No. 712,772. Patented Nov. 4, 1902.

# C. R. DAVIS.

## GRINDING OR POLISHING MACHINE.

(Application filed July 17, 1902.)

(No Model.) 4 Sheets—Sheet 1.

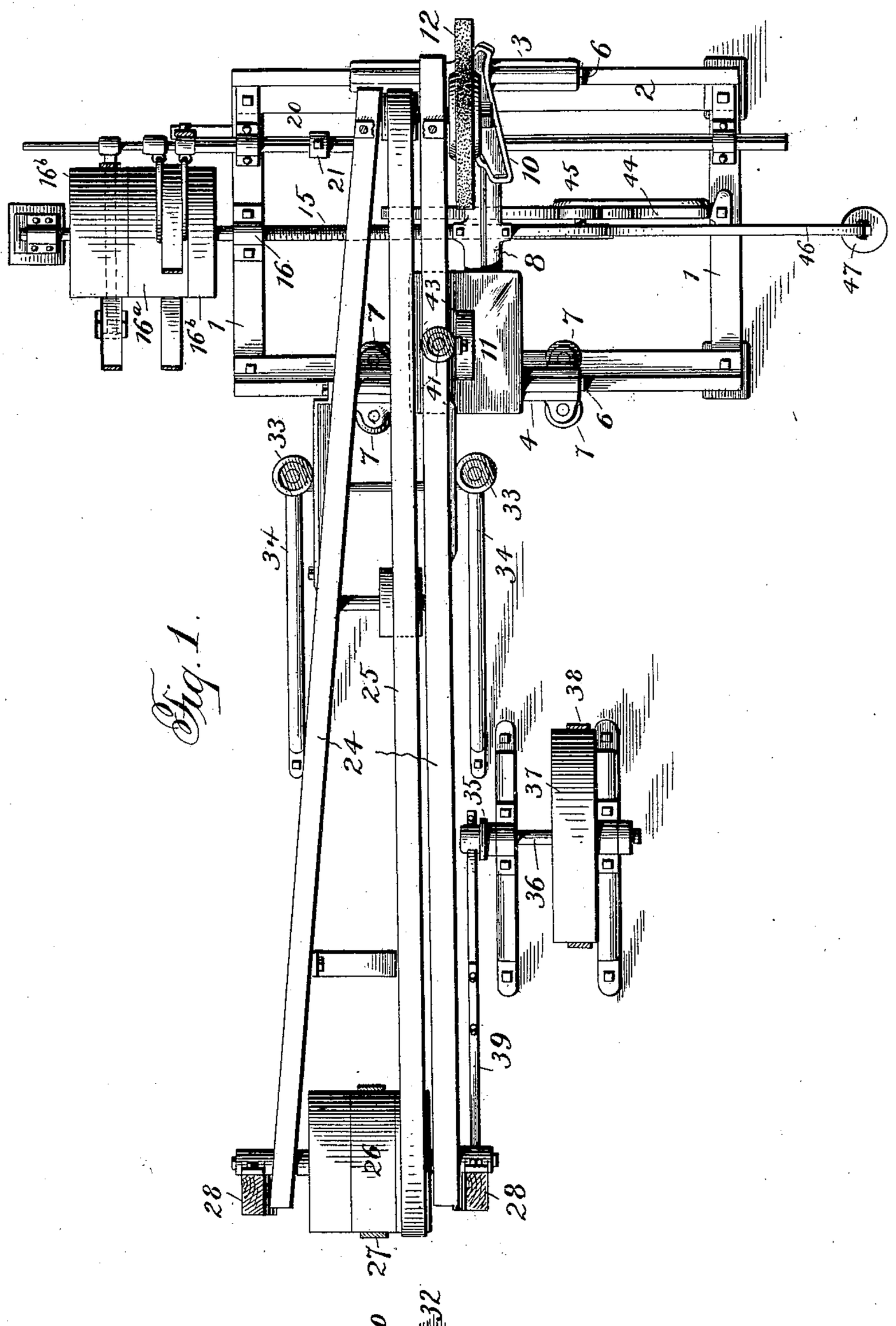


Fig. 1.

