June 14, 1932. S. B. FIELD 1,862,671

GRINDING OR POLISHING MACHINE

Filed Jan. 5, 1927 5 Sheets-Sheet 1

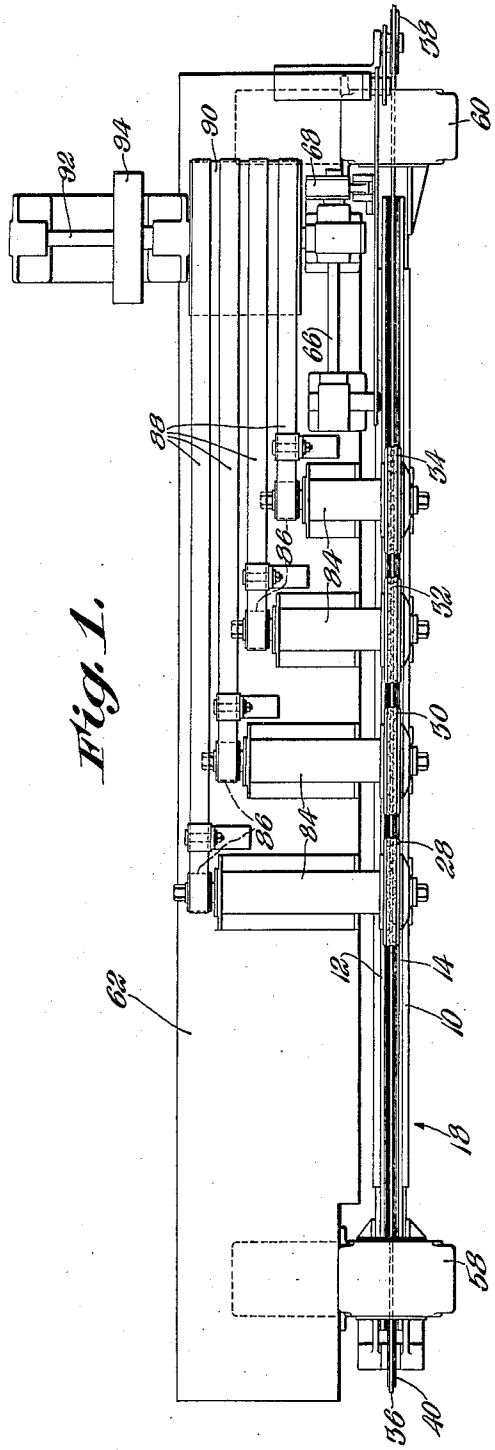


Fig. 1.

