

No. 686,991.

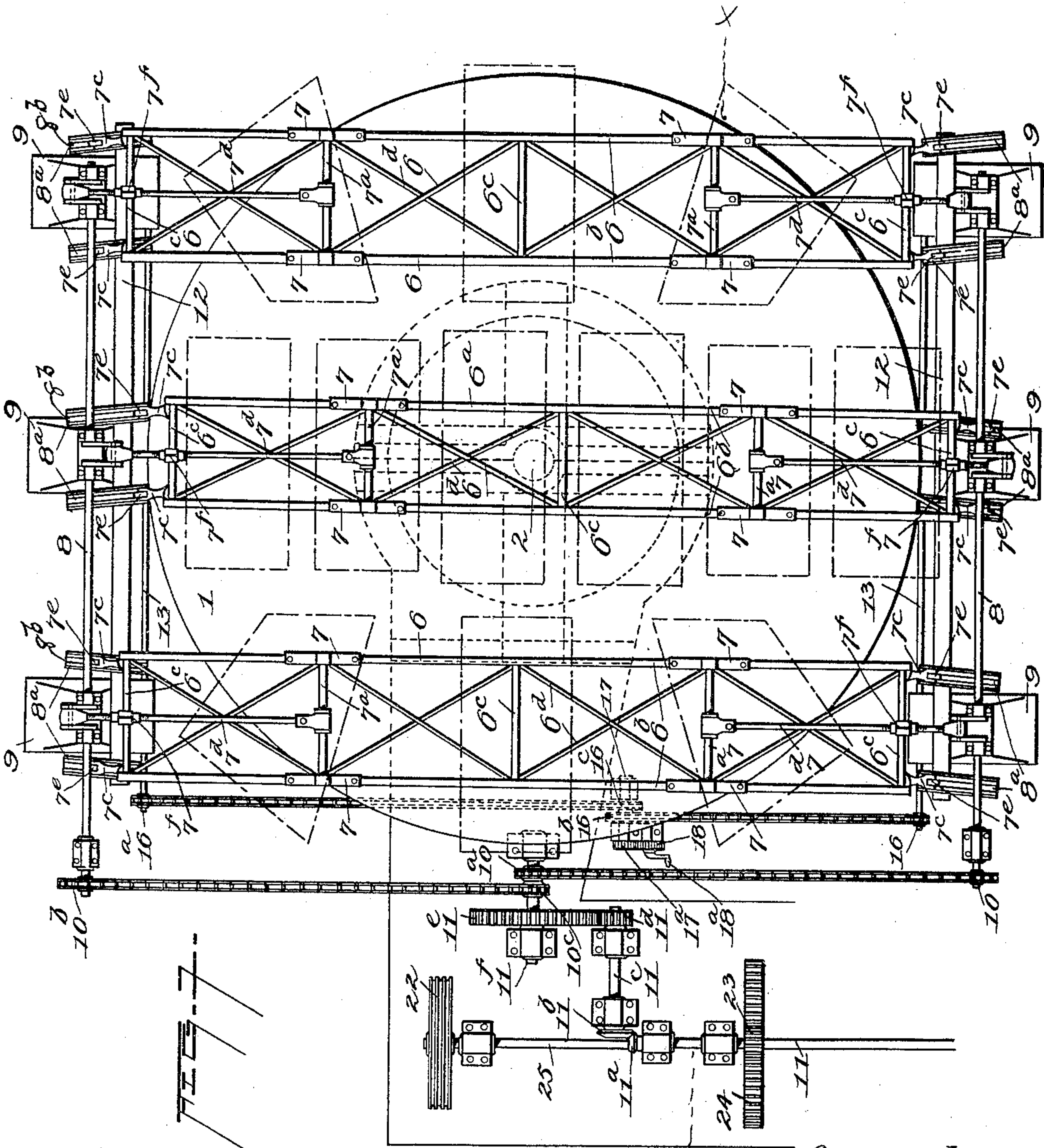
Patented Nov. 19, 1901.