WITNESSES

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## GRINDING OR POLISHING MACHINE.

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(No Model.) 4 Sheets—Sheet 2.

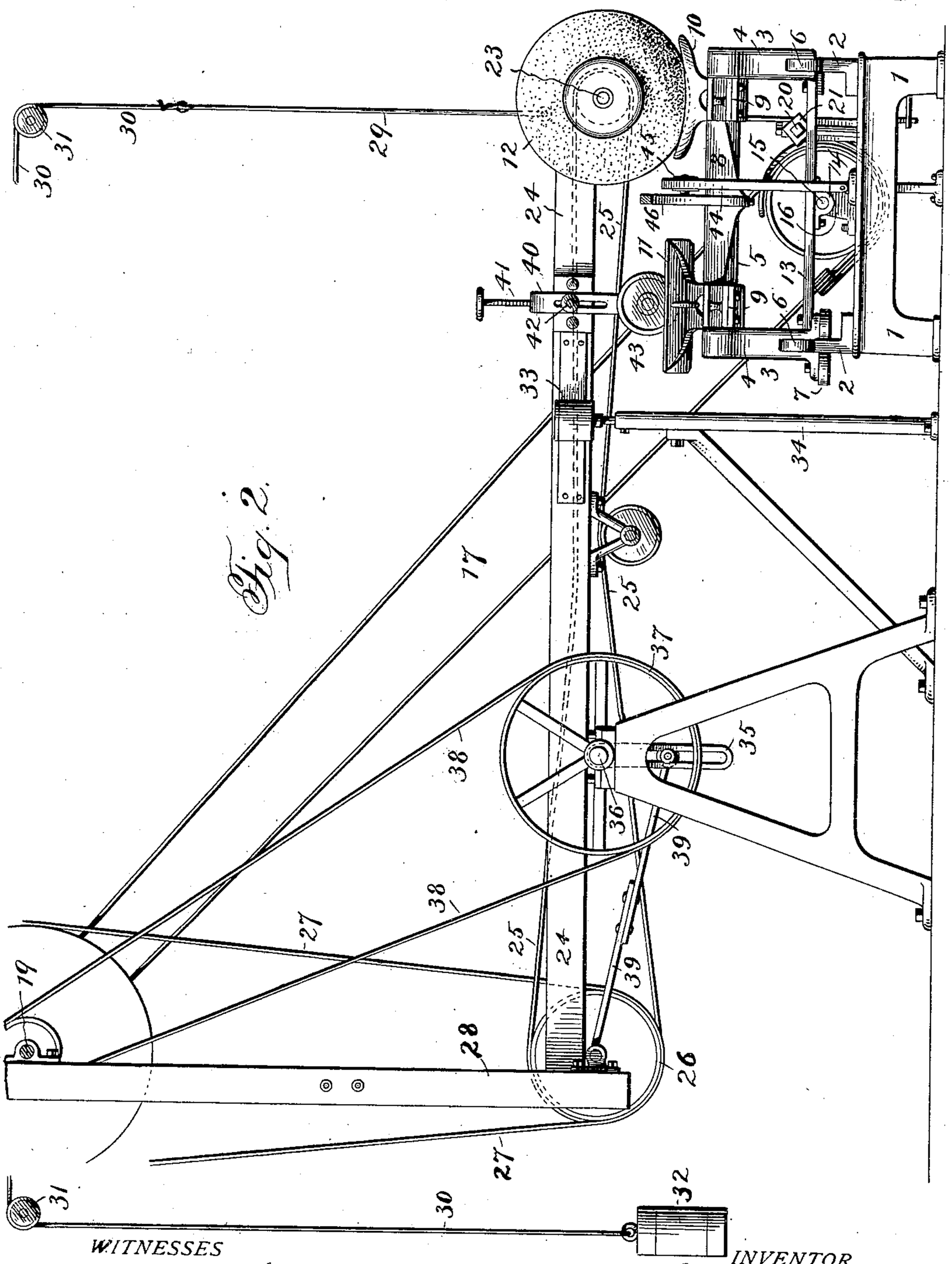

Fig. 2.

