(No Model.) 3 Sheets—Sheet 1.

H. C. SCHRADER.

MACHINE FOR GRINDING DRINKING GLASSES.

No. 486,591. Patented Nov. 22, 1892.

Fig. 1.

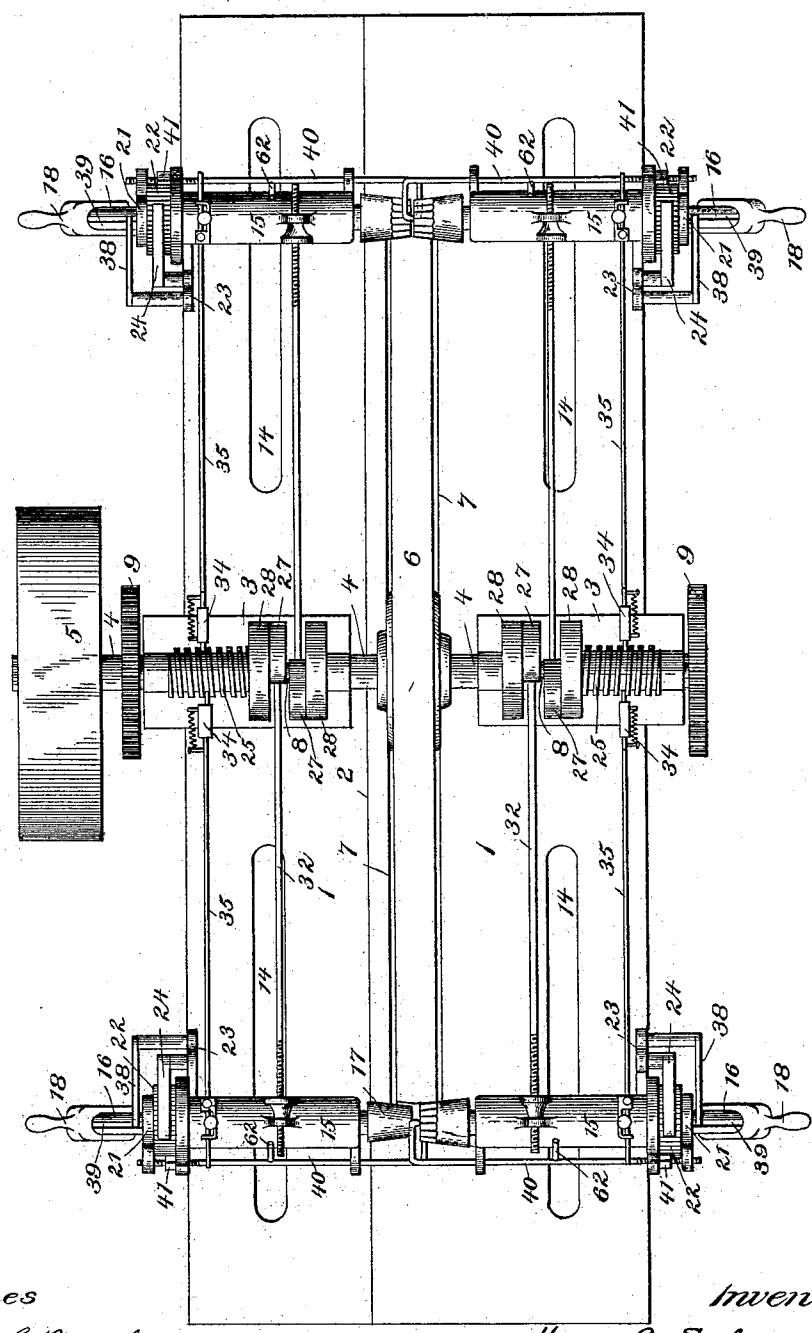

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Fig. 2.

