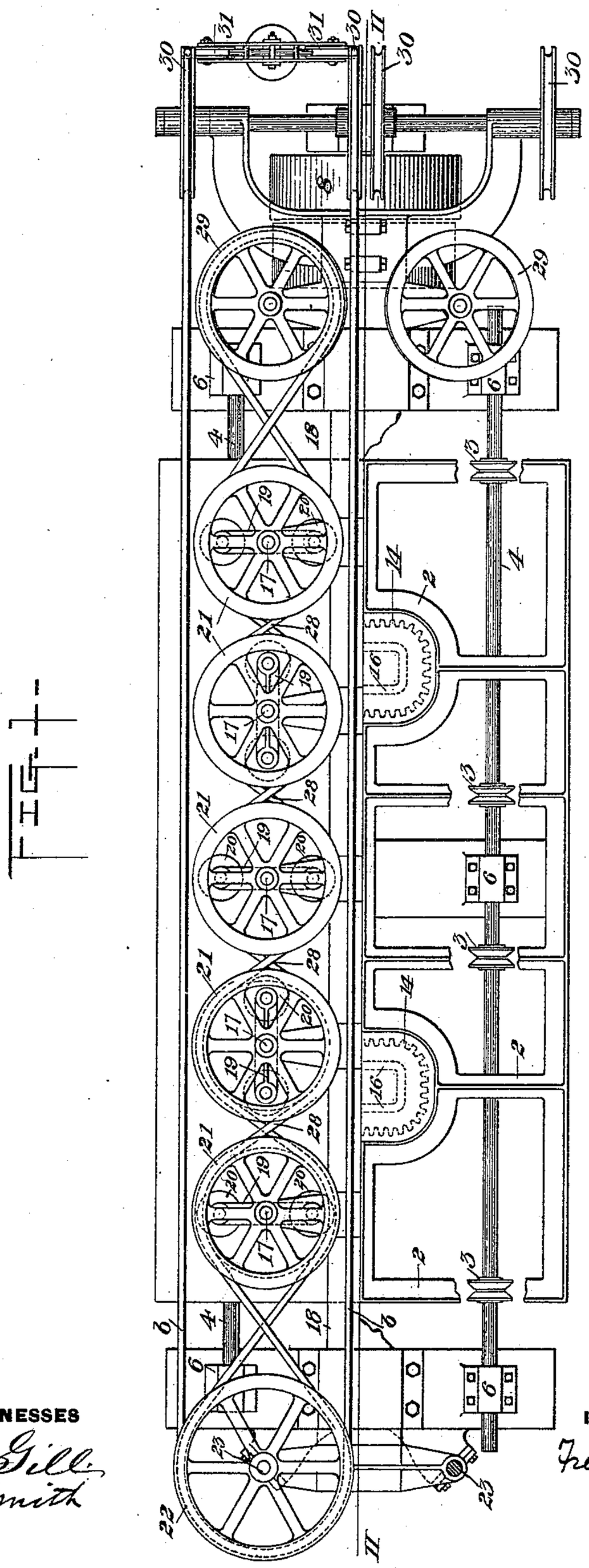
(No Model.) 3 Sheets—Sheet 1.

F. F. FISCHER.

GLASS POLISHING MACHINE.

No. 449,816. Patented Apr. 7, 1891.



WITNESSES

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(No Model.) 3 Sheets—Sheet 2.

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GLASS POLISHING MACHINE.