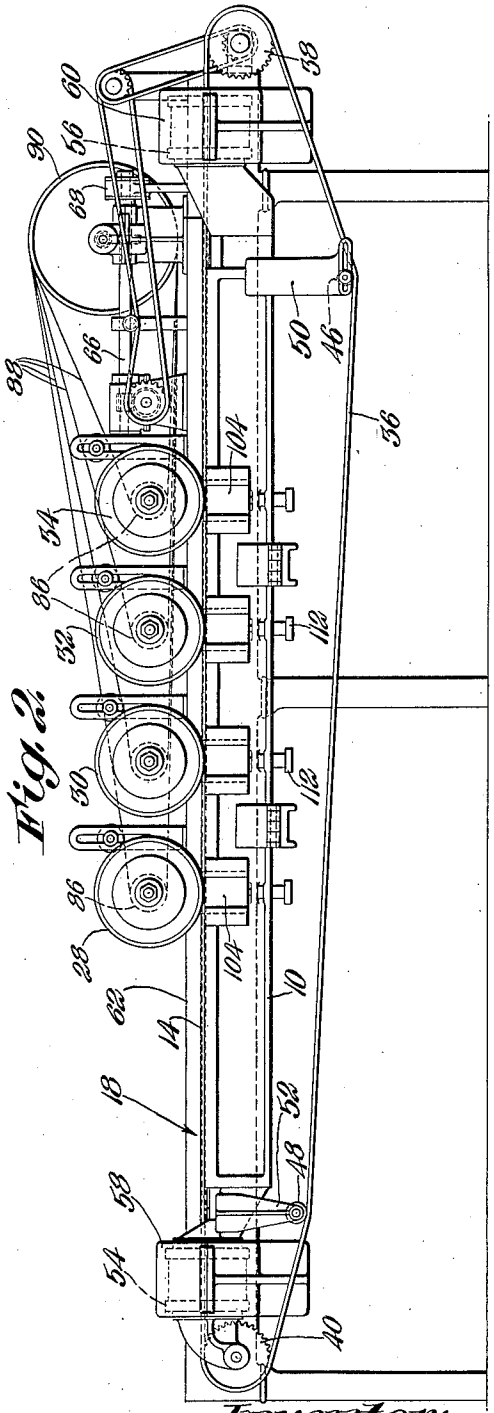


Fig. 2.

Inventor:
Samuel B. Field
by J. Stanley Churchill
atty.