M. SEIBERLING.
GRINDING OR POLISHING MACHINE.

(Application filed Apr. 6, 1900.)

(No Model.)

4 Sheets—Sheet 1.



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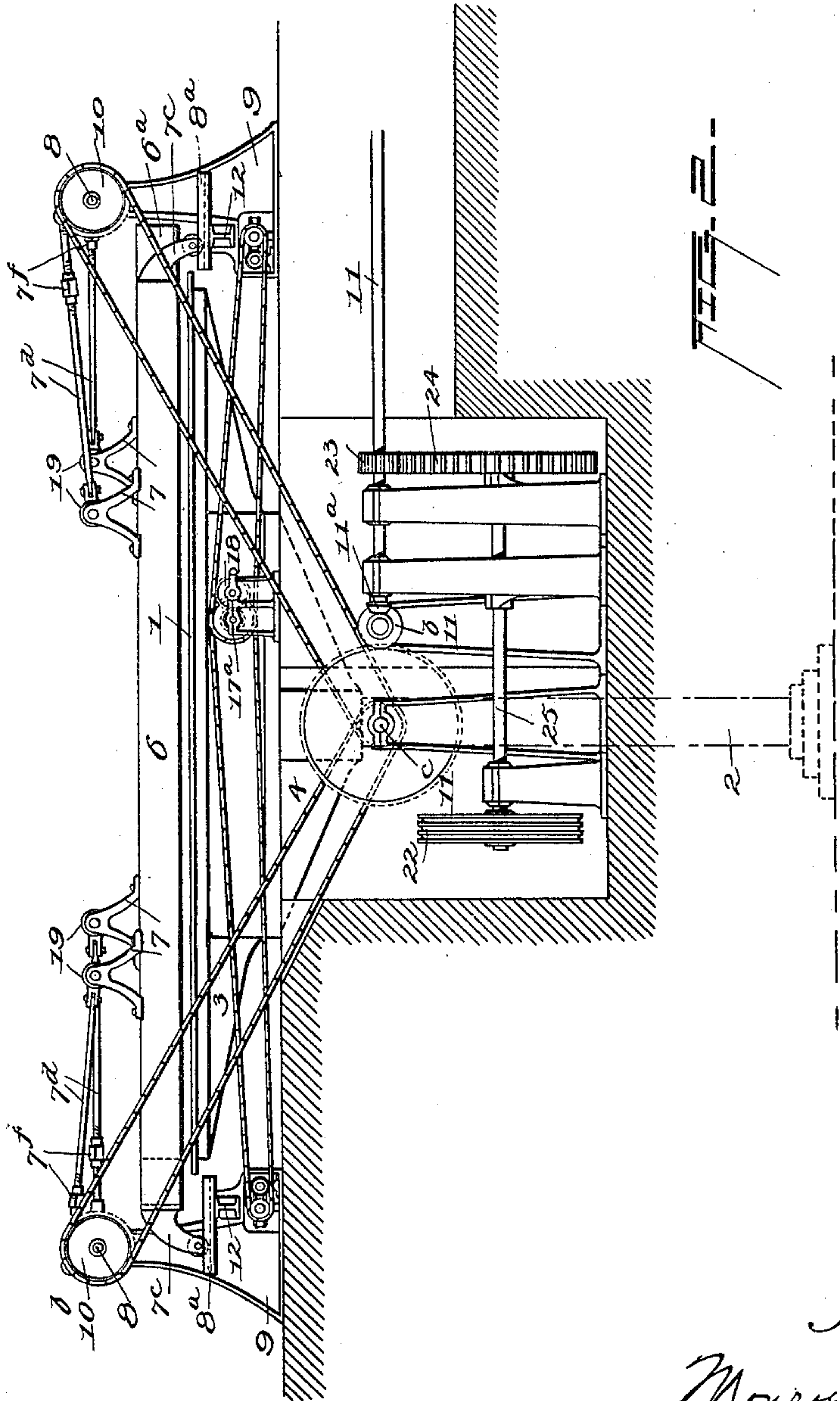
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4 Sheets—Sheet 2.