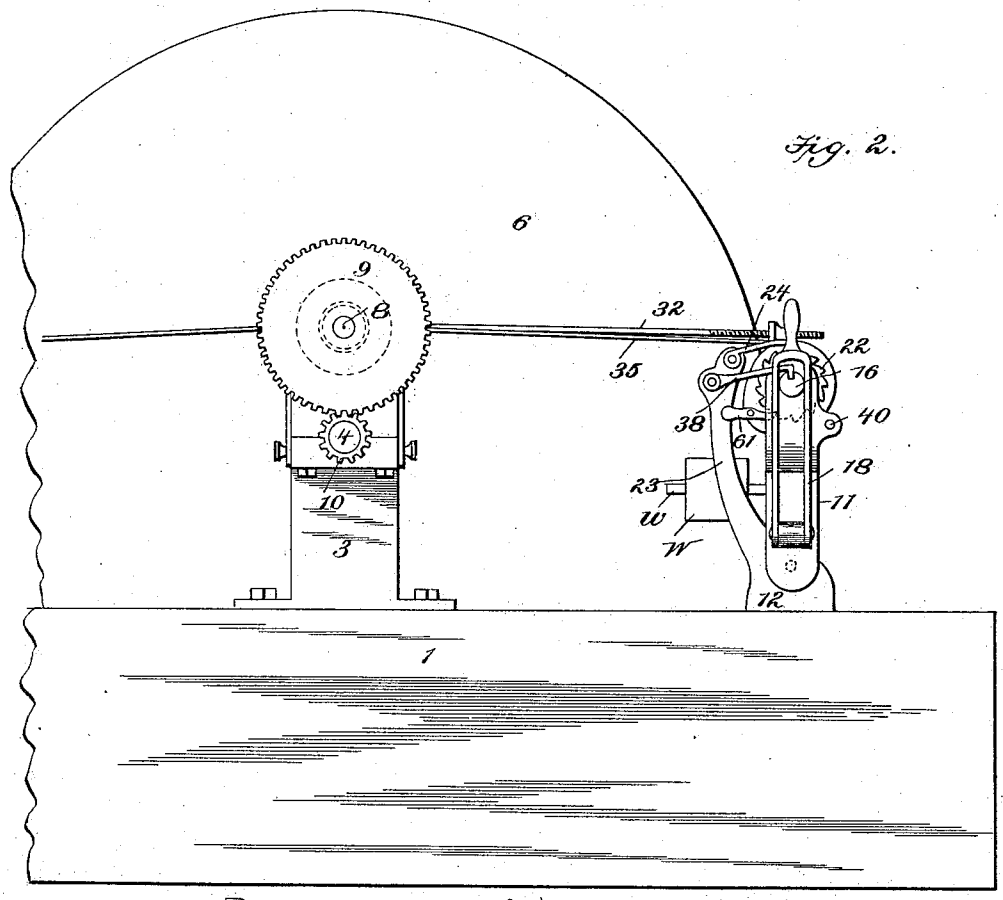

Fig. 3.

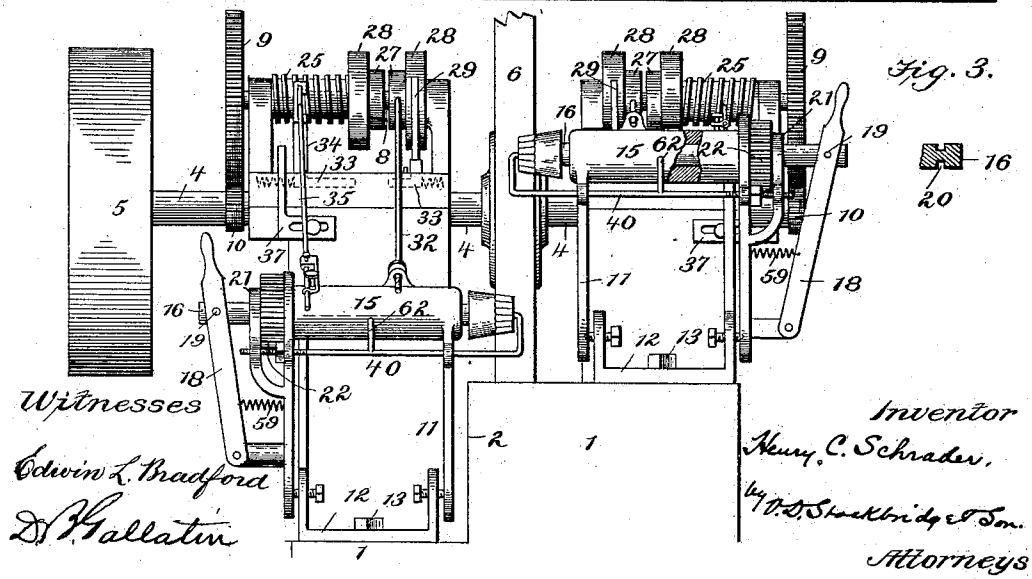

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Fig. 4.