June 14, 1932. S. B. FIELD 1,862,671

GRINDING OR POLISHING MACHINE

Filed Jan. 5, 1927 5 Sheets-Sheet 2

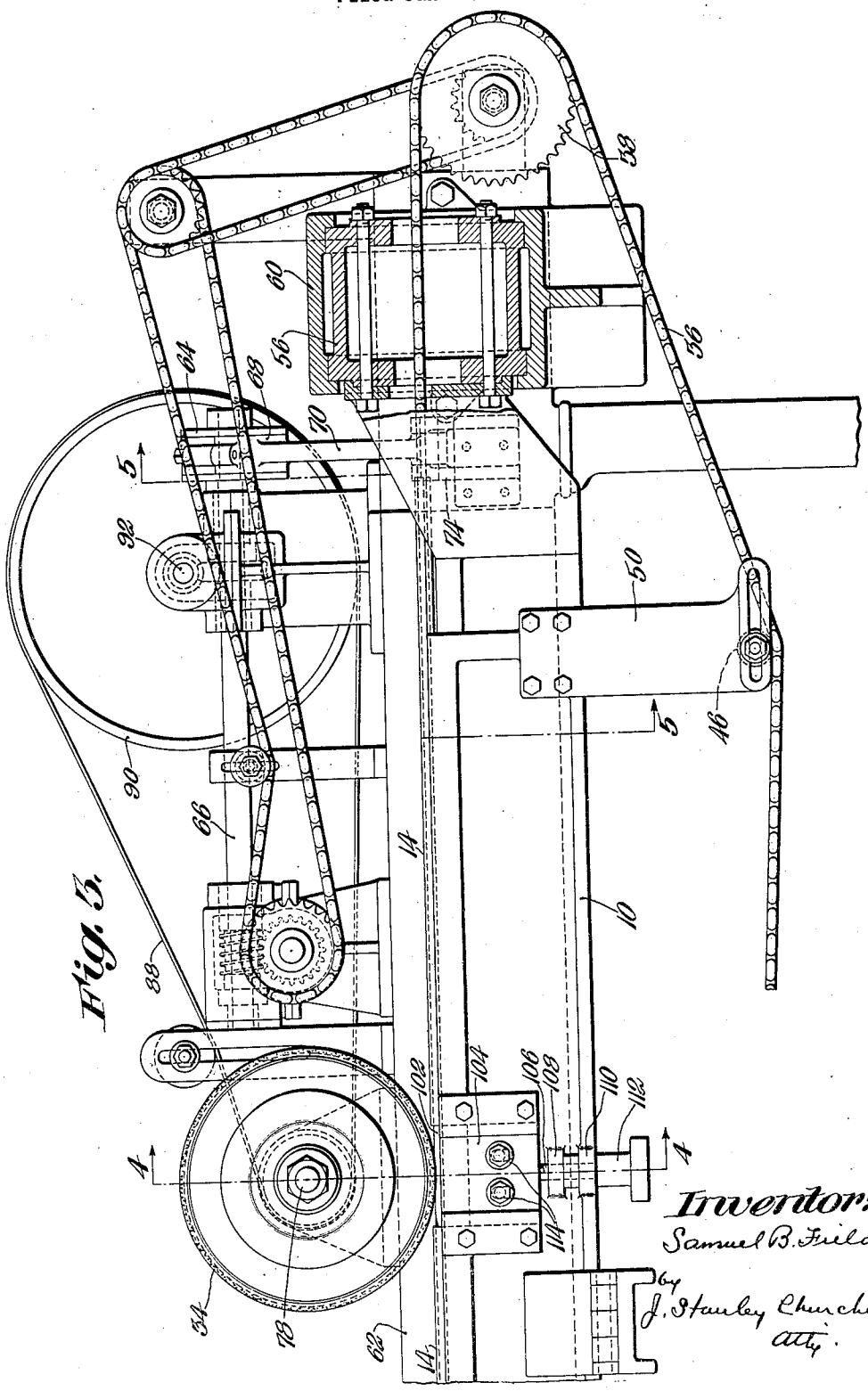


Fig. 5.

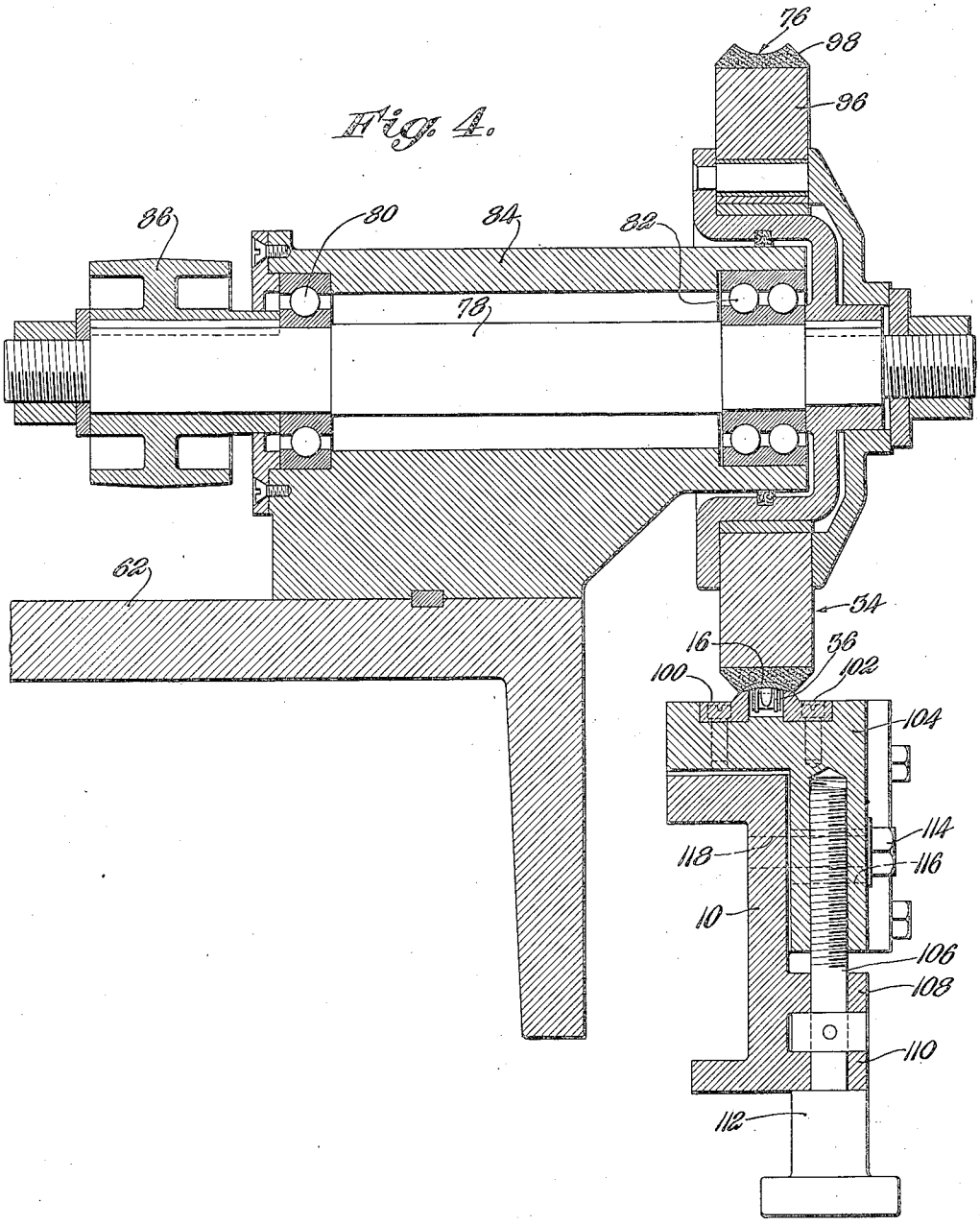
Inventor:
Samuel B. Field
by
J. Stanley Churchill
Atty.