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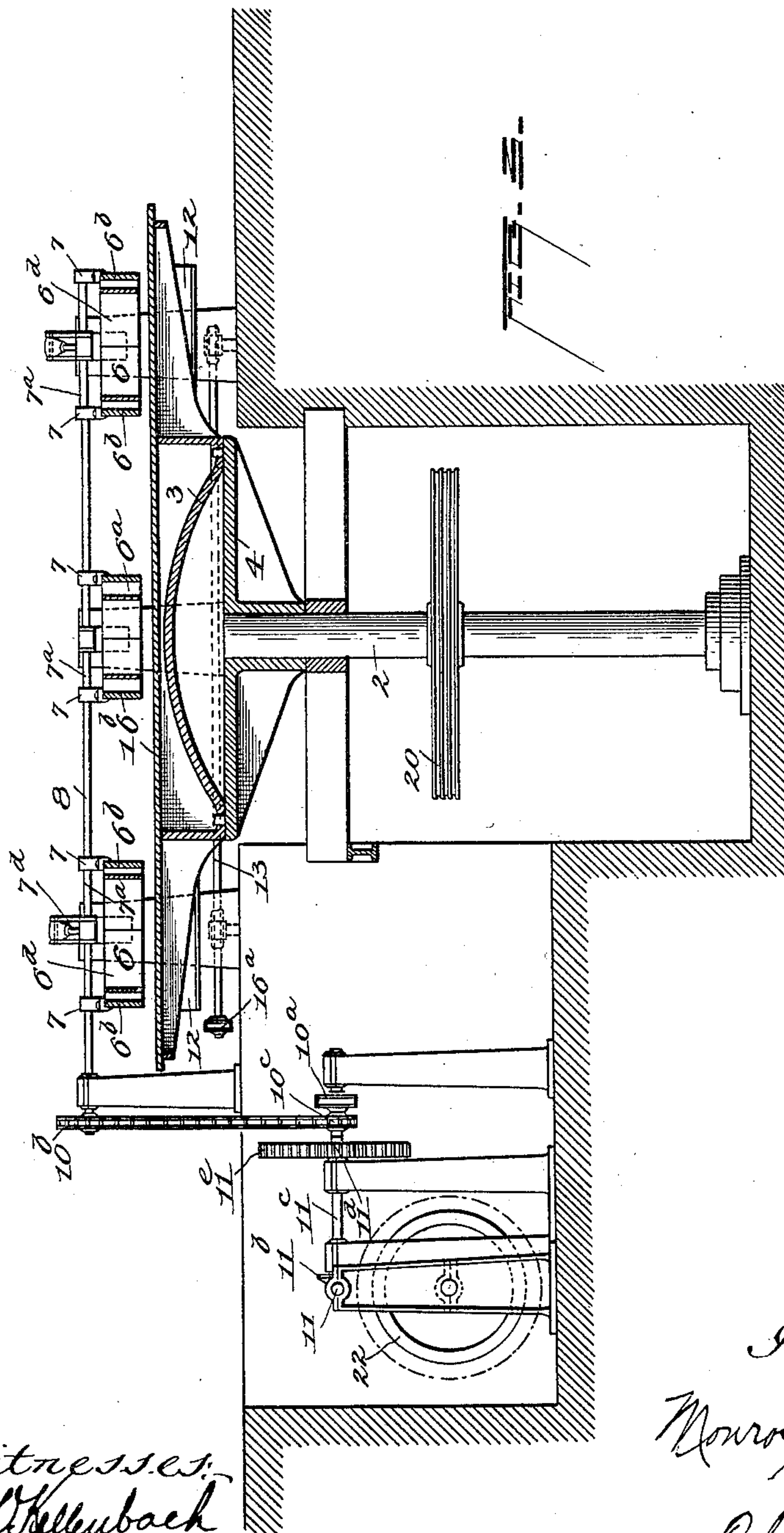
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4 Sheets—Sheet 3