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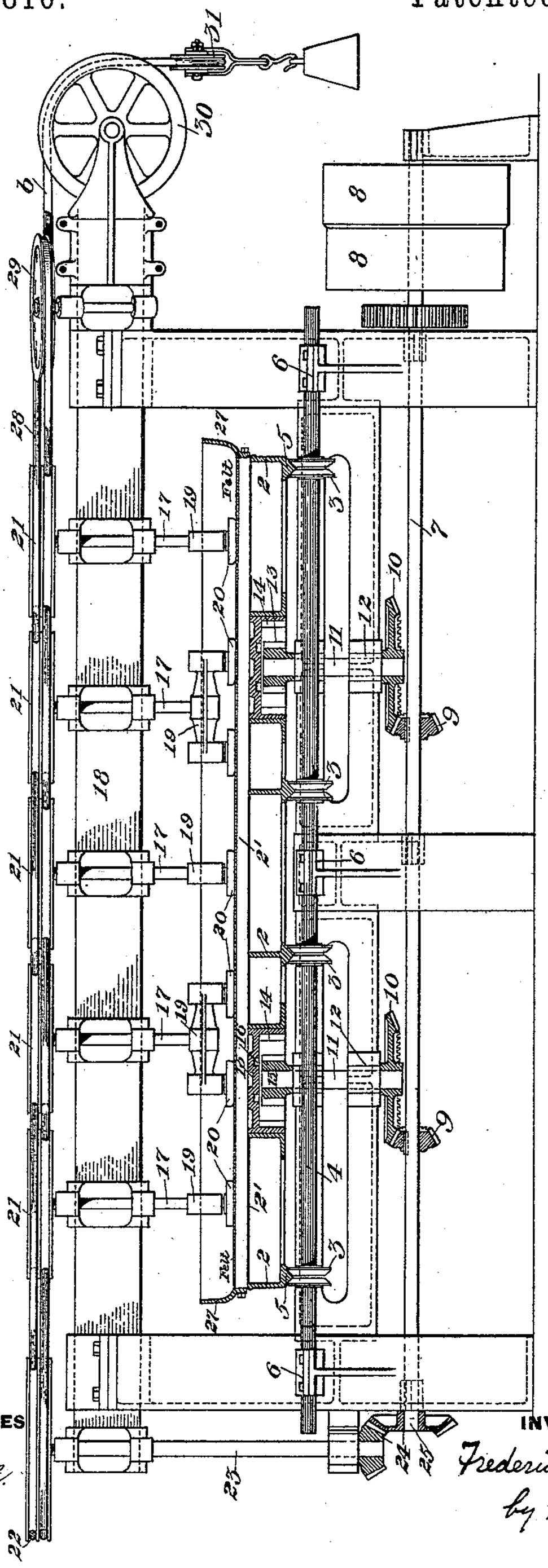
FIG. 2.



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(No Model.) 3 Sheets—Sheet 3.