June 14, 1932. S. B. FIELD 1,862,671

GRINDING OR POLISHING MACHINE

Filed Jan. 5, 1927 5 Sheets-Sheet 3

Fig. 4.



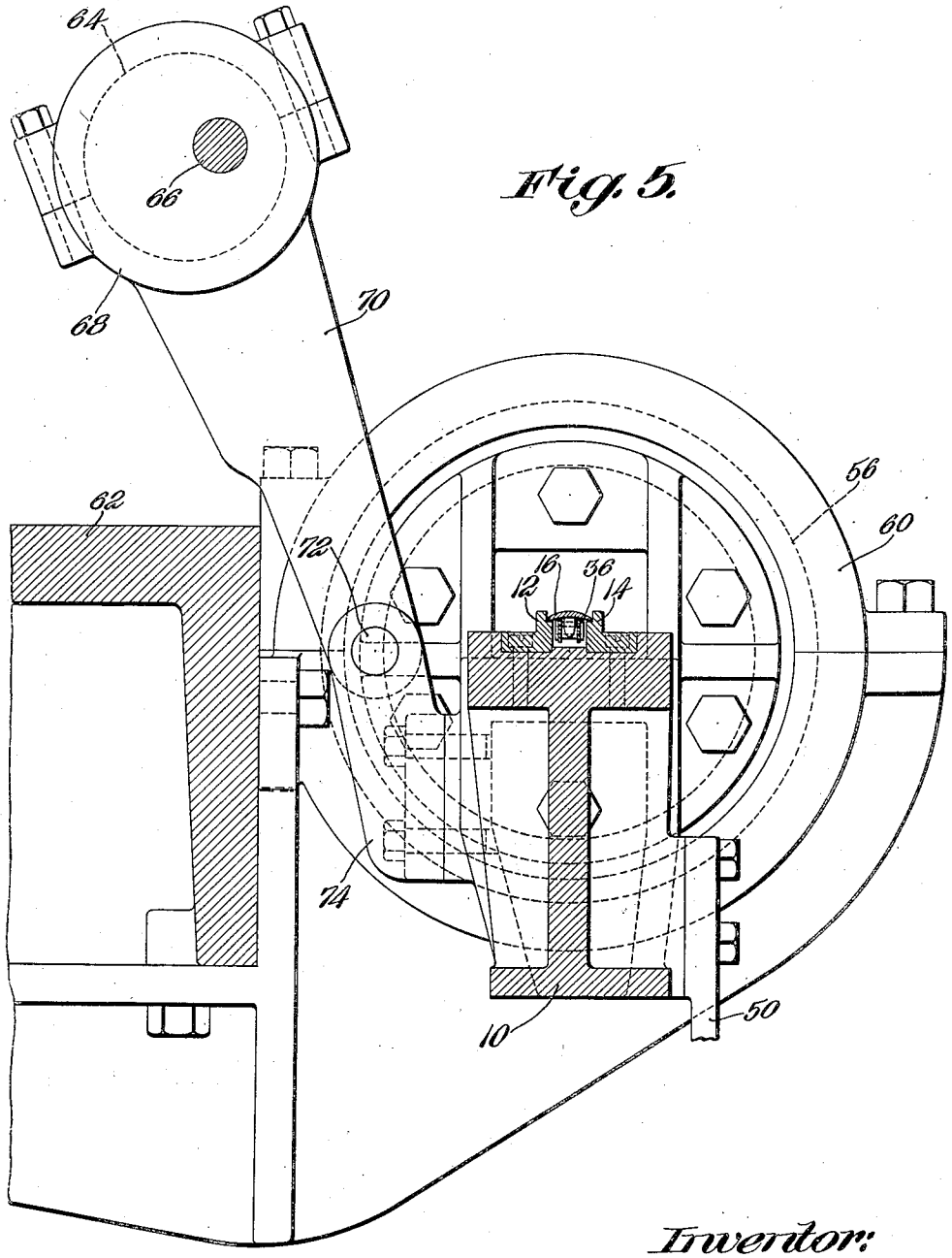
Inventor:
Samuel B Field
by J. Stanley Churchill
Atty

June 14, 1932. S. B. FIELD 1,862,671

GRINDING OR POLISHING MACHINE

Filed Jan. 5, 1927 5 Sheets-Sheet 4

Fig. 5.