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## GRINDING OR POLISHING MACHINE.

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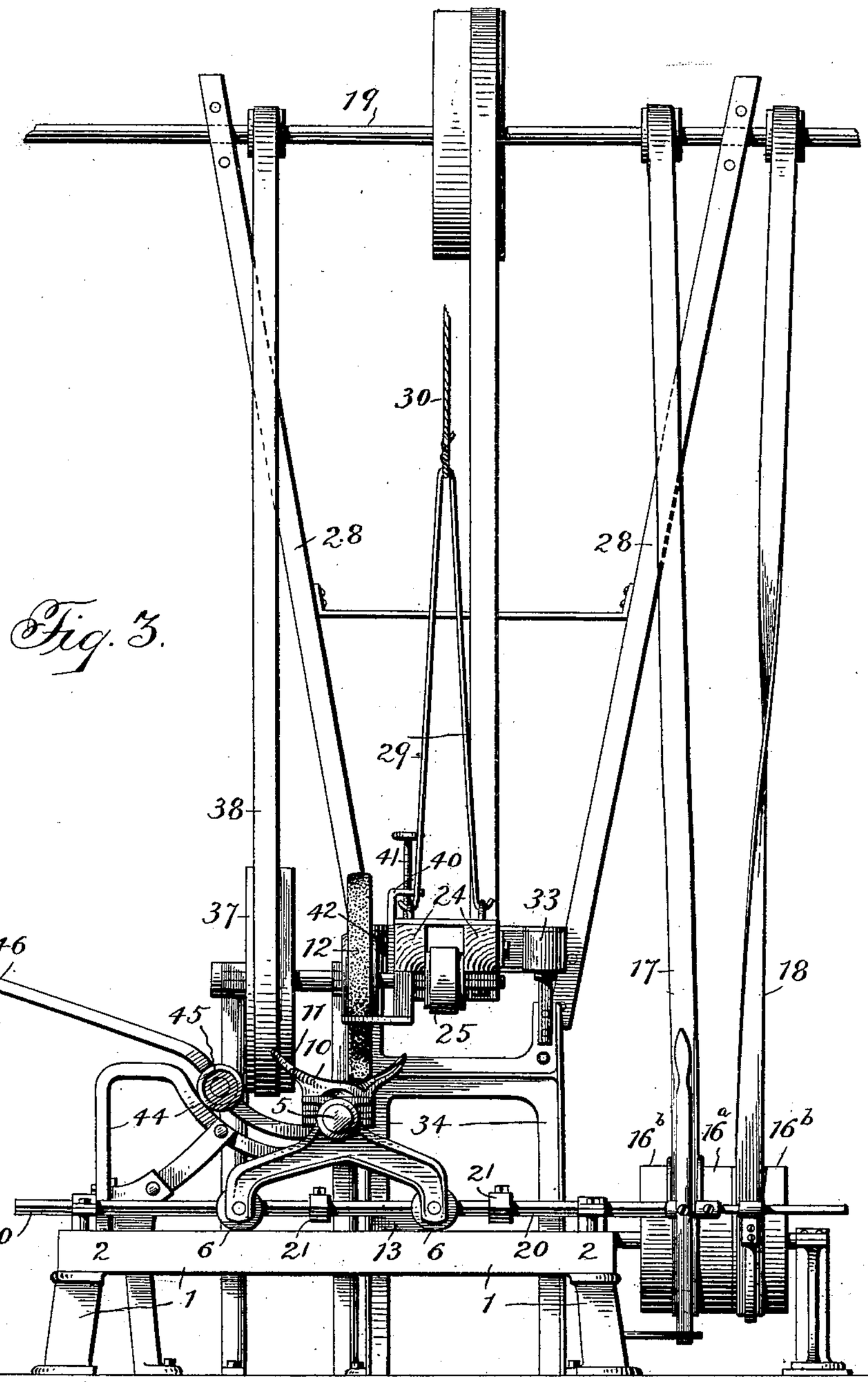
(No Model.) 4 Sheets—Sheet 3.