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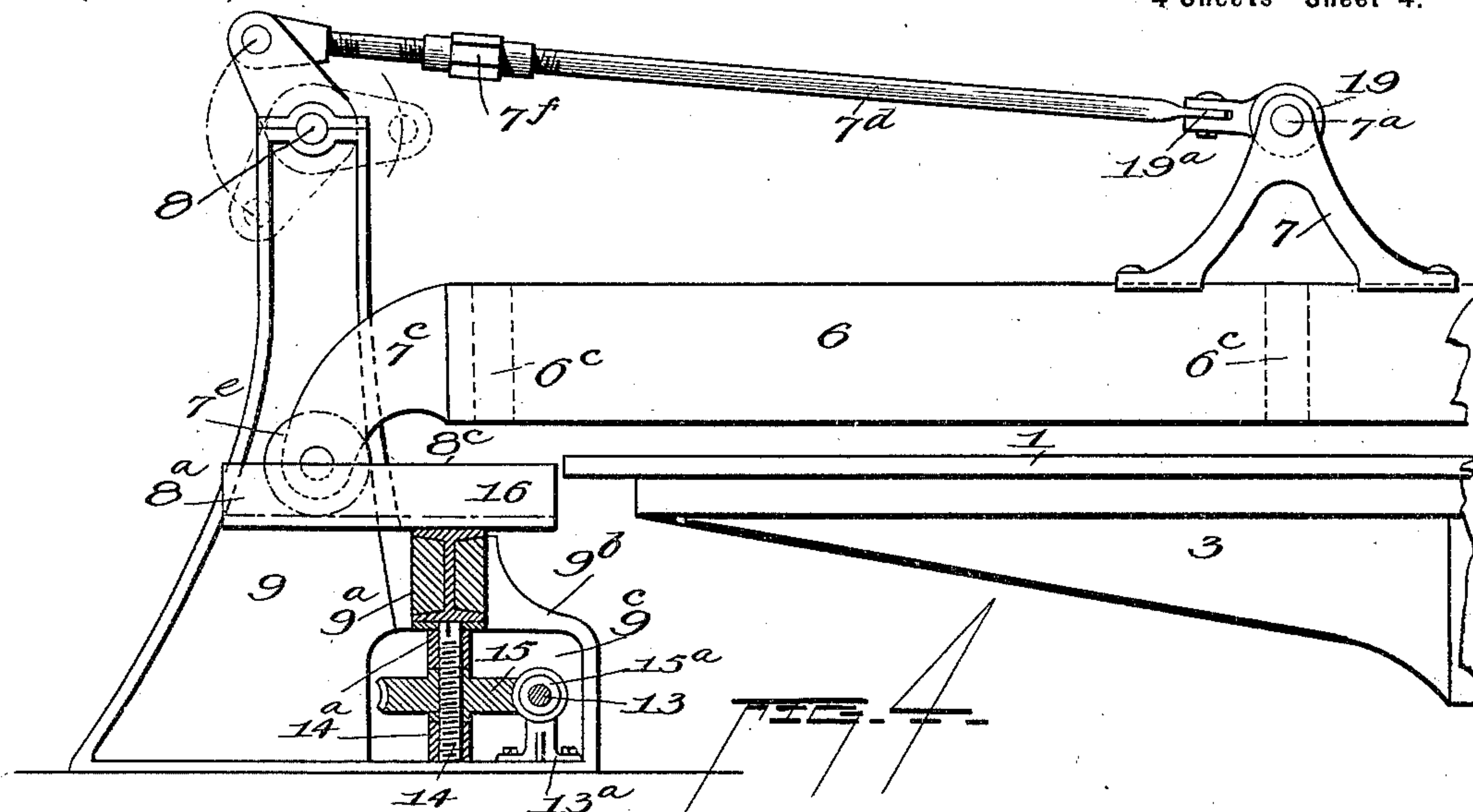
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4 Sheets—Sheet 4.



UNITED STATES PATENT OFFICE.

MONROE SEIBERLING, OF PEORIA, ILLINOIS.

GRINDING OR POLISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 686,991, dated November 19, 1901.

