A. B. LANDIS.

GRINDING MACHINE.

APPLICATION FILED JULY 15, 1909.

1,017,880.

Patented Feb. 20, 1912.

5 SHEETS—SHEET 1.

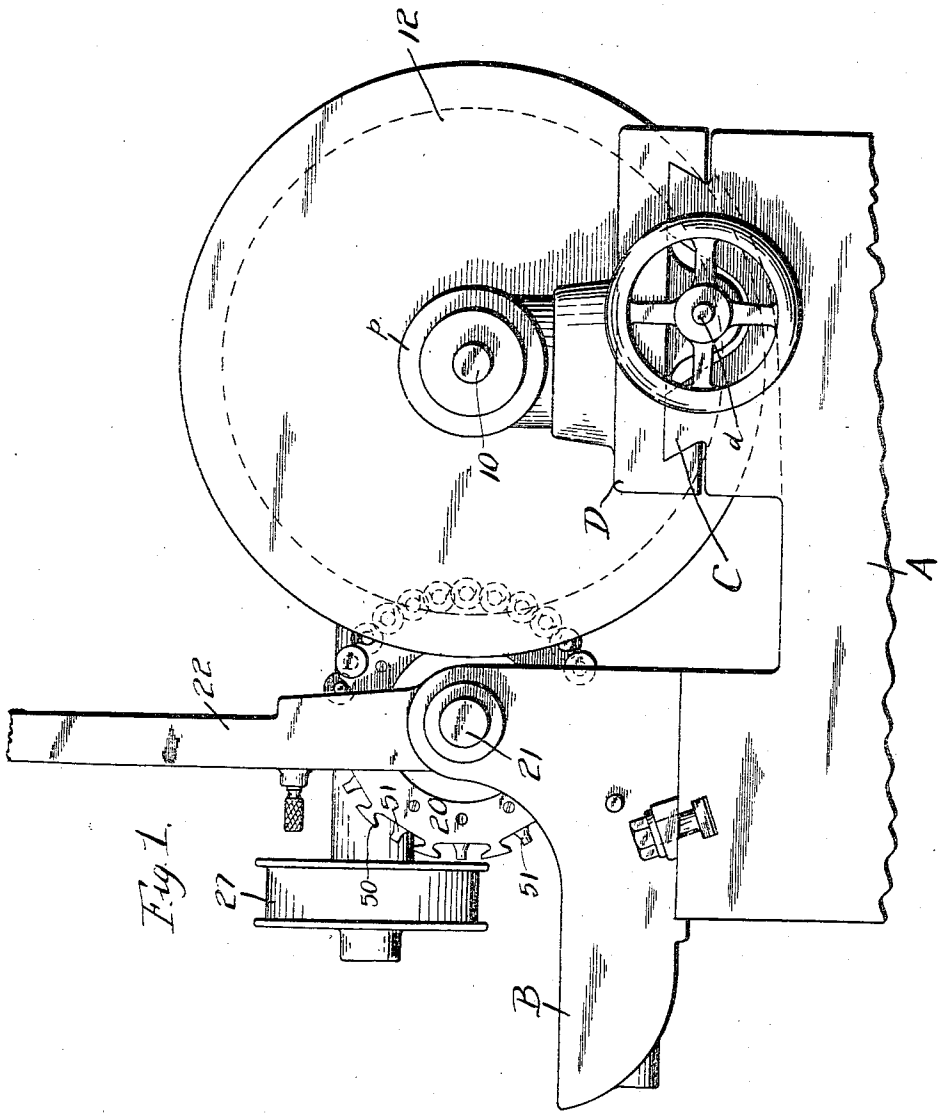

Fig. 1.