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 4.

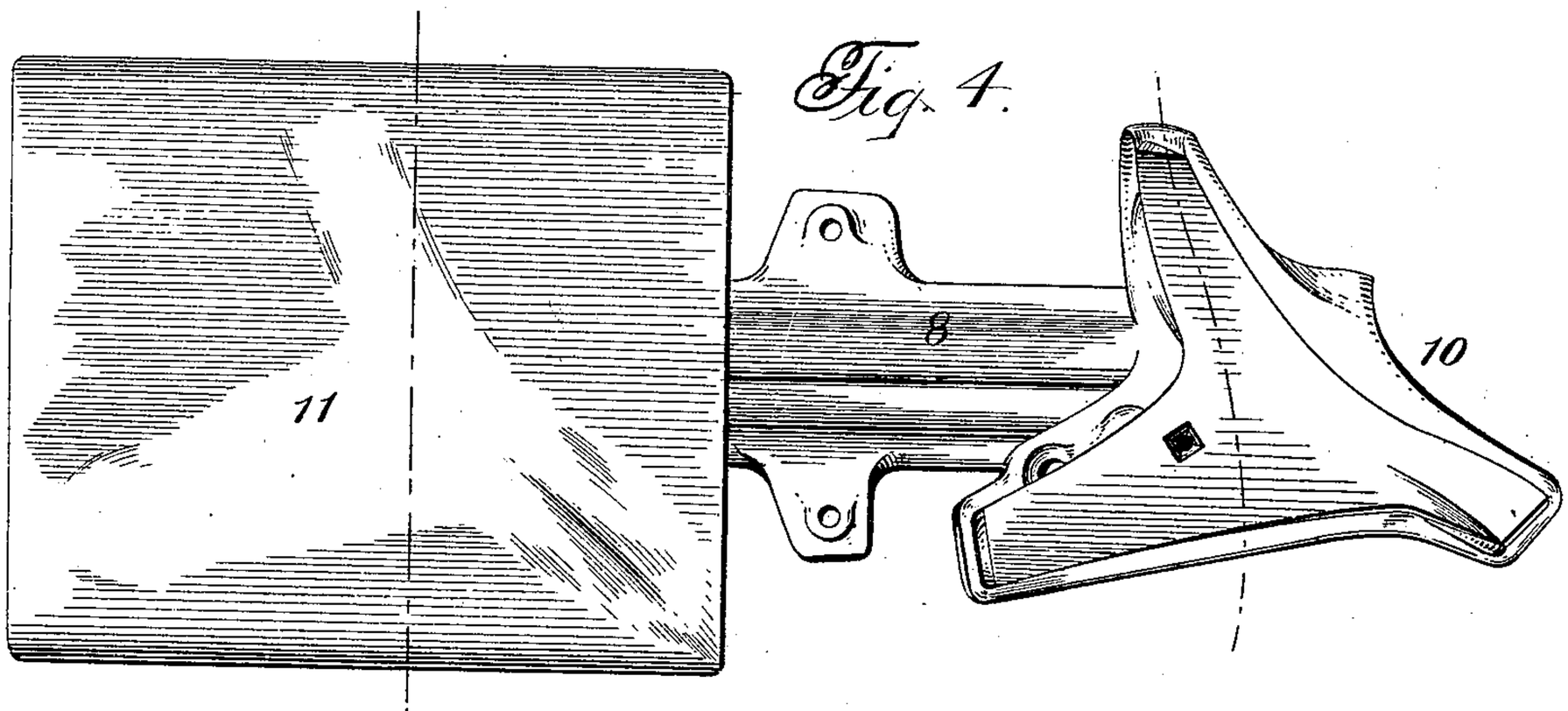



Fig. 5.