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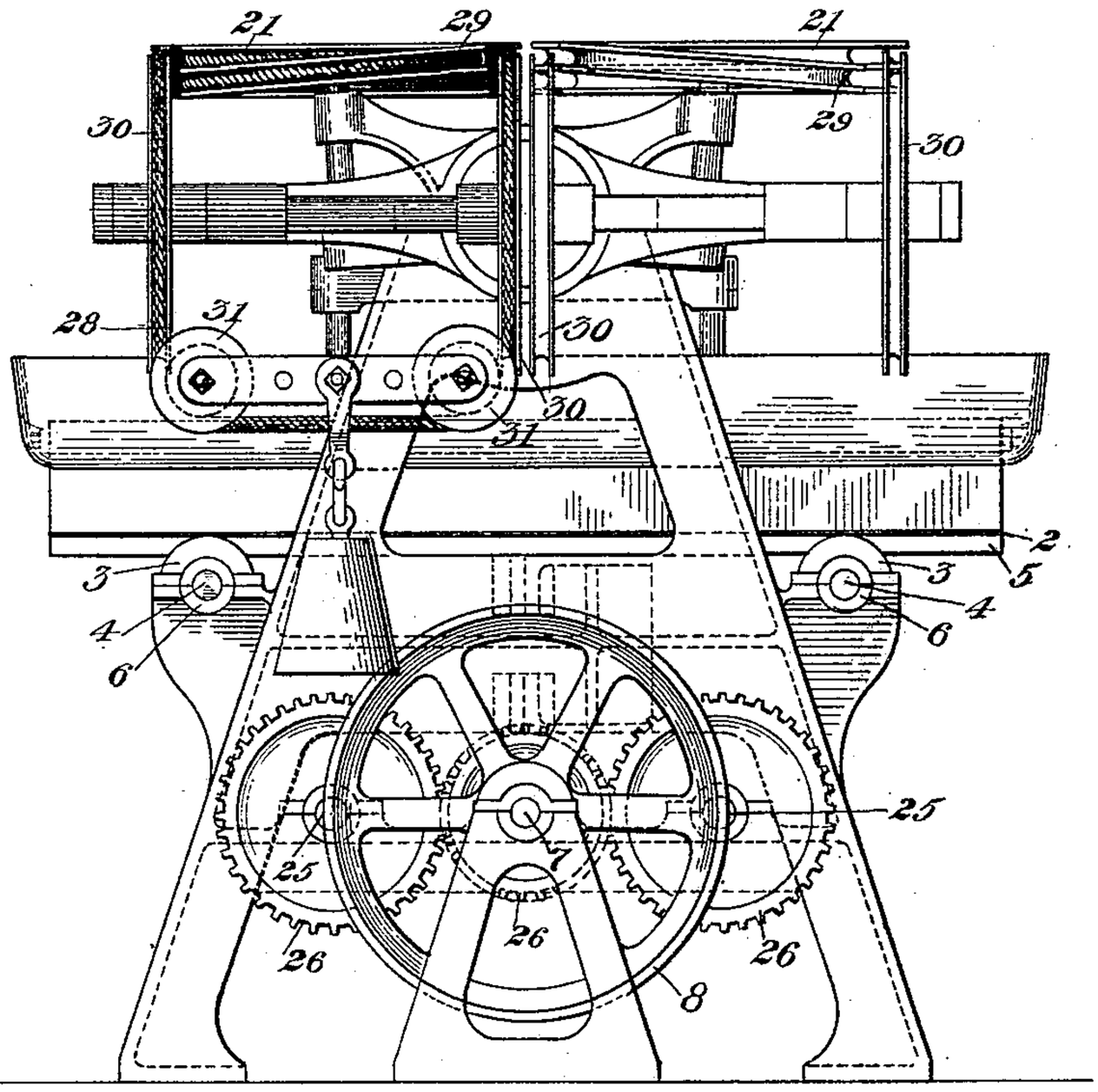
FIG. 3.



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UNITED STATES PATENT OFFICE.

FREDERICK F. FISCHER, OF PITTSBURG, PENNSYLVANIA.

GLASS-POLISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 449,816, dated April 7, 1891.

Application filed April 19, 1890. Serial No. 348,648. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK F. FISCHER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Glass-Polishing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of my improved machine, part of the bed-plate being removed for the purpose of better illustration. Fig. 2 is a vertical longitudinal section on the line II II of Fig. 1. Fig. 3 is an end elevation. Like symbols of reference indicate like parts in each.

In the drawings, 2 represents the table-frame by which the glass sheets to be polished are supported. The top 2′ of the table, on which the glass rests, is preferably made of wood, which may be covered with rubber or felt, and the table-frame is supported on rollers 3, which are set on shafts 4. These rollers are formed with grooved peripheries, to accommodate ribbed portions 5 of the table, which fit thereon, and the shafts 4 are so set in their bearings 6 as to be longitudinally movable therethrough. The table is thus capable of motion both longitudinally and laterally in a horizontal plane, the motion in one direction being permitted by the movement of the supporting-shafts through their bearings, and the motion in the other direction being that of the table on the rollers 3. It is desirable that such motions be imparted to the table during and throughout the work of polishing the glass, in order that every portion of the glass may be subjected to the action of the buffers, and I effect the same as follows:

7 is a shaft which extends lengthwise of the machine and is driven by suitable belt-pulleys 8 or other driving-gear.

9 are beveled pinions on the shaft 7, in gear with beveled cog-wheels 10, whose vertical shafts 11 are journaled in stationary bearings 12 in the frame of the machine.