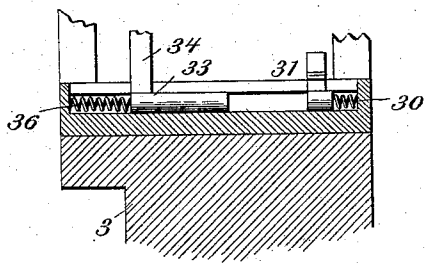


Fig. 5.

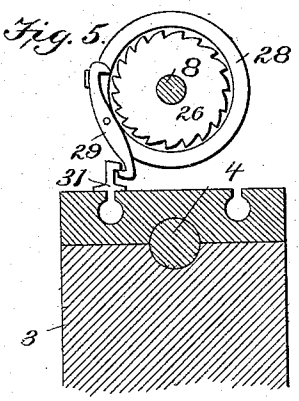


Fig. 6.

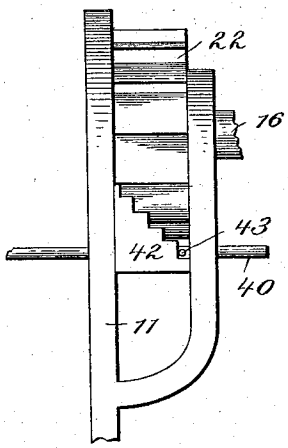
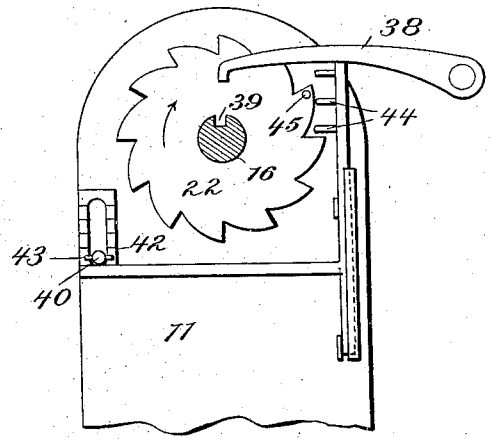


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY C. SCHRADER, OF WHEELING, WEST VIRGINIA.

MACHINE FOR GRINDING DRINKING-GLASSES.

SPECIFICATION forming part of Letters Patent No. 486,591, dated November 22, 1892.

Application filed January 12, 1892. Serial No. 417,796. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SCHRADER, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented certain new and useful Improvements in Machines for Grinding Drinking-Glasses and other Like Articles; 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 particularly to machines for grinding on the outer surfaces of drinking-glasses, goblets, and other hollow vessels a series of facets.

The object is to increase the capacity and efficiency of machines of this character.

To these ends the invention consists in the construction, arrangement, and combination of parts hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, which illustrate my invention and form a part of this specification, Figure 1 represents a plan view of the entire machine. Fig. 2 is a side elevation of one end of the machine. Fig. 3 is an end elevation with the grindstone partly broken away. Fig. 4 is a sectional detail of a sliding dog for releasing a pawl from a ratchet connected with an eccentric. Fig. 5 is a sectional detail showing the dog in engagement with the pawl. Fig. 6 is an elevation showing a means for effecting the adjustment of the glass-holder to facilitate grinding facets in different planes; and Fig. 7 is a view showing the shaft carrying the object-holder in section and the step-by-step driving-ratchet of said shaft, the locking-pawl, and the contiguous parts in elevation.

1 designates the table or frame of the machine, which is divided longitudinally by a vertical offset or shoulder 2 into two parts, one of which is higher than the other. At the sides of this table and at or near its mid-length are erected two standards or pillars 3 3, which support in suitable bearings a transverse shaft 4, which I denominate the "driving-shaft." The shaft 4 is provided at one end with a band-pulley 5, through which power is applied to drive the machine.

6 designates the grindstone, which is mounted on the shaft 4 centrally above the table, its lower part depending through a longitudinal slot or opening 7.