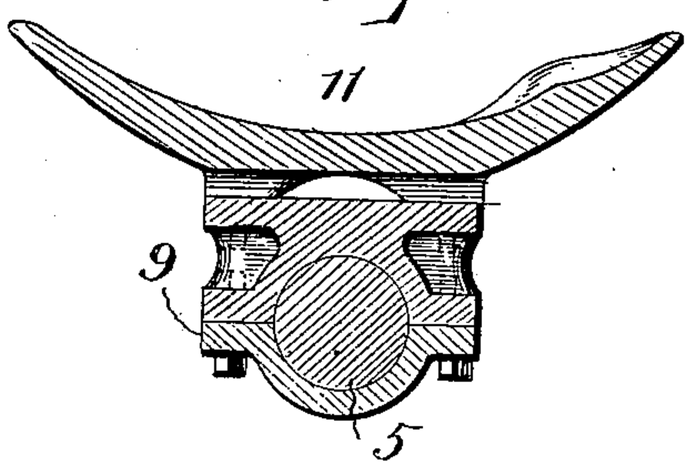



Fig. 6.

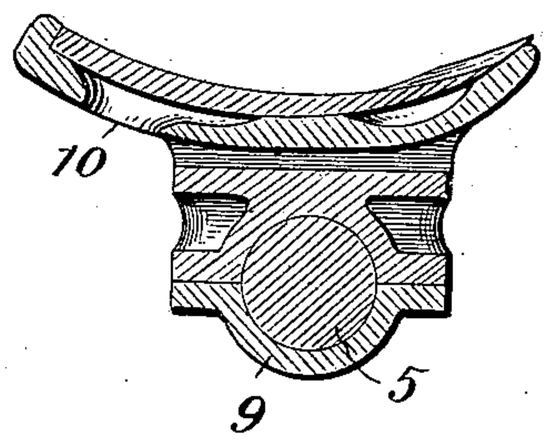
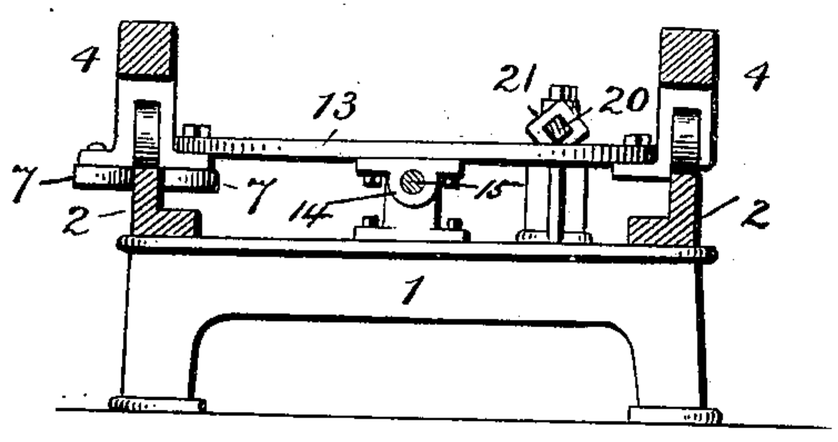



Fig. 7.

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# UNITED STATES PATENT OFFICE.

CALVIN R. DAVIS, OF SOUTH BEND, INDIANA, ASSIGNOR TO OLIVER CHILLED PLOW WORKS, OF SOUTH BEND, INDIANA.

## GRINDING OR POLISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 712,772, dated November 4, 1902.

Application filed July 17, 1902. Serial No. 115,993. (No model.)

*To all whom it may concern:*

Be it known that I, CALVIN R. DAVIS, a resident of South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Grinding or Polishing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in grinding and polishing machines, the object of the invention being to provide improvements of this character which will automatically grind or polish curved and irregular surfaces and more particularly designed for polishing the points and other parts of a plow, although it may of course be used for various other purposes.

With this object in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view, partly in section, illustrating my improvements. Fig. 2 is a side view. Fig. 3 is an end view, and Figs. 4, 5, 6, and 7 are views of various details of construction.