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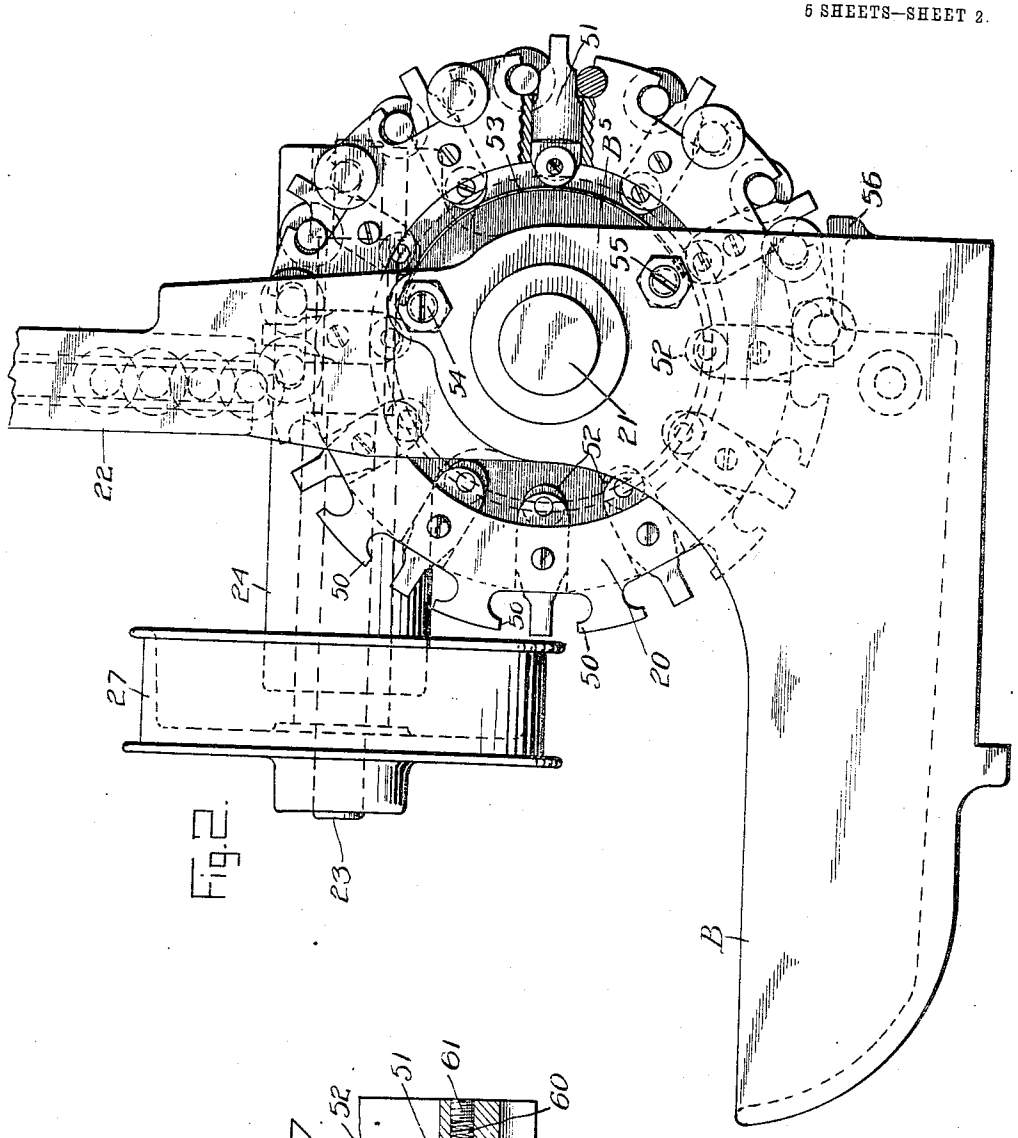

Fig. 2.

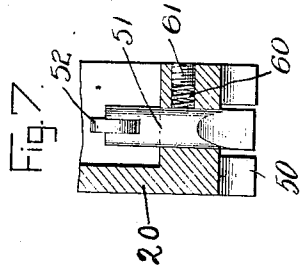

Fig. 7.

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5 SHEETS—SHEET 3.

Fig. 5.

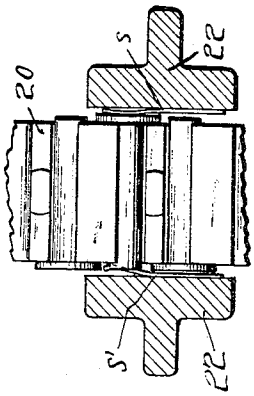


Fig. 6.