Application filed April 6, 1900. Serial No. 11,805. (No model.)

To all whom it may concern:

Be it known that I, MONROE SEIBERLING, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Grinding or Polishing Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in machines for grinding and polishing. Especially does it relate to grinding and polishing plate-glass, although it may be employed on other material either for grinding or polishing, the object being to reduce the time necessary for operating upon the glass or other material, and consequently decrease the cost of production to a minimum.

A further object of the invention is the provision of an easy and ready means for elevating or lowering the rubbing devices, thus raising them off of the surface being treated, and thus permitting the surface being treated to be removed from the table.

Referring to the accompanying drawings, forming a part of this specification, and in which like numerals of reference indicate similar parts throughout, Figure 1 is a plan view of a machine constructed in accordance with my invention. Fig. 2 is a view in elevation of one side thereof. Fig. 3 is a section on the line X X of Fig. 1. Figs. 4 and 5 are enlarged detailed parts of certain features.

In the drawings I have illustrated in combination with the features of my invention the well-known rotating devices upon which the material to be treated is placed, consisting of the rotary table 1, supported and rotating with the standard 2. This is maintained in a vertical position in the usual manner, the lower side of the table being formed with the depending body portion 3, adapted to rest on a plate 4, secured to the top of the standard 2, the table being removably secured to the plate 4, so that it may be removed with the material being treated thereon, the particular means for permitting of such removal not being shown, as those skilled in the art understand well the method employed.

I employ in combination with the rotary table 1 a series of truss-beams, (designated as 6, 6, and 6^a,) to which any preferable rubbing device may be connected by which they are moved in lines at angles to each other over the surface to be ground or polished. By the arrangement of the beams and the complex relative movement imparted thereto practically the entire surface of the material to be treated is acted upon virtually at all times by the rubbing devices, and by which a very high degree of efficiency is secured.

The table 1 through suitable power mechanism is arranged to be continuously rotated, and the beams 6, 6, and 6^a are so supported, arranged, and coupled with intermediate mechanism actuated by the power mechanism that the two outer beams 6 6 are moved in diagonal lines to the axial center of their driving means and parallel with each other, and the center or intermediate beam 6^a has imparted to it an oppositely-shifted end movement or reciprocated in such a manner as to move the ends in an arc of a circle. These beams consist of parallel side frame-pieces 6^b 6^b and the transverse brace-beams 6^c and the diagonal truss-beam 6^d, intermediate the transverse beams 6^c.

7 7 are suitable journal-supports carried by the frame-pieces 6^b 6^b and at points near the opposite ends thereof, and 7^a 7^a are short shafts or spindles journaled in the journal-supports 7 7. On the opposite ends of the beams, which are termed "truss-beams," I have shown at opposite sides suitable castings or casters 7^c 7^c, provided with small rollers or wheels 7^e, extending out and downwardly at their outer ends and so arranged that the casters extend outward in angles substantially diagonal to the central bearing-line of the beams. The movement above referred to of the beams is secured by connecting the spindles or short shafts 7^a 7^a by a suitable pitman connection 7^d to transversely-driven horizontal shafts 8 8 at opposite ends of the beams, which when actuated will transmit a reciprocating movement to the beams.

8^a represents suitable frames, supported as hereinafter set forth, which are provided with the centrally-disposed longitudinal grooves 8^b and the side flanges 8^c, in which the rollers 7^e of the beam are arranged to travel, which di-

rect the path of travel of said beams when the same are actuated, which will be for the outside beams a movement in lines diagonal to the axial bearing of their driving mechanism or directed toward and from the axial center of the table. This is accomplished by arranging the angle of the casters 7^c 7^c to be approximately in the same line at opposite sides, and for the intermediate beam 6^a the arrangement of the casters is in lines opposite to each other, which, as shown in the drawings, will cause the beam to have an oppositely-shifted end movement or a reciprocal movement in an arc of a circle. These movements may be shortened or enlarged as may be desired by adjusting the angle of the frames 8^a as desired, the arrangement and construction being such that the entire surface of the table by such movements will be covered by the rubbing devices at all times during the grinding or polishing process.