Above the shaft 4, on opposite sides of the grindstone, are two short horizontal shafts 8 8, supported in suitable bearings on the boxes of the shaft 4. These shafts carry at their outer ends gear-wheels 9 9, which mesh with small gears 10 10 on the shaft 4, whereby motion is imparted to the shafts 8 from the shaft 4, the purpose of which will be presently explained. Upon the table are four adjustable swinging frames 11, two at each end and at opposite sides. These frames are pivoted to base-pieces 12, which are adjustable longitudinally and angularly on the table and are secured in adjusted position by clamping-bolts 13, which project through longitudinal slots 14 in the table. The frames 11 each comprise two vertical legs which are pivoted at their lower ends to the base-pieces 12 and are united at their upper ends by a tubular bearing or barrel 15, in which works a shaft 16. The shaft 16 projects beyond the frame 11 at both ends and is capable of both longitudinal and rotary motion. Its inner end projects in front of the face of the grindstone and carries an elastic holder 17, preferably of rubber, upon which the vessel to be ground is placed. The shaft is moved longitudinally by means of a lever 18, pivoted to a laterally-projecting arm on the frame 11, the lever having an opening into and through which the shaft projects, the two being connected by pins 19, which project into a circumferential groove 20 in the shaft, whereby rotary movement of the shaft is at all times permitted. At its outer end the frame 11 has a vertical bracket-arm 21, through which the shaft also passes, and between this bracket-arm and the end of the frame is a ratchet-wheel 22, which is splined on the shaft so as to permit longitudinal movement of the latter through the ratchet-wheel. A vertical arm 23 projects from the base 12, and to this arm is pivoted a hooked pawl 24, which engages the teeth of the ratchet-wheel and holds and turns the latter and its shaft when the frame 11 is swung outward.

While the foregoing description relates to a single frame 11 and its connections, it is to be understood that the other three are all similarly constructed.

The shafts 8 8 each carry a worm or screw 25 and two ratchet-wheels 26 26, (shown in Fig. 5,) which are all fast on the shafts and revolve therewith continuously. They also each carry two eccentrics 27 27, which are normally loose thereon, but are made fast and caused to revolve intermittingly by the following mechanism: Each eccentric 27 has a lateral cup-shaped extension 28 concentric with the shaft, which receives one of the ratchet-wheels 26, (shown in Fig. 5,) and each of these cups carries a pivoted hooked spring-pawl 29, adapted to engage the ratchet-wheel therein, whereby the ratchet and its eccentric are locked together. In a suitable guideway formed in the box or housing of the shaft 4 is a sliding dog 31, (one for each eccentric,) which is normally held in the path of pawl 29 by a spring 30, but is adapted to be pushed out of the way thereof. The pawl is spring-actuated, and when in engagement with the ratchet the eccentric will revolve with the shaft, the ratchet being fast; but when it is out of engagement the eccentric will remain idle. When the dog stands in the path of the pawl, the parts will revolve together until the outer free end of the pawl strikes the dog. When this occurs, the pawl is thrown out of engagement with the ratchet-wheel and the latter will continue to revolve with the shaft, while the eccentric will remain at rest. When the dog is pushed out of the path of the pawl, the pawl will be immediately thrown into engagement with the ratchet-wheel and the parts will revolve together until the dog is again moved back into the path of the pawl. Rods 32 connect the eccentrics 27 with the tops of the frames 11, and through these connections the frames are swung or vibrated at each revolution of the eccentrics, as will be hereinafter fully set forth in the description of the machine. In the same guideway with the dog 31 is a slide 33, which is capable of being reciprocated therein. It has a vertical arm 34, constructed and adapted to serve as a holder for the end of a rod or bar 35, which is capable of sliding back and forth therein, the opposite end being connected to the top of the swinging frame 11, so that when the said frame is swung or vibrated the said rod or bar will move therewith. The end of the rod or bar 35 is in engagement with the worm or screw 25, which runs in a direction to carry the rod 35 and its sliding holder 33 34 toward the grindstone against the action of a spring 36, which when the rod is disengaged from the worm 25 draws the slide back, the limit of outward movement being determined by an adjustable stop 37 on the bearing of the shaft 4.