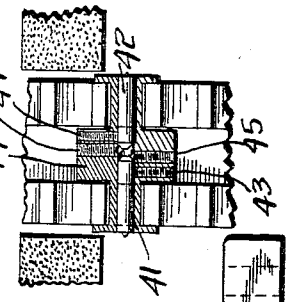
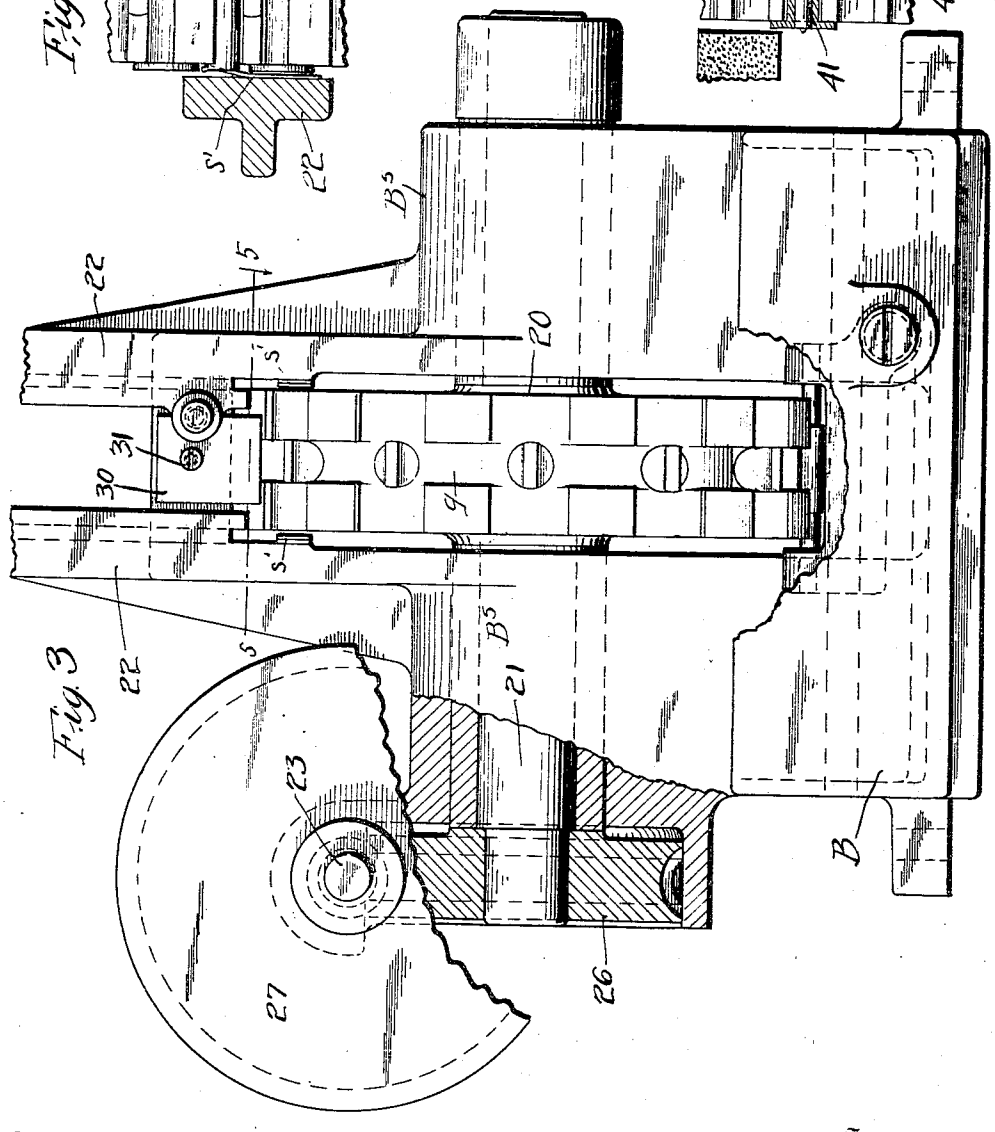


Fig. 3.