13 are gear-wheels fixed to the shafts 11 and meshing with the teeth of quadrilateral racks 14. These racks are fixed in openings in the table-frame 2, and are provided with caps or cover portions 15, having quadrilateral grooves 16, in which fit pins or studs on the respective gear-wheels for the guidance of the racks around them, in the manner hereinafter described. It follows from this construction that if the shaft 7 be driven it will rotate the gear-wheels 13, which, by their action on the racks, will move the racks with the table continuously in four directions in succession—viz., longitudinally in one direction, then transversely, then longitudinally and transversely in reverse directions—said motions being in a horizontal plane, each point of the table moving alternately longitudinally and laterally, as will be readily understood. In Fig. 1 only one half of each of the racks is shown, the other being obscured by the remaining parts of the machine.

The buffers by which the glass is polished are constructed and operated in a peculiar manner. The buffer-spindles 17 are journaled vertically in bearings which project from a bar 18, extending above the table 2, and forming part of the machine-frame. Each spindle has at its lower end oppositely-extending arms 19, carrying short vertical shafts to which the buffers 20 are fixed. The spindles are rotary on their axes, and the buffers themselves are rotary on their individual axes in their bearings at the ends of the arms 19. The spindles 17 are driven by belt-pulleys 21, each of which is preferably formed with a double groove. The belts or cords 28 are crossed between the adjacent pulleys, so as to impart thereto motions in opposite directions, the effect of which opposite motions is that the buffers respectively neutralize each other in their tendency to shift the glass on the machine-table and make it unnecessary to exercise the care heretofore required to cement the glass sheets firmly to the table in order to hold them stationary. The spindles may be driven by sprocket-wheels or by gearing, if desired.

The arrangement of the endless driving belts or cords 28 is clearly shown in the drawings. The cord passes twice around each of the pulleys, being laid in each pulley of the series, thence extending around an end guide-pulley 29 with an inclined groove, thence extending back around each pulley and at the end driving-pulley 22. The branches *b* of the endless cord extend longitudinally over up-

right guide-pulleys 30 and around weighted suspended pulleys 31, by which the cord is kept taut. The motion transmitted in this manner to the spindles is very regular and easy and effects the work with the least possible jarring of the machine. It will be understood, however, that unless otherwise expressed, my claims do not exclude the driving of the spindles by gearing or by sprocket-chains.

In Fig. 1 of the drawings I show but a single line or series of buffer-spindles, though the machine illustrated is adapted to have two of such series, and when a larger machine is required the number is increased, so as to cover the table properly.

The pulleys 22, from which the pulleys 21 derive their motion, are set on shafts 23, and are driven by gearing 24 from shafts 25, which, by means of gearing 26, are connected with and driven by the shaft 7, Fig. 3. It will be thus seen that the revolution of the shaft 7 will not only cause the motion of the table in four directions in succession, in the manner above described, but will also drive the buffer-spindles so as to cause them to rotate on their vertical axes and to move the arms 19 radially around the same, thus rubbing the buffers 20 on the surface of the glass sheet and causing them to revolve on their vertical axes. This radial motion of the buffers, combined with the double reciprocating motion of the table, has the effect of bringing every portion of the glass sheet under the action of the buffers to substantially the same extent, so that the sheet is uniformly and entirely polished thereby. The action of the machine in this regard is much better than that of any other machine known to me.

Instead of using two buffers rotary on a single spindle, but one buffer fixed to a radial arm may be set on each spindle. The use of two buffers is, however, preferable, since by making the buffers comparatively small they accommodate themselves to irregularities of the glass, while accomplishing as much effective work.

The manner of arranging and operating the buffers which I show and describe is of especial advantage as compared with constructions heretofore known, because being light and easy to operate, the mechanism can be driven at a high rate of speed without jarring it and putting it out of order. In former machines the massiveness of the construction has required the machine to be driven slowly and has made frequent repairs necessary.

There is another feature of the machine which may conveniently be used in connection with the improvements above described, and which may also be used on machines of other forms, and is therefore claimed by me herein, broadly. It is well known that in the polishing of plate-glass the glass must be brought to a certain temperature before it can be polished, and that throughout the polishing operation this temperature must be maintained. The consequence has been that during the first part of the action of the machines no actual polishing takes place until the buffers by their friction have raised the plate-glass to the proper temperature, and that during the polishing of the glass great care must be exercised in water-sprinkling it in order to prevent excessive rise of its temperature.