The operation of the mechanism thus far described is as follows: Power being applied to the driving-shaft 4 through the band-pulley 5, the shafts 8 will be driven through the gears 9 10. The ends of the rods 35, being in engagement with the worms or screws 25, will be gradually moved thereby toward the grindstone 6, moving, also, the slides 33 in the same direction. When the slides 33 strike the dogs 31, the latter will be carried along out of the paths of the spring-pressed pawls 29, when the latter will be thrown into engagement with the ratchet-wheel 26, whereby the eccentrics 27 will be made fast on the shafts 8, and will then revolve with the latter. The eccentrics will then swing or vibrate the frames 11 through the rods 32, and this movement of the frames will carry along the rods 35, disengaging them from the worms 25. As soon as this disengagement is effected, the springs 36 will move the slides 33 outward to the limit of their movement, as determined by the adjustable stops 37, where they are ready for re-engagement with the worms when the frames swing back. The outward movement of the frames causes the partial rotation of the shafts 16 through the action of the pawls 24, which engage and hold the ratchet-wheels 22. On the completion of the inward movement of the frames the pawls engage the next teeth of the ratchet-wheels ready for the next movement of the frames, whereby another partial rotation is produced, and so on, until a full revolution of the shafts 16 is accomplished. When a full revolution is completed, a latch 38, also pivoted to the arm 23, drops into a notch or groove 39 either in the hub of the ratchet-wheel 2 or in the shaft 16 and holds the frame 11 in its outward position. The attendant now removes the glass from the holder 17 and replaces it with a new one, after which the latch 38 is lifted by the attendant, when the frame swings inward under the action of a weight W and the next operation begins. The number of teeth of the ratchet-wheels 22 corresponds with the number of facets to be cut on the glass, and on the completion of each full revolution of the shafts 16 the operation ceases, the glass is removed from the holder, and a new one is put on. The parts are so adjusted that when the eccentrics 27 are brought into action the dogs 31 will return to their normal positions before the completion of a full revolution, so as to disengage the pawls 29 and allow the free and independent revolution of the ratchet-wheels 26 after the completion of the revolution and until the dogs are again thrown out of action by the operation of the worms 25 and slides 33, as above explained. The shafts 16 are constantly pressed inward toward the grindstone 6 by springs 59 between the levers 18 and frames 11, the limit of inward movement being determined by stops 40, carried by the frames 11. These stops consist of adjustable rods carried by the frames and having their inner ends bent up at right angles to stand in front of the holders 17. By the adjustment of these stops, which is effected by means of screw-nuts 41 working against one of the legs of the frame 11, the limit of inward movement of the shafts 16 and the length of the facets to be cut on the glass are determined, the length of the glass exposed to the action of the grind-

stone being thereby regulated. A weighted pawl 61, pivoted on the frame 11 and engaging the teeth of the ratchet-wheel 22, prevents the backward rotation of the latter, and, in connection with the pawl 24, holds it in fixed position while the frame 11 is at rest. The shaft or stop 40 is provided with a handle 62, by which it is turned out of holding position to permit glasses to be placed on and removed from the holders 17. The frames 11 are constantly pressed inward toward the grindstone by weights W, which are adjustable on horizontal arms *w*, projecting inward from the frames. By adjusting the weight in or out the pressure of the glass or vessel being ground against the grindstone is varied and the rate at which the cutting proceeds is regulated. The natural wear of the grindstone makes it necessary to adjust the frames 11 inward from time to time, and in order to permit such adjustment the slots 14 are formed in the table; also, as the grindstone wears away greater number of revolutions is required to effect the same amount of grinding. Hence the stops 37 are made adjustable, so that as the stone wears down the rods 35 may by the adjustment of the stops be caused to engage the worm or screw 25 nearer the outer end of the latter, whereby a longer travel is given to the slide 33 and a greater number of revolutions to the stone before the dogs 31 are thrown out of action, as above explained. The rods 32 35 are adjustably connected with the frames 11 in order to permit the adjustment of the latter on the table. By making the table with the longitudinal offset 2 two frames 11 may be mounted at each end opposite each other, which, being mounted in different planes, permits two glasses to be ground simultaneously at opposite ends of the table or on opposite sides of the stone without interfering with each other, whereby the capacity of the machine is doubled. It is desirable sometimes to cut circumferential rows of facets on the glass, and in order to effect this I have devised the modification shown in Fig. 6. This comprises a stepped block 42, secured to one of the legs of the frame 11 in such manner as to permit vertical movement. A lateral arm or pin 43 on the shaft of stop 40 projects in front of this block and rests successively on the different faces thereof. The said block has in one of its sides a series of laterally-projecting pins 44, corresponding in number with the number of steps or faces, and on the ratchet-wheel 22 is also a projecting pin 45, which engages successively the pins 44 of the block 42 to move the latter one step at each revolution of the ratchet-wheel. As the block is moved by successive movements the arm 43 drops from one step to the other, allowing both the stop 40 and the shaft 16 to move inward under the action of spring 59, which constantly draws the lever 18 inward. On the block 42 is an arm 43, which in the raised position of the block raises and supports the latch 38, holding the same out of engagement with the shaft 16 or its attachments until the block 42 reaches the limit of its movement, when it drops into action and holds the frame in its outward position, as already explained, until the block is again shifted.