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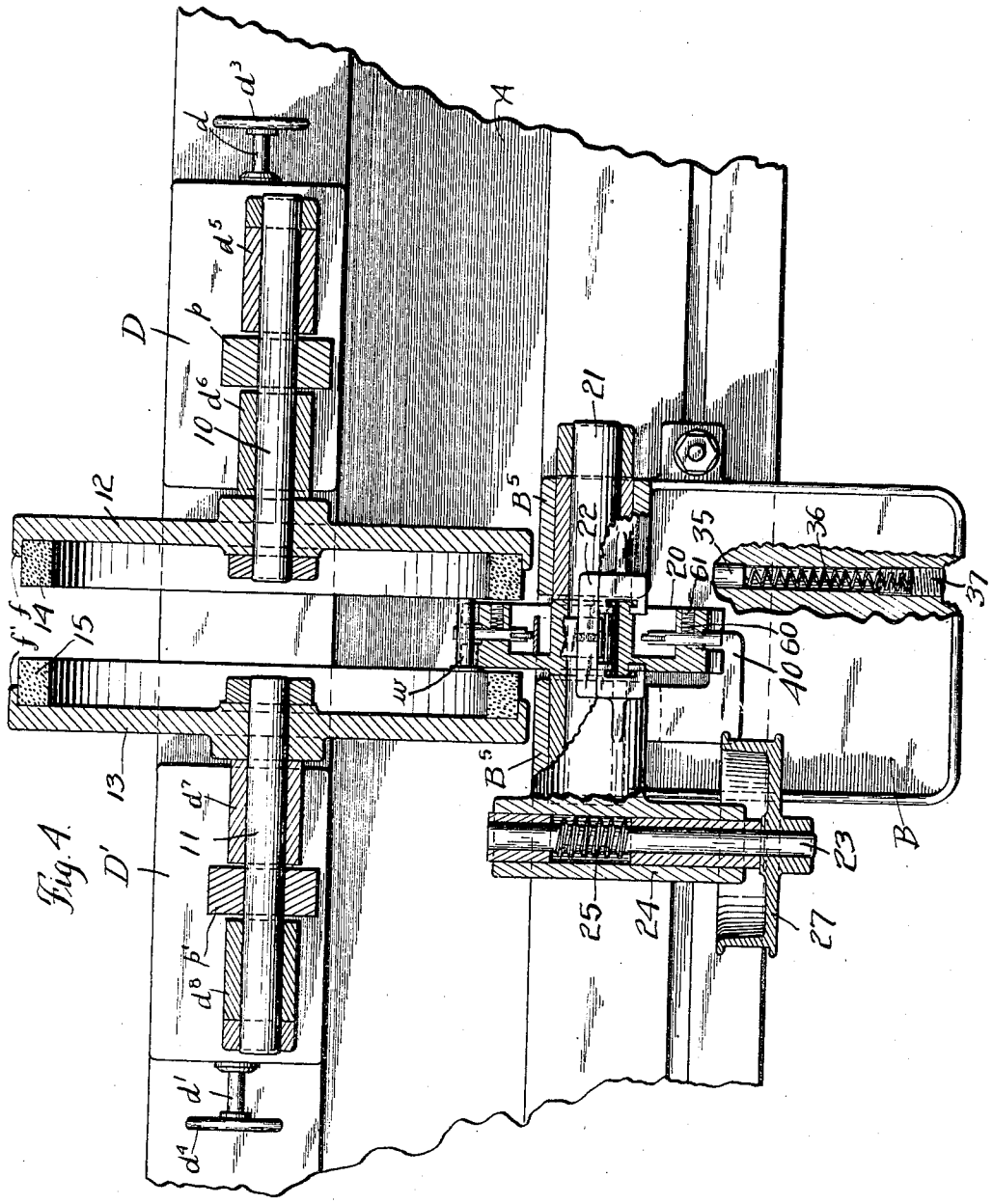

Fig. 4.

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5 SHEETS—SHEET 5.