In order to save the time which has been heretofore lost in the beginning of the operation and to make it unnecessary to exercise such care during the continuance of the polishing, I provide the machine with means by which the glass sheet is surrounded by a solution of the polishing material or rouge of the usual consistence, which solution may be supplied originally at the proper temperature to heat the glass to the degree required for the polishing operation, and is in sufficient quantity to maintain this temperature at an approximately constant point, the loss by radiation being supplied by the friction of the buffers on the surface of the glass. To this end I form around the top of the table an upwardly-extending rim 27, which, in conjunction with said top, constitutes a pan. Into this pan is poured a rouge solution preferably in quantity sufficient to surround the glass sheet and to cover somewhat its surface. This improvement will be found to be of very great utility, since it facilitates the work of the machine, saves time and labor, and by maintaining the glass sheet at an equal temperature results in uniformity of the product.

The operation of the machine will be readily understood by those skilled in the art. In order to place the glass sheet or sheets on the machine-table, the buffer-spindles 17 may be raised by hand in their bearings, so as to lift the buffers from the table-frame, the glass sheet or sheets are placed on the table-top within the pan, and the top secured in place on the table-frame. The spindles may then be lowered to bring the buffers on the surface of the glass, the warm rouge solution is poured into the pan on and around the sheets, and the main shaft of the machine is started to rotate, the result being that the table is moved in four directions in succession under the buffers, and the buffers rotated on the glass, with which they are maintained in operative contact by the gravity of the buffers and their spindles. When the polishing operation is completed, the buffer-spindles are raised in their bearings and the table-top, with the glass sheets, is removed from the machine.

It will be understood by those skilled in the art that within the limits of my invention the machine may be varied in many ways in form and construction, and that, although I consider the mechanical devices which I have illustrated to be the best adapted to the purposes of the machine, and as such intend to claim them specifically, I do not intend precisely to limit thereto the broader and more general claims.

I claim—

1. In a polishing-machine, a supporting-table, in combination with means by which the table is moved in four directions in succession—viz., longitudinally in one direction, then transversely, then longitudinally and transversely in reverse directions, and so on—substantially as and for the purposes described.

2. In a polishing-machine, the combination, with a supporting-table, of a quadrilateral rack fixed thereto and a rotatory pinion in gear therewith and rotating in fixed bearings, whereby motion of the table in four directions is effected, substantially as and for the purposes described.

3. In a polishing-machine, the combination, with a supporting-table, of a rack fixed thereto and having a continuous peripheral series of teeth, a rotatory pinion in gear with the rack and rotating in fixed bearings, whereby motion of the table in four directions is effected, and a pinion-guide on the rack, substantially as and for the purposes described.

4. In a polishing-machine, the combination of the table, supporting-shafts longitudinally movable in their bearings, rollers on the said shafts, and means for moving the table laterally and longitudinally, substantially as and for the purposes described.

5. In a polishing-machine, buffer-spindles having radial arms, buffers on said arms, means for rotating the spindles, a glass-supporting table, and means whereby the table is moved longitudinally and laterally under the buffers, substantially as and for the purposes described.

6. In a polishing-machine, the combination, with a series of buffer-spindles and double pulleys affixed thereto, of an endless cord passing in a double course around said pulleys, and a weighted tightening-pulley 31, around which the cord passes, substantially as and for the purposes described.

7. In a polishing-machine, the combination of buffer-spindles having radially-projecting arms, buffers carried by the arms, driving mechanism by which the spindles are rotated in opposite directions, a glass-supporting table, and mechanism whereby the table is moved in right lines under the buffers, substantially as and for the purposes described.

8. In the art of polishing glass, the improvement which consists in surrounding the glass sheet with heated liquid for the purpose of bringing it to the proper temperature for polishing and maintaining it thereat, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 3d day of April, A. D. 1890.

FREDERICK F. FISCHER.

Witnesses:

THOMAS W. BAKEWELL,

JNO. K. SMITH.