Having now described my invention, I claim—

1. In a machine of the character described, the combination, with the swinging frames, the grindstone, and the main shaft, of the worm-shafts geared with the main shaft, ratchet-wheels fast on said worm-shafts and eccentrics loose thereon, spring-pawls for locking said ratchets and eccentrics, movable stops for throwing said pawls out of action, and slides operated by said worms to move said stops, substantially as shown and described.

2. In a glass-grinding machine, the combination, with the grindstone, of a vibrating glass-holder pivoted on a given horizontal plane and a second holder pivoted on a different plane, substantially as described.

3. In a glass-grinding machine, the combination, with the grindstone, of two vibrating glass-holders arranged on the same side thereof and pivoted on different horizontal planes and connections between the shaft of the grindstone and said frames to vibrate the latter, substantially as shown and described.

4. In a glass-grinding machine, the combination, with the grindstone, of two vibrating glass-holders at each side thereof, the holders at each side being pivoted in different horizontal planes to hold the articles being ground at different elevations, substantially as shown and described.

5. The combination of a grindstone and a plurality of glass-holders arranged in pairs on opposite sides of the grindstone, the holders of both members of each pair being operated to recede from and return to the stone by a train of connections operatively connected with a single worm, substantially as described.

6. In a glass-grinding machine, the combination, with the shaft of the grindstone and the vibrating holder, of a worm-shaft in gear with the shaft of the grindstone, an eccentric on said worm-shaft, and a connection between said eccentric and the holder to vibrate the latter, substantially as shown and described.

7. In a glass-grinding machine, the combination, with the grindstone, of a vibrating glass-holder, a continuously-rotating worm-shaft, an eccentric on said shaft, provided with a pawl for making it fast thereon, a movable dog for tripping said pawl, a connection between the eccentric and the holder for vibrating the latter, a slide operated by the worm on said shaft to move the dog out of the path of the pawl to permit the latter to be thrown into operative position, and a connection between the vibrating holder and the slide to disengage the latter from the worm, substantially as shown and described.

8. In a glass-grinding machine, the combination, with the grindstone, of a swinging

frame movable toward and from the stone, a rotatable and longitudinally-movable shaft in said frame, provided with a holder for the article to be ground, a ratchet on said shaft, and a pawl pivoted to a stationary part of the machine to engage and hold the ratchet, and thereby cause a partial rotation of the shaft and holder at each movement of the frame, substantially as shown and described.

9. The combination of a grinding-stone, a frame pivoted to swing in a plane parallel with the axis of the stone, a rotatable and longitudinally-movable shaft extending across the path of the stone, provided with a holder for the object to be ground, means for rotating and reciprocating said shaft, and an adjustable stop for gaging the longitudinal movement of the shaft across the path of the stone, whereby facets in different planes may be made on the object, substantially as described.

10. The combination, with the grindstone, of a frame movable toward and from the stone in a plane parallel to that of the stone, a rotatable and spring-pressed longitudinally-movable shaft in said frame, provided with a holder for the article to be ground, an adjustable stop for limiting the longitudinal movement of the shaft toward the stone, and a stepped block for holding said stop in different positions, substantially as shown and described.

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

HENRY C. SCHRADER.

Witnesses:

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EDWIN L. BRADFORD.