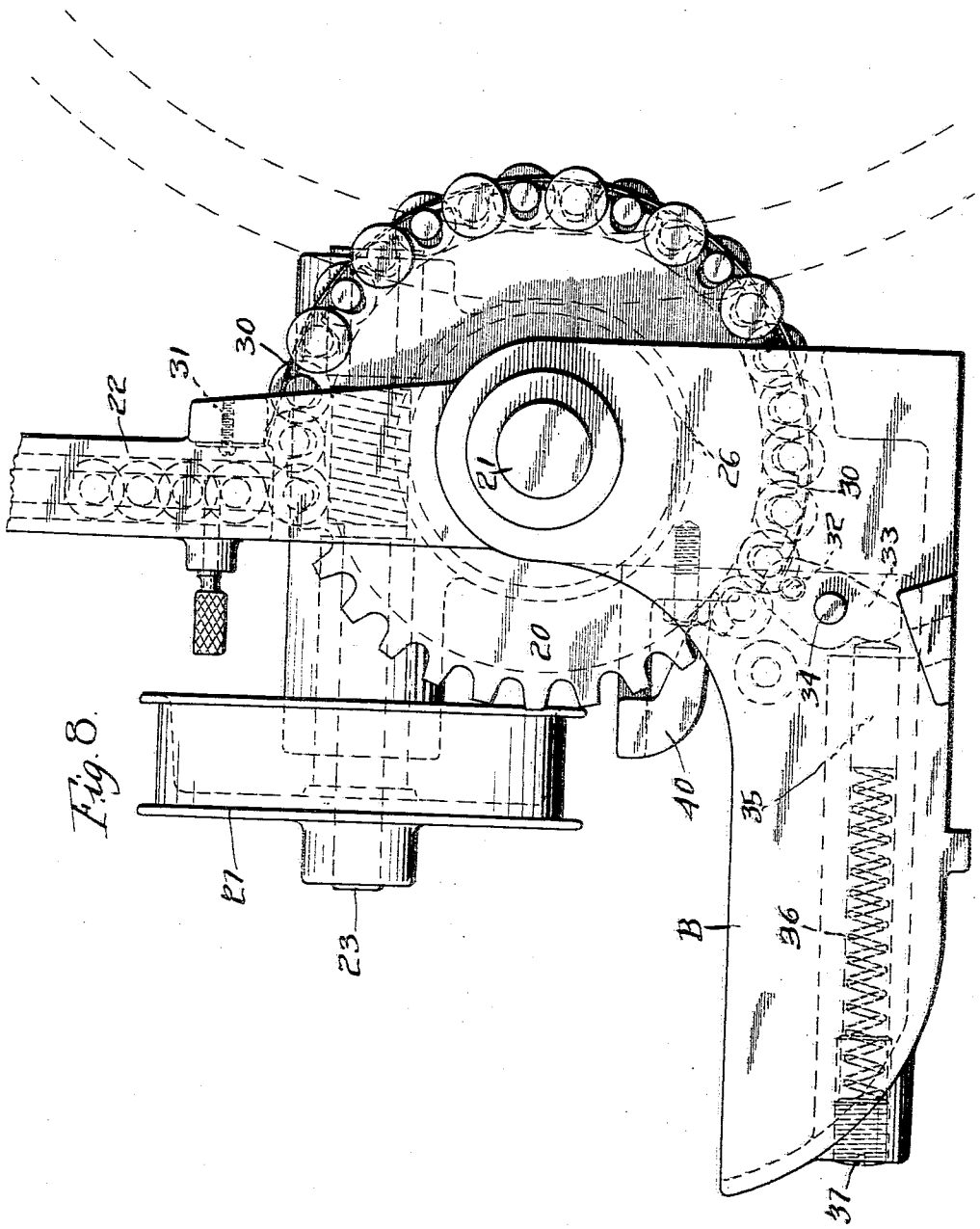

Fig. 8.

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UNITED STATES PATENT OFFICE.

ABRAHAM B. LANDIS, OF WAYNESBORO, PENNSYLVANIA.

GRINDING-MACHINE.

1,017,880. Specification of Letters Patent. Patented Feb. 20, 1912.