At opposite sides of the table I have shown a shaft, referred to above as 8 8, journaled in the standards 9. These are arranged at equal distances from the center of the table. The pitman-rods 7^d, which have suitable connection with these shafts, are arranged to be adjustable or extensible to compensate for any binding or length of stroke of the beams by the provision of the coupling 7^f, connecting opposite threaded ends of the pitman, which is shown consisting of two parts. These shafts are arranged to be driven through suitable sprocket-and-chain connection 10 10^a 10^b 10^c of a power mechanism consisting of the power-shaft 11 and the bevel-pinion 11^a, thence through the bevel-wheel 11^b on an intermediate shaft 11^c, carrying suitable spur-wheel 11^d, intermeshing with the spur-wheel 11^e on the shaft 11^f, which carries the sprockets 10^a and 10^c.

12 represents parallel frame-supports consisting in the present instance of I-beams arranged at opposite sides of the table and of suitable length arranged to be supported by the standards 9 and retained in perfect bearing relation in the pockets 9^a, formed in the extensions 9^b of the standards, which have the hollowed-out portions 9^c, as shown. These beams are arranged to be elevated and lowered, which will result in a raising and lowering of the beams 6, 6, and 6^a through the frames 8^a, supported thereby, on which the truss-beams rest and travel.

I have provided a simple but effective means for raising the truss-beams 6, 6, and 6^a through the I-beams, consisting of the horizontally-arranged shafts 13 13, journaled in the boxings 13^a, carried within the hollowed-out portions 9^c of the standards 9. In the extensions 9^b of the two outer standards I have shown a short vertical threaded shaft or screw 14, having a vertical bearing relation to the central bearing-line of the frames 12 and is supported in the bearings 14^a and arranged to be raised and lowered through the worm-wheel 15, having an internally-arranged nut,

through the rotation of the shafts 13 and the worms 15^a, intermeshing with the worm-wheel 15, the rotation of the shafts 13 in one direction or the other causing an upward or downward movement of the threaded shafts or screws 14, resulting in a corresponding movement of the I-beams resting thereon. To have a perfect bearing relation of these beams in the standards 9, I have shown filling-in castings at these points, designated as 15^b, which form a bearing for the I-beams in the pockets 9^a. The power device or mechanism for actuating the shafting 13 is a very simple arrangement, consisting of the sprocket-and-chain connections 16 16^a on the shafts 13 and driven through the sprockets 16^b 16^c on the short shaft 17, arranged to be actuated through the spur-gears 17^a and 18, by suitable means. I have shown for convenience a crank 18^a, attached to the spur-wheel 18, for accomplishing this purpose.

In my improved construction, the beams are each operated from oppositely and transversely carried driven shafts, supported by suitable standards and actuated through sprocket-and-chain connection from the power mechanism, and although the thrust of the pitmen is substantially transverse to the shafts the coupling with the beams is of such a nature as to permit the same to be moved in lines diagonal to such axis, and as the coupling of the pitmen is at points one-third distance apart around the axial centers of their driving means the movements transmitted to the beams will be in opposite directions relative to their longitudinal bearing, except for the short periods, when either of the outer beams may have the same relative movement as that of the intermediate beam. This is occasioned by the length of stroke of the beam, which is much shorter in the intermediate beam than of the two outer, and the important feature to be noticed is the manner of supporting and directing the movement of the beams, which relieves the table and material to be treated of the weight incident to such grinding or polishing and is also of importance, since the push or pull of the material in one direction by one or more of the beams is counteracted by the push or pull of the beam or beams moving in the opposite direction, which is greatly facilitated in the oppositely-arranged and diagonal movement imparted to the beams, and the connection of the beams to their driving means and means of transmitting a complex reciprocal movement to the same enables me to so adjust and separate the same as to entirely cover the surface of the table with rubbers, as is outlined in Fig. 1 of the drawings, which is found in practice to produce improved results in the quality of the work and a great saving of time in doing the quantity of work now done on the ordinary machine. The connection between the pitman-rods 8^d and the spindles 8 is of such a nature that the side thrust of the beams, which to the length

of the pitman-rod connection thereto is very small, is not sufficient to bind, and is provided for by making a loose or pivotal connection of the same, as at 19^a, to the coupling 19 on the spindle 8, which will permit of a reciprocal movement of the outer beams in lines diagonal to the axial centers of their driving means or in lines directed toward and from each other at opposite ends, while the movement of the intermediate beams is such that the central body portion thereof reciprocates in a reduced circle, while the ends travel in lines opposite to each other or in an arc of a circle.