1 represents a supporting-frame made with parallel tracks 2, on which is mounted my improved carriage 3, which latter comprises forked standards 4, connected at their upper ends by a shaft 5 and bifurcated at their lower ends to receive rollers 6, running along the top of the tracks, and one of said standards is provided with horizontally-disposed rollers 7 to run against the opposite sides of the track and prevent possibility of the carriage leaving the same.

On shaft 5 a semicylindrical plate 8 is secured by bands 9, passed beneath the shaft and secured to the plate, and on this plate near its ends are removably secured the article-holder 10 and guide-plate 11, both being connected by bolts to flanges on plate 8 to permit their ready removal. The article-holder shown is for a plow-point and is recessed to receive the point and hold its face exposed to the grinding or polishing wheel 12, as will be more fully hereinafter described.

The standards 4 are connected by a cross-bar 13, carrying a threaded collar 14, through which a threaded rod 15 extends, and said rod is supported in a bearing 16 on frame 1 and has secured thereto a central pulley $16^a$ and loose pulleys $16^b$, connected by straight and twisted belts 17 and 18 with a pulley on drive-shaft 19, and a slide-bar 20, moved by lever $20^a$, carries shifting-fingers 21, so that these belts can be moved on and off pulley 16 to reverse the direction of rotation of screw-rod 15 and the movement of the carriage.

The grinding-wheel 12 is secured upon a short shaft 23 at the forward end of a swinging frame or cradle 24, power being transmitted to shaft 23 and grinding-wheel 12 by means of a belt 25, connecting a pulley 26 at the rear end of the frame with a pulley on shaft 23; and a belt 27 connects pulley 26 with a pulley on drive-shaft 19. The swinging frame or cradle is supported at its rear end by means of bars 28, hinged on the drive-shaft and pivotally connected to the shaft at the end of the cradle on which pulley 26 is mounted. The forward end of the cradle is connected by rods or links 29 with a rope or cable 30, passed over suitable sheaves 31 and having a counterweight 32 secured to its free end to counterbalance the forward end of the cradle, which latter is prevented from lateral displacement by means of guide-rollers 33, supported on a standard 34 and bearing against the respective sides of the cradle. The cradle is given a reciprocating movement by a slotted crank-arm 35, and a shaft 36, carrying pulley 37, connected by a belt 38 with a pulley on the drive-shaft, and a rod 39, is connected at one end to the cradle and at its other end adjustably to the slotted crank-arm, so that by adjusting this connection on the crank-arm the length of throw of the cradle can be varied at will. On the cradle a vertical bar 40 is adjustably connected by means of a set-screw 41 and a clamping-nut 42, and this bar carries the guide-wheel 43 to run upon the guide-plate 11 and govern the up-and-down movement of the grinding-wheel, as will hereinafter appear.

To one end of frame 1 a guide-rail 44 is secured and bent to conform to the general curvature of the article to be ground or pol-

ished, and on this rail 44 runs a roller 45, supporting a long arm 46, secured to plate 8, and a weight 47 is secured to this arm 46 to always maintain the roller 45 on rail 44, thus compelling plate 8 and the article-holder 10 and guide-plate 11 to gradually turn and present the entire surface of the article to the grinding-wheel. The guide-plate 11 on its upper face, on which guide-wheel 43 runs, is cast with just the proper contour to raise and lower the grinding-wheel in accordance with the outline of the plow-point, so that as the grinding-wheel is moved back and forth over the article the surface of the guide-plate 11 will compel the guide-wheel 43 to rise and fall in just the proper manner to move the grinding-wheel at uniform pressure over the irregular surface of the article.

The operation of my improvements is as follows: The plow-point is placed in holder 10, and drive-shaft 19 through the medium of belts 25 and 27 revolves grinding-wheel 12 and belt 38 turns shaft 36 and crank-arm 35 to swing the cradle back and forth, as above explained. As the grinding-wheel is moved over the face of the plow-point its movement is governed by guide-wheel 43, moving over the guide-plate 11, permitting the grinding-wheel to move into and out of hollows and over raised portions of the plow-point, grinding or polishing the entire surface uniformly. The drive-shaft also by means of belts 17 and 18 transmits motion to screw-rod 15, which latter, turning in the collar on cross-bar 14, slowly moves the carriage 3 along the track to expose the entire surface of the plow-point to the grinding-wheel, and as the carriage moves along the track roller 45 will run on guide-rail 44 and turn plate 8 on shaft 5 to tilt the article-holder 10 and guide-plate 11 in precise accordance with the lateral curvature of the plow-point. When the point has been ground or polished from end to end, the direction of movement of the carriage can be changed by reversing the lever $20^a$ and the point reground or a new one inserted in its place.