Application filed July 15, 1909. Serial No. 507,836.

To all whom it may concern:

Be it known that I, ABRAHAM B. LANDIS, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

The object of my said invention is to provide a machine for grinding the heads and ends of pins, and it consists in various improvements in the construction and operation of a grinding machine whereby such an object is accomplished in a convenient, efficient and expeditious manner, all as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is an end elevation of the top portion of a grinding machine embodying my said invention, Fig. 2 a similar view of a portion of Fig. 1 on an enlarged scale, showing the work-holding devices and the construction and arrangement of details more clearly, Fig. 3 a rear elevation, Fig. 4 a view partly in horizontal section and partly in top plan, Figs. 5, 6 and 7 detail views illustrating parts more fully and on an enlarged scale, and Fig. 8 a view similar to Fig. 2 showing a modified construction.

In said drawings the portions marked A represent the bed of the machine, B the work table, C the grinding wheel slide, and D, D′ the respective bases of the two grinding wheels.

The general structure of the grinding machine may be in the main of a well known or any appropriate, design. The base A supports the work table B on one side and has the slide C for the grinding wheel bases on the opposite side. The grinding wheel bases D, D′ are mounted to be adjusted by means of screw rods d and d' in a well known manner and on their tops are provided with bearings d^5, d^6, d^7 and d^8 for the shafts 10 and 11, respectively, of the wheels 12 and 13. A pulley p is mounted on the shaft 10 for gearing the same to a suitable power shaft, and a similar pulley p' on shaft 11 for the same purpose.

The grinding wheels 12 and 13 are cup-shaped disks, mounted on the adjacent ends of their respective shafts, and on the outer edges of their adjacent faces carry rings 14 and 15 respectively of "emery", stone, or other suitable abrading material surrounded by projecting annular flanges f and f' which project inwardly from the edges of said faces and thus serve to secure said rings in place. By means of the screw-rods d, d' operated by the hand wheels d^3 and d^4 on their respective outer ends, the bases D, D′ may be adjusted longitudinally on the slide C to bring the adjacent grinding faces of the rings 14 and 15 the desired distance apart.

On the top of the table B a work carrying wheel 20 is journaled on a shaft 21 mounted in suitable bearings in standards B^5 at the front edge of said table. Said wheel 20 is formed with transverse recesses at intervals in its periphery adapted to receive and carry the pins to be ground. A magazine 22 is mounted on the standards B^5 and extends up to above said wheel, comprising parallel bars formed with T-shaped grooves in their adjacent sides to receive and hold the pins to be ground. A driving shaft 23 is mounted in suitable bearings in a bracket 24 on said table and is formed with a worm 25 which engages with a gear wheel 26 mounted on shaft 21. A pulley 27 mounted on said shaft 23 affords the means for gearing said shaft to an appropriate power shaft.

The wheel 20, as before stated, is formed at intervals around its periphery with transverse recesses adapted to receive the pins to be ground. Said recesses are preferably formed with overhanging edges 50 under which the pins may be clamped, as best shown at the right in Fig. 2, the edges of said recesses being formed on a curve the radius of which is slightly less than the radius of the circumference of the pins. In the bottom of each of said recesses is formed a central radial perforation in which is mounted a sliding pin 51 the outer end of which is formed with two opposite sides ta-

pered, or wedge-shaped, and adapted to bear against the pins constituting the work. On the inner end of each of said pins is mounted an anti-friction roller 52 adapted to bear upon a track 53, which is secured between the standards B^5 within the wheel 20 on the front side of said wheel, the upper end of said track being mounted on a screw, or bolt, 54 and its lower end on a screw, or bolt, 55 which extend across the space between said standards, one near the top or receiving end of the working side of the wheel and the other near the bottom or the discharge end. Said wedge-shaped pins 51 are of the form best shown in Figs. 2 and 7 and operate to clamp a pin on each side thereof under the overhanging edges 50 on each side of a transverse recess in the periphery of the wheel, as best shown at the right in Fig. 2, as will be presently more fully described. A friction device comprising a spring 60 mounted under a screw 61 in a transverse perforation in the side of wheel 20, bears against the side of each pin 51 and holds it against any movement except when forced out and in.

