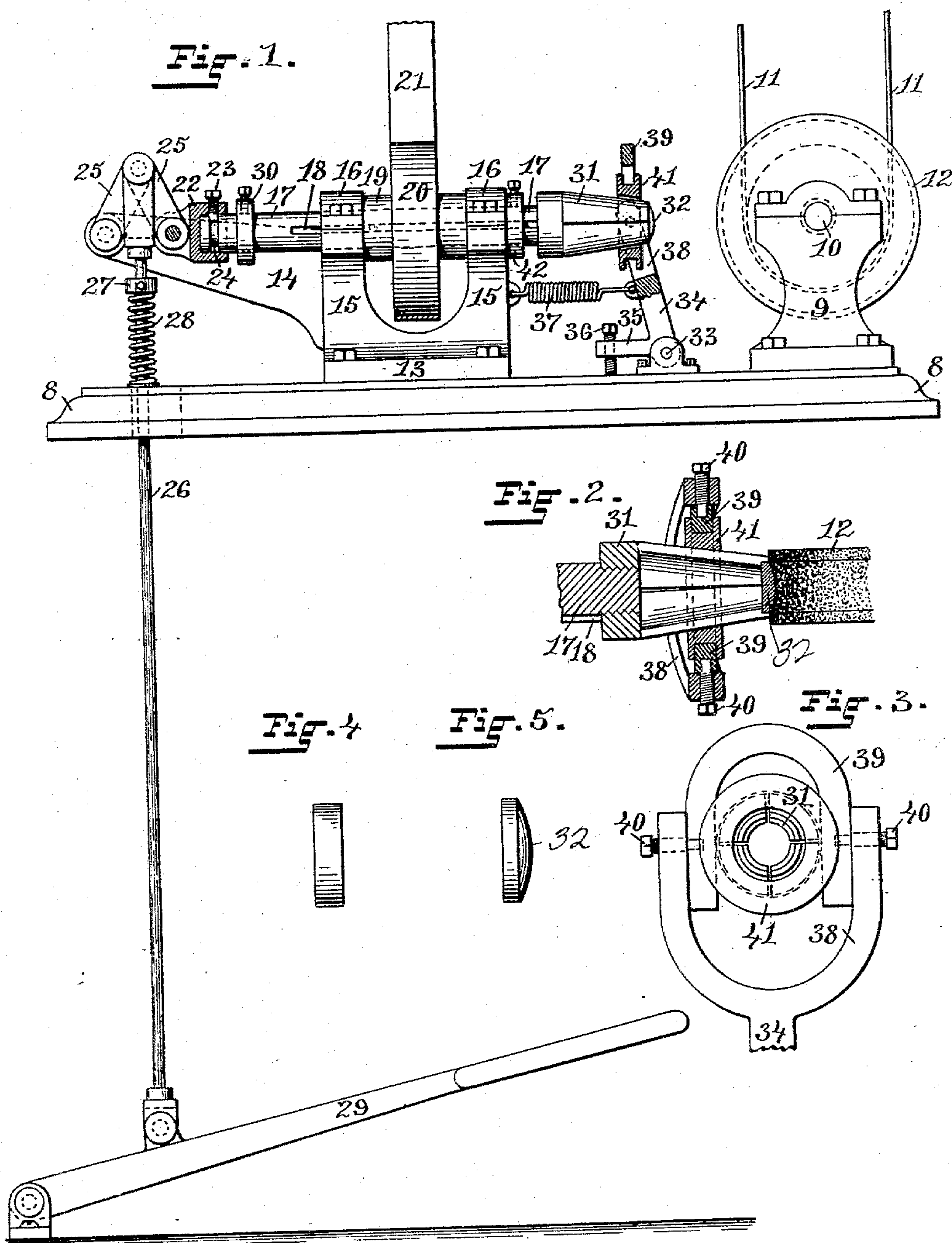


(No Model.)

W. E. COOK.
GRINDING MACHINE.

No. 556,919.

Patented Mar. 24, 1896.



WITNESSES:

Chas. H. Luther Jr.
M. F. Bligh.

INVENTOR:

Walter E. Cook
Joseph H. Miller & Co.
Attys.

UNITED STATES PATENT OFFICE.

WALTER E. COOK, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF TO J. P. CARL WEIS, OF SAME PLACE.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 556,919, dated March 24, 1896.

Application filed February 10, 1892. Serial No. 421,002. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. COOK, of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Grinding-Machines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in machines for grinding the surfaces of disks of mother-of-pearl or other material.

The object of this invention is to produce a grinding device adapted to automatically grasp a disk to be ground, and, while firmly holding the same, to rapidly grind the surface thereof and then release the disk thus operated on.

The invention consists in the peculiar construction of the automatic rotatable clutch and the mechanism by which it is longitudinally movable, and the combination therewith of a rotatable wheel having a grinding-surface the cross-section of which is opposite in shape to the proposed shape of the disk when ground.

The invention further consists in certain other peculiar features of invention and novel combination of parts, which will hereinafter be more fully described and pointed out in the claims.

Figure 1 represents a view, partially in section, of the complete machine, indicating the operation of the same. Fig. 2 represents an enlarged sectional view of the chuck and clamping-ring, with a disk grasped in the chuck and being shaped by the grinding device. Fig. 3 represents a front end view of the chuck and the clamping device on an enlarged scale. Fig. 4 represents an edge view of a blank or disk before being ground or shaped. Fig. 5 represents a similar view of a disk after being ground in this machine by a grinding-wheel having a cross-section corresponding to that illustrated in Fig. 2.

Similar numbers of reference designate corresponding parts throughout.