While I have described my improved machine as relating to grinding plow-points, it is to be understood that I do not confine myself to such use, as it can be adapted by changing the guide-plates to grind or polish almost any curved or irregular surface by simply attaching suitable holders 10, guide-plates 11, and guide-rails 46, the latter of course shaped to move the holder and guide-plate in accordance with the lateral configuration of the article being ground or polished.

A great many slight changes might be made in the general form and arrangement of the several parts described without departing from my invention, and hence I would have it understood that I do not limit myself to the precise construction set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a grinding or polishing machine, the combination with a swinging frame or cradle, a grinding or polishing wheel thereon, an article-holder to support the article beneath and in the path of the grinding-wheel, means for moving the article at right angles to the movement of the cradle, and guiding means movable with the article and compelling said grinding-wheel to move up and down in conformity with the configuration of the article being ground or polished.

2. In a polishing-machine, the combination with a holder to support an article to be polished, of a polishing-wheel, means for moving the same across the article, and means for moving the article at right angles to the movement of the polishing-wheel and means for automatically tilting the article as it moves beneath the grinding-wheel.

3. In a polishing-machine, the combination with a holder to support an article to be polished, of a swinging frame or cradle, a polishing-wheel thereon movable across the face of the article, and means for moving the holder at right angles to the cradle and automatically tilting said holder in accordance with the lateral curvature of the article being polished.

4. In a polishing-machine, the combination with a movable carriage, of a plate supported to turn on the carriage, an article-holder on said plate, a swinging frame or cradle above the plate, a guide-roller partially supporting one end of the cradle, a guide-plate on said first-mentioned plate for the guide-roller to govern the up-and-down movement of the polishing-roller over the article being polished, and means for turning said plate to tilt the article-holder and guide-plate in accordance with the configuration of the article.

5. In a polishing-machine, the combination of a swinging frame or cradle, a polishing-wheel thereon means for turning said wheel and swinging said cradle, a laterally-movable article-holder beneath the cradle to hold the article in the path of the polishing-wheel, and means for automatically tilting the holder in accordance with the curvature or outline thereof to present the entire surface of the article to the polishing-wheel.

6. In a polishing-machine, the combination of a swinging frame or cradle, a polishing-wheel thereon, means for turning the wheel and swinging the frame or cradle, a carriage, means for slowly moving the carriage at right angles to and beneath the cradle, a plate mounted to turn on said carriage, an article-holder carried by the plate to hold the article in the path of the polishing-wheel, a stationary bent rail, an arm secured to the plate and a roller on said arm moving along the rail to tilt the plate and article-holder in accordance with the curvature of the article.

7. In a polishing-machine, the combination with a movable carriage, and an article-holder

thereon, of a hinged bar, a frame or cradle pivotally connected thereto at one end, a counterweighted cable secured to the other end of the cradle to relieve the weight thereof, a polishing-wheel at this end of the cradle to swing across the article to be polished, means for moving the article at right angles to the movement of the cradle, means for automatically tilting the article and rollers between which the cradle swings to hold it against lateral movement.

8. In a polishing-machine, the combination with a swinging frame or cradle and a polishing-wheel thereon, a carriage movable beneath the cradle and at right angles thereto, a plate mounted to turn upon the carriage, an article-holder at one end of the plate to hold the article in the path of movement of the polishing-wheel, a guide-roller on the cradle, and a guide-plate having a surface of uneven outline to guide the polishing-wheel over the article.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CALVIN R. DAVIS.

Witnesses:
MICHAEL M. MATTHEWS,
FRANK ABBOTT.