The pins *w*, constituting the work to be ground, are formed with heads and are placed in the magazine alternately reversed so that the head on one pin is on the same side of the wheel 20 as the point of the adjacent pin. The wheel 20 is somewhat narrower than the length of the pins so that the point of each pin projects beyond the surface of the wheel on one side and its head beyond the surface on the opposite side. Springs *s* and *s'* are mounted on the adjacent faces of the two sides of the magazine 22 just below the ends of the grooves therein and are adapted to bear against the heads of the pins, as they pass from between said sides and force them into close relation with the side of the wheel 20, against which said heads should bear as they pass between the faces of the grinding rings 14 and 15.

In the modified construction shown in Fig. 8 a flexible retaining band 30 is connected at its upper end to the front side of the magazine 22 by means of a screw 31 and passes over the periphery of wheel 20 to its under side where its opposite end is connected to a pin 32 on a lever 33 which is mounted on a pivot 34 in table B. A plunger 35 mounted in a longitudinal perforation in table B bears against the lower end of said lever 33 on the opposite side of its pivot from the connection 32 and is held by a spring 36 under pressure against said lever, which serves to keep said band 30 under tension. A screw 37 in the outer end of the perforation containing said plunger and spring bears against the outer end of said spring to hold it in position and also serves as a means for regulating the force, or tension, under which said band 30 is held to the work.

The periphery of wheel 20 is formed with a central circumferential groove *g* with which the nose of a discharging device 40, mounted on table B is adapted to engage and thus insure the discharge of the pins after being ground. Said device 40 is located so that its point projects into said groove at a point behind the point where band 30 connects with the lever 33.

In Fig. 6 I have illustrated a diamonding device for use in dressing the faces of the rings 14 and 15, which consists of a block 49 adapted to fit within the notches of the wheel 20 and formed with a longitudinal perforation in which are mounted spindles 41 and 42 carrying diamond points in their outer ends. A screw 43 is adapted to bear against the side of spindle 41 and a similar screw 44 against the side of spindle 42 to secure them in the desired position. The inner adjacent ends of said spindles are tapered and a screw 45 with a conical end is adapted to bear against the inner tapered end of spindle 41 and a similar screw 46 against the inner tapered end of spindle 42 by which means said spindles may be adjusted outwardly as may be desired. The block 49 is just the length of a pin and formed with a head or circumferential flange on each end which snugly embraces the sides of the wheel and prevents any longitudinal movement thereof.

In operation, the pins being placed in the magazine by hand or any suitable mechanism, are fed into the recesses in the periphery of wheel 20 by gravity, one on each side of the projecting point of a pin 51, and as said wheel is revolved by the rotation of shaft 23 with its worm 25 meshing with the gear 26 on the shaft 21 carrying said wheel 20, said recesses in the periphery of said wheel pick up said pins one by one as they drop from the lower ends of the grooved magazine. The rotation of the wheel carries the pins forward between the springs *s* and *s'*, on opposite faces of the lower end of the sides of the magazine, which force the pins longitudinally so that the head of each will bear snugly against the side of the wheel. As the pins drop into the recesses on each side of the sliding wedge-pins 51, said wedge-pins are down in the position shown on the left side of Fig. 2. As the wheel advances the inner ends of said pins, carrying the rollers 52, roll up over the bolt 54 onto the track 53, the movement operating to slide said pin outward and force its tapered sides firmly against the work, clamping it under the overhanging edges of said recesses where it is securely held during the operation of grinding. The track 53 is sufficiently flexible to yield somewhat as may

be necessary for the purpose. As wheel 20 rotates it continues to pick up the pins constituting the work and carries them slowly between the adjacent sides of the grinding rings 14 and 15 of the wheels 12 and 13, by which their ends are dressed to make them the exact length for which the machine is adjusted. When the inner ends of the wedge-pins 51 pass bolt 55 they are then free to slide back and release the work and a cam 56 is mounted on the base B in position so that their outer ends will strike its top surface immediately after their inner ends have passed said bolt, which serves to force said pins inwardly, as shown most clearly in Fig. 2, releasing the work and permitting it to fall out. The wear on the grinding rings 14 and 15 is compensated for by the adjusting screws *d* and *d'*.