To actuate the standard 2, carrying the table 1, I have shown for convenience a pulley 20, fixed to the standard 2, which is arranged to be actuated through a rope belt driven by the driving-pulley 22, actuated by the power-shaft 11 through the spur-gear 23, fixed thereon, intermeshing with the spur-gear 24 on the shaft 25, to which the pulley 22 is attached and with which it rotates.

I do not wish to confine myself to exact power devices shown for actuating the table nor to the means for rotating the shafts 8 and 13, as in the first instance it might be preferable to gear direct from the power-shaft through a suitable bevel-pinion on a transversely-carried shaft which shall have a suitable bevel-pinion for intermeshing with a bevel-wheel carried by the standard 2 and also carry suitable means for driving the shafts 8, 8, and for driving the shafts 13, 13 other suitable means may be provided just as effective without departing from the spirit of the invention herein set forth. This may apply also to the truss-beams, which it may be deemed best to modify, and I do not wish to limit myself to the detail in either case, as other and well-known beams may be substituted without altering the character of the device nor the principle outlined.

The rollers 7^c of the casters 7^c I described as traveling in the grooves 8^b of the frames 8^a, provided with the flanges 8^c, this arrangement being deemed advisable, since by providing the frames with the flanges it insures an absolute oblique movement of the beams by reason of the flanges retaining the casters in position, as desired by my improvement, which will prevent the rollers from jumping the flanges when in movement.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a grinding, or polishing machine, the combination with a rotary table, of rubbing devices, and means for reciprocating said devices and for imparting to the same simultaneous with such reciprocation a movement at an angle diagonal to the axial bearing-line of the power-driving mechanism therefor.

2. In a grinding, or polishing machine, the combination with a rotary table, of rubbing devices, means of reciprocating said devices, oppositely-extended guiding mechanism car-

ried at the outer ends of said rubbing devices for causing the same to reciprocate in a line diagonal to the central bearing-line of the rubbing devices.

3. In a grinding, or polishing machine, the combination with a rotary table, of a series of three beams, bars, or carriers, for carrying grinding or polishing devices, of the means for simultaneously reciprocating said beams or bars, arranged to engage means for causing the outer beams to reciprocate in lines diagonal to the central bearing-line of the beams, and for moving the center beams so that the ends thereof will reciprocate in an arc of a circle.

4. In a grinding, or polishing machine, the combination with a rotary table, of a series of beams, having attached to their outer ends suitable brackets or casters arranged to travel in grooves or tracks arranged in lines diagonal to the central bearing-lines of the beams, of suitable connection with the beams to power driving mechanism, and of means for actuating said driving means.

5. In a grinding, or polishing machine, the combination with a rotary table, of suitable power mechanism, connections with a rotary table, a series of three truss-beams, for carrying rubbing devices, transverse power-shafts and means for connecting the beams for actuation through said shafts, by which the two outer beams are reciprocated in lines opposite to the beams carried intermediate thereof.

6. In a grinding, or polishing machine, the combination with a rotary table, of suitable power mechanism, connections with oppositely-arranged rotating shafts, truss-beams carrying rubbing devices and having connection with rotating shafts, and means for moving said beams in lines diagonal to the axial center of said shafts, substantially as described.

7. In a grinding, or polishing machine, the combination with a rotary table, of rotating shafts journaled in suitable standards at opposite sides of said table, sprocket-wheels carried by said shafts and driven through suitable sprocket-and-chain connection from power mechanism and connections from said shafts with rubbing devices movable in oblique lines above said table, substantially as described.