Inventor:
Samuel B. Field
By J. Stanley Churchill
Atty.

June 14, 1932. S. B. FIELD 1,862,671

GRINDING OR POLISHING MACHINE

Filed Jan. 5, 1927 5 Sheets-Sheet 5

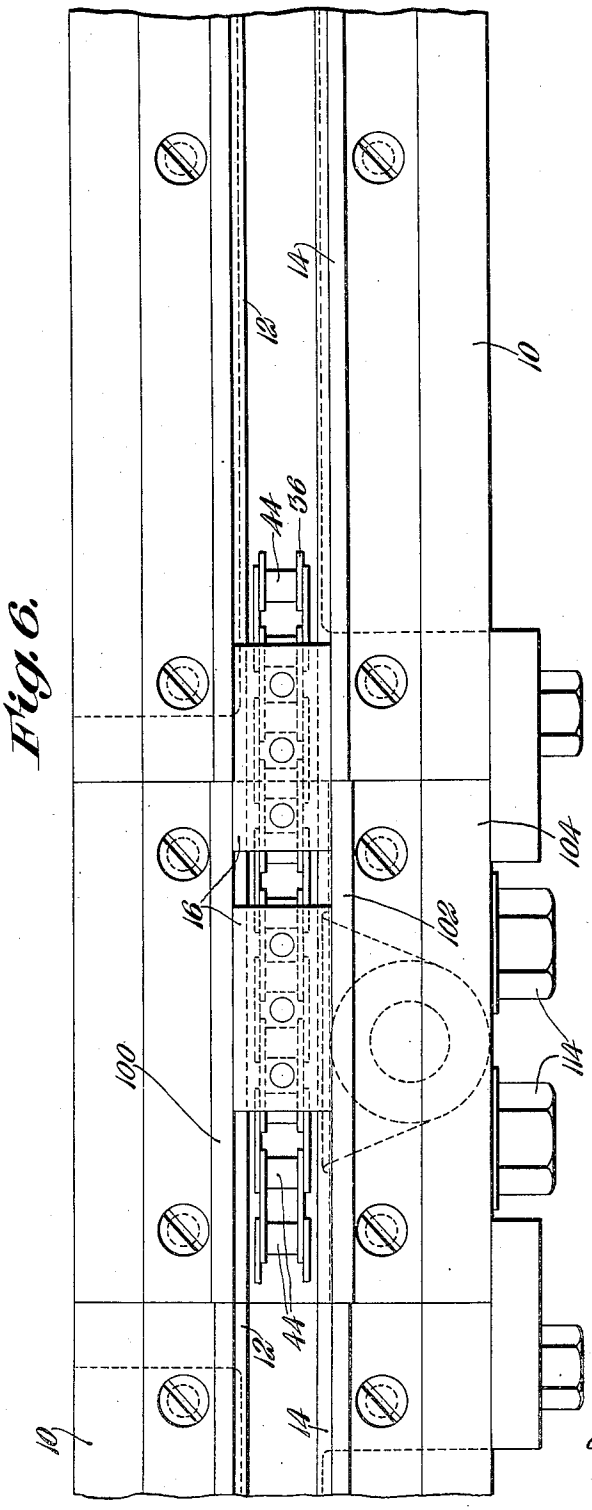


Fig. 6.

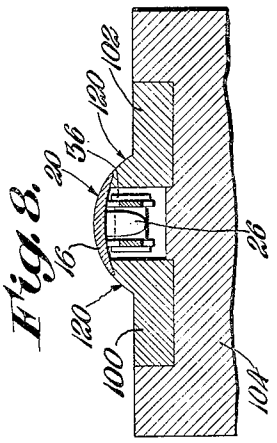


Fig. 8.