In the drawings, 8 indicates a base which is supported on a bench or by suitable standards. At one end of this base is secured a

frame 9 in which is journaled a shaft 10, which is driven by the belt 11 working over a pulley on said shaft. The grinding-wheel 12 is carried by this shaft and is shown as having a circumferential concaved surface; but other grinding-wheels of various sizes or having convex or other circumferential surfaces may be substituted for that shown in the drawings.

At or near the center of the base 8 is securely bolted the casting 13 having the rearwardly-extending arm 14 and the upright members 15, in the upper parts of which are formed bearings in longitudinal axial alignment with each other and with the circumferential center of the grinding-wheel, and rotatably secured in these bearings by the straps 16 is the spindle 17 extending to the rear of said casting a distance about equal to the distance from the forward end of the spindle to the circumference of the grinding-wheel. This spindle has a longitudinal slot 18, in which a spline secured to the inner surface of the sleeve 19 extends, so that, while horizontally independently movable through the sleeve 19, the rotation of the sleeve is conveyed to the spindle. This rotation is accomplished by means of the pulley 20 mounted on the sleeve 19 and driven by the belt 21 in a direction at right angles with the direction in which the grinding-wheel is driven.

The rear end of the spindle is secured in the cup-fitting 22 by the set-screw 23 carried by said fitting and having an end which works in a groove 24 cut around the spindle near this end. This fitting is pivotally connected by the links 25 with a stud on the rear end of the arm 14. The pin connecting the links 25 is secured to the upper end of the rod 26, provided with a stop 27 bearing against the coiled spring 28, against the pressure of which the rod is operated by the treadle 29 to draw the upper ends of the links 25 downward, thus spreading their lower ends and forcing the spindle forward a distance regulated by the stop-collar 30 clamped to the spindle.

On the forward end of the spindle 17 is secured the spring-opening chuck 31, which is herein shown as formed of four segmental and tapering strips adapted to spring open sufficiently to allow the disk 32 to drop out. Any of the well-known forms of clutches may,

however, be used without departing from the spirit of my invention.

Intermediate the casting 13 and the frame 9 the bracket 33 is secured to the base 8, and 5 pivoted in this bracket is the arm 34 having the extension 35 carrying a stop-screw 36 to regulate the backward throw of the arm by the coiled spring 37 secured to the arm at one end and to the casting 13 at the other 10 end. At the upper end of the arm 34 is formed a yoke 38, in which the inverted-U-shaped guide 39 is pivoted by the set-screws 40, and supported in this guide by the forward end of the chuck 31 is a clamping-collar 41, freely 15 rotatable and having a circumferential groove in which the arms of the guide engage, the backward throw of the spindle 17 from the pressure of the coiled spring 37 being regulated by the stop-collar 42 clamped to the 20 spindle and adapted to strike the surface of the member 15.

A blank, Fig. 4, having been inserted in the open end of the chuck 31, is held for an instant while pressure is applied to the treadle 25 29. This pressure draws the upper end of the links 25 downward and advances the spindle 17 and the chuck secured thereto, the spindle at the same time being rotated, as described. As the chuck advances, the clamping-ring 41 is engaged, and, moving slightly 30 over the tapering surface of the chuck, firmly closes the same on the blank, which is thus firmly held and rapidly rotated. A continuous pressure on the treadle 29 will advance 35 the chuck until the blank is brought against the circumference of the rapidly-rotating grinding-wheel 12, the surface of the blank being thus ground to a cross-sectional shape the exact opposite of the shape of a section 40 of the wheel. If the circumference of the wheel be concave the finished disk will be convex, as shown, and if the circumference of the wheel be convex the disk will be concave.

45 Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a grinding-machine of the nature described, the combination with a rotatable 50 grinding-wheel, of a longitudinally-movable spindle rotatable in a direction at right angles

to the direction of travel of the grinding-wheel, a spring-operated chuck carried on said spindle, and a rotatable clamping device carried on an independent support adapted 55 to engage said chuck to close the same, as described.

2. In a grinding-machine, the combination with the spindle 17, journaled in horizontal bearings in the members 15 of the casting 13, 60 having the longitudinal slot 18, the sleeve 19 mounted on the portion of the spindle between said members and provided with a spline engaging in the longitudinal slot 18, a pulley 20 secured to said sleeve and adapted 65 to rotate the same when driven by a belt, a spring-opened chuck 31, mounted on the forward end of said spindle, provided with tapering segmental jaws, and means for advancing said spindles, of a clamping-ring 41 70 rotatable between the arms of the inverted-U-shaped guide 39 pivotally secured in the yoke 38 of the spring-operated arm 34, and a grinding mechanism rotatable in a line with the axis of said spindle, as described. 75

3. In a grinding device having a longitudinally-movable rotatable spindle carrying a spring-operated chuck mounted in suitable bearings, and means for revolving the same, the combination therewith of the cup-fitting 80 22 secured to the rear end of the spindle by the set-screw 23 engaging in a groove 24 cut into the surface of said spindle, the links 25 pivotally connecting said fitting with a stud secured to the frame of the machine, a spring- 85 raised rod 26, depressible by the treadle 29, pivoted to the junction of said links, a clamping-ring 41 surrounding the chuck, the inverted-U-shaped guide 39 engaging a groove in the circumference of said ring and pivotally secured in the yoke 38, and the pivoted 90 arm 34, having the extension 35 and a set-screw therein operated by the coiled spring 37, formed in part with said yoke, as described. 95

In witness whereof I have hereunto set my hand.

WALTER E. COOK.

Witnesses:

J. A. MILLER, Jr.,
M. F. BLIGH.