8. In a grinding, or polishing machine, the combination with a rotary table, oppositely-arranged driven shafts, and means for actuating the same, beams carrying suitable rubbing devices arranged transversely to said shafts, and driven thereby and carrying at opposite ends mechanism traveling in suitable supports for directing the beams in lines opposite to each other, means whereby said supports may be raised or lowered, substantially as described.

9. In a grinding, or polishing machine, the combination with a rotary table, oppositely-arranged driven shafts, journaled in suitable standards, rubbing devices connected with

and actuated by said shafts, vertically-movable transverse supports and guiding means carried thereby for directing the path of travel of said rubbing devices through mechanism engaged thereby and mechanism for raising and lowering the rubbing devices through the transverse supports, substantially as described and shown.

10. A grinding and polishing machine consisting of a rotating table, beams carrying suitable rubbing devices located above said table and having traveling supporting and guiding means arranged on said beams, said supports arranged in lines diagonal to the central bearing-line of the beams, means of reciprocating said beams, transversely-carried truss-beams located oppositely to each other and arranged with guides for directing the path of travel of the above said supports, and means for raising or lowering the guides to thus elevate or lower the beams, substantially as described.

11. A grinding and polishing machine, consisting of a rotary table, beams carrying rubbing devices located and moving in opposite lines above said table, each beam provided with castings extending outward and downward in lines diagonal to the central longitudinal lines of the beams, rollers or wheels carried by said castings and arranged to travel in grooves or tracks supported by means arranged to be elevated or lowered, of the means for reciprocating said beams and for raising or lowering the same, substantially as described.

12. The arrangement of the rotary table, and rubbing devices and the mechanism for causing the rubbing devices to travel in lines extending obliquely to each other, in combination with shafts 13, and their connection with mechanism for raising or lowering the rubbing devices, and power mechanism for actuating the shafts 13, substantially as described.

13. The combination with a revolving table, of truss-beams carrying rubbing devices mounted over the table supported at opposite ends by suitable means which direct the line of travel thereof, means for reciprocating said beams and causing the beams to travel in lines extending obliquely to each other.

14. In a grinding or polishing machine, the combination with a rotary table, rubbing devices supported and moving in lines obliquely to each other above the same, oppositely-ar-

ranged vertically-adjustable supports for the same, transversely-carried shafts to the beams, actuating suitable means for raising the supports, for elevating or lowering said beams.

15. In a grinding, or polishing machine, the combination with a rotary table, of rubbing devices having pitman connection with transversely-carried shafts, power devices, oppositely-arranged guides at opposite ends of the rubbing devices, rollers or wheels carried by said rubbing devices arranged to travel in grooved ways in said guides, which said guides are provided with flanged side extensions for guiding and retaining the wheels in contact with said grooves, substantially as described.

16. A polishing or grinding device or apparatus, comprising a truss-frame consisting of parallel side frame-supports, transverse frame-pieces and diagonally-arranged truss-braces intermediate the transverse frame parts, of suitable brackets or casters secured in a suitable manner to said frame, for the purpose herein set forth.

17. A truss-frame provided with suitable casters at opposite ends carrying rollers or wheels, so arranged as to travel in a plane diagonal to the central bearing-line of the frame, substantially as described.

18. A polishing or grinding device or apparatus, comprising a suitable frame, rollers carried by said frame, of one or more journal-supports carried thereby and suitable spindles or shafts journaled therein, substantially in the manner and for the purpose set forth.

19. In a polishing or grinding apparatus, the combination with a frame comprising parallel side frame-pieces, transverse braces and diagonal truss-braces intermediate the transverse braces, journal-supports carried by said frame and having short shafts or spindles journaled therein, of suitable brackets or casters supported at opposite ends of the frame and having depending outer extensions carrying rollers arranged to travel in lines diagonal to the central bearing-line of the frame, substantially as described.

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

MONROE SEIBERLING.

Witnesses:

F. H. BOLTE,

CHAS. W. LA PORTE.