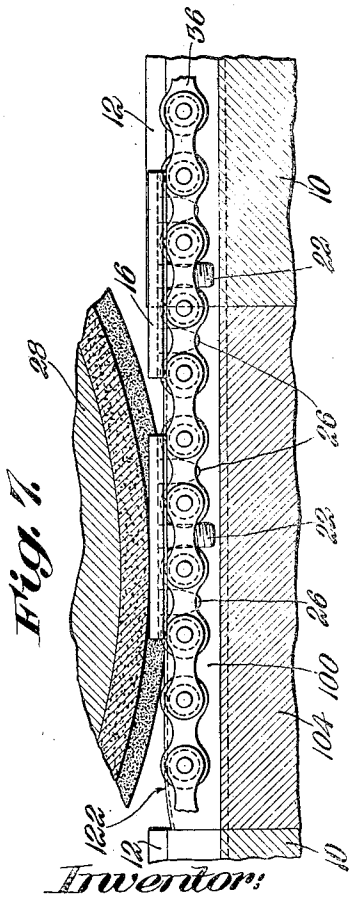


Fig. 7.

Inventor:
Samuel B. Field
by J. Stanley Churchill
Atty.

Patented June 14, 1932 1,862,671

UNITED STATES PATENT OFFICE

SAMUEL B. FIELD, OF HOLBROOK, MASSACHUSETTS, ASSIGNOR TO PNEUMATIC SCALE CORPORATION, LIMITED, OF QUINCY, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

GRINDING OR POLISHING MACHINE

Application filed January 5, 1927. Serial No. 159,128.

This invention relates to a grinding or polishing machine.

One object of the present invention is to provide a machine for the purpose specified, of novel construction, and in which the grinding or polishing operation is performed in a highly efficient and novel manner.

A further object of the invention is to provide a novel construction of machine for grinding or polishing articles having a curved surface to be ground or polished, which is capable of performing the desired grinding or polishing operation in an efficient, economical and satisfactory manner.

Another object of the invention is to provide a novel and automatic machine for handling and grinding or polishing articles having a curved surface, and in which provision is made for presenting the different portions of the curved surface to the grinding or polishing element in a manner such as to secure most satisfactory and efficient results.

A still further object of the invention is to provide an automatic machine for grinding or polishing an article having a cylindrical surface to be ground and in which provision is made for causing relative movement between the work and the grinding or polishing element in a plurality of directions to thereby produce a ground or polished cylindrical surface of the desired character.

With these objects in view and such others as may hereinafter appear, the invention consists in the machine and in the structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings which illustrate the preferred embodiment of the invention, Figure 1 is a plan of the improved machine; Fig. 2 is a side elevation of the same; Fig. 3 is a side elevation partly in section of the right-hand end of the machine shown in Fig. 2; Fig. 4 is a section on the line 4—4 of Fig. 3; Fig. 5 is a section taken on the line 5—5 of Fig. 3; Fig. 6 is a detail in plan showing a portion of the work supporting and conveying mechanism; and Figs. 7 and 8 are sectional details to be referred to.

In general the present grinding or polishing machine includes a grinding element and work supporting mechanism to present the work in operative relation to the grinding element, and provision is made for relatively moving the grinding element and the work in a plurality of directions during the grinding operation. In this manner a superior and highly efficient grinding or polishing effect is secured and one free from the objectionable grooves or scratches which have heretofore been experienced with other forms of grinding or polishing machines of which I am aware.

In its preferred form the present grinding or polishing machine is particularly designed for grinding or polishing work having a curved surface to be ground, and for such purpose provision is made for relatively moving the grinding element and the work in a plurality of directions during the grinding operation, and at the same time in a manner such as to preserve the proper relation between the grinding element and the work.