When the grinding surfaces of the rings 14 and 15 need dressing the block 40 carrying the diamonding tool, as shown in Fig. 6, is placed in one of the notches of wheel 20 and carried through between the faces of said grinding rings, which faces are thereby quickly and accurately dressed as desired.

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

1. In a grinding machine, the combination of a frame, grinding wheels mounted thereon and arranged with adjacent grinding surfaces, means for adjusting said grinding wheels toward and from each other, a work-holding mechanism comprising a wheel with transverse notches or recesses in its periphery to receive the work, a magazine adjacent to said wheel for feeding the work thereto, said wheel being mounted on a shaft and arranged to pass between the adjacent faces of the grinding wheels, means for rotating said shaft, radially sliding wedges for holding the work in the transverse recesses in said wheel during the operation, and means for automatically operating said wedges, substantially as set forth.

2. In a grinding machine, the combination of a frame, grinding wheels arranged with adjacent grinding faces, a work-feeding wheel mounted on a shaft and provided with work-carrying recesses in its periphery and radial perforations at the bottom of said recesses, said wheel being mounted to pass between the adjacent surfaces of the grinding wheel, means for rotating said wheel, and sliding wedges in said perforations for securing the work, substantially as set forth.

3. In a grinding machine, the combination of a frame, grinding wheels arranged with adjacent grinding faces a distance apart, a rotary work-carrying wheel arranged to pass between said grinding faces and formed with transverse work receiving and holding recesses, and radially movable clamps arranged to impinge against one side of the work for securing it in said recesses, substantially as set forth.

4. In a grinding machine, the combination of a frame, grinding mechanism, a rotary work-carrying wheel formed with transverse recesses in its periphery adapted to hold the work, sliding wedges for clamping the work in said recesses, means for sliding said wedges outward to clamp the work on the working side of the wheel, and means for sliding them back to release the work when the grinding has been done, substantially as set forth.

5. In a grinding machine, the combination of a frame, grinding mechanism, a rotary work-carrying wheel formed with recesses in its periphery to receive the work, said recesses being formed with overhanging adjacent edges and with central perforations extending through the rim of said wheel, sliding wedge-shaped pins mounted in said perforations, means for forcing said pins outwardly after the work has been received into said recesses, and means for forcing them inwardly after the grinding has been done, substantially as set forth.

6. In a grinding machine, the combination of a frame, grinding mechanism, a rotary work-carrying wheel formed with transverse recesses at intervals around its periphery and a perforation extending through its rim centrally from the bottom of each recess, sliding wedges mounted in said perforations, means for delivering the work to said recesses on each side of said sliding wedges, and a track arranged within the rim of the wheel adjacent to the grinding mechanism for forcing said wedges outwardly to clamp the work during the grinding operation, substantially as set forth.

7. In a grinding machine, the combination of a frame, grinding mechanism, a rotary work-carrying wheel formed with work-receiving recesses in its periphery and with radial perforations extending through the rim of said wheel from a central point in each recess, sliding wedges mounted in said perforations provided with rollers on their inner ends, a track extending adjacent to the inner face of the rim of the wheel around the side on which the grinding is done for forcing said wedges outwardly to clamp the work, and a cam arranged on the frame adjacent to the lower outer face of the wheel in position to contact with the outer points of said wedges and force them inwardly to release the work after the grinding has been done, substantially as set forth.

8. In a grinding machine, the combination of a frame, grinding mechanism, a rotary work-carrying wheel formed with transverse recesses in its periphery for holding

the work, sliding clamps for securing said work, friction devices for normally holding said clamps, means for forcing said clamps outwardly to secure the work, and means for forcing them inwardly to release the work after the grinding has been done, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Washington, District of Columbia, this 29th day of June, A. D. nineteen hundred and nine.

ABRAHAM B. LANDIS. [L. S.]

Witnesses:
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J. D. YOAKLEY.