Referring to the drawings, which as above stated illustrate the preferred embodiment of the invention, and illustrate a machine particularly designed for polishing the curved surfaces of metal articles, and particularly the cap employed in the construction of the well-known Gillette safety razor, 10 represents a work support herein shown as having spaced apart guide members or guideways 12, 14 mounted thereon. In the operation of the machine a plurality of the work pieces or cap members 16 are fed or placed by the operator upon the guideways in a position at the left-hand portion of the machine, as indicated at 18 in Figs. 1 and 2. The construction of the cap member is such that its outer or upper surface 20 is cylindrical, and that it possesses

a depending screw threaded stud 22 and a pair of rounded prongs 26 one upon each side of the stud. The construction and general shape of the cap member is illustrated in Figs. 6, 7 and 8. In the operation of the machine, the caps 16 are placed upon the guideways 12, 14, with their curved top surface uppermost and with the studs 22 and prongs 26 projecting downwardly between the guideways.

Provision is made for moving the cap members longitudinally through the guideways and through the machine, and to thereby cause the successive cap members to pass beneath a series of grinding or polishing elements herein shown as four in number and comprising rotating grinding or polishing wheels 28, 30, 32 and 34 (see Figs. 1, 2, 4 and 7). For this purpose, as herein shown, a roller chain 36, driven as will be described, is caused to pass between and longitudinally through a space between the guideways 12, 14, and to cooperate with the depending portions of the cap 16 to cause the latter to slide upon the guideways as the chain is moved therethrough. The particular construction of cap 16 lends itself to cooperate with the chain inasmuch as the studs 22 and prongs 24 thereon enter between the rollers 44 of the chain in a manner analogous to gear teeth. The chain 36 is herein shown as passing around the driven sprocket 38 to be driven thereby (see Fig. 3), and at the left hand end of the machine (see Fig. 2) the chain passes around an idler sprocket 40. The lower run of the chain is arranged to pass around guide rolls 46, 48 secured to brackets 50, 52 depending from the work support 10.

In order to prevent the formation of scratches or grooves in the surface of the work as the latter is moved under the grinding or polishing wheels 28, 30, 32 and 34, provision is preferably made in the present machine for causing relative movement between the grinding elements and the work in a plurality of directions, and for this purpose as herein shown provision is made for oscillating the work support 10, and cap members 16 carried thereby, in a direction transversely of the direction of rotation of the grinding or polishing wheels.

To this end, hinge or roller members 54 and 56 are secured to the opposite ends of the work support 10 and are rotatably journalled in bearing members 58 and 60 secured to the main frame or platen 62 of the machine, (Figs. 1, 2, 3 and 5). Mechanism is provided for oscillating the work support 10 on its hinges 54 and 56 in the bearings 58 and 60, including an eccentric 64 secured on a constantly driven shaft 66. An eccentric strap 68 formed on the upper end of a link 70 encircles the eccentric 64. The lower end of the link 70 is pivotally connected by means of a pin 72 to a bracket 74 which is secured to the work support 10. By means of the mechanism described the work support 10 and caps 16 are constantly oscillated inwardly and outwardly across the grinding surfaces of the grinding wheels and the formation of longitudinal scratches or grooves in the polished surfaces 20 of the caps is prevented, with the result that the polished surface of the work presents a smooth and finished appearance.

In order that the surfaces 20 of the cap members may be ground or polished to the desired curvature the grinding surfaces 76 of the wheels 28, 30, 32 and 34 are preferably concave in form and of the same curvature as the surfaces 20. Also, for the same purpose, the cap members 16 are so positioned on the work support 10 by the guide members 12 and 14 that the axis of the cylindrical surfaces 20 coincides with that of the hinge members 54 and 56.

The polishing wheels 28, 30, 32 and 34 of the illustrated machine are secured on the front ends of shafts 78, which are journalled by means of ball-bearings 80 and 82 in bearing members 84 secured to the platen 62 (Figs 1 and 4). The shafts 78 and grinding wheels attached thereto are constantly rotated by pulleys 86 secured to the rear ends thereof and connected by belts 88 to a drum 90 secured to the main shaft 92 of the machine which is constantly driven by means of a pulley 94 from a suitable external source of power.

In the illustrated and preferred form, best shown in Fig. 4, the polishing wheels are formed with a cylindrical body portion 96, preferably of wood, to which is adhesively affixed a rim portion 98, preferably of leather. The rim portion 98 is formed with the concave polishing surface 76 previously described to the polishing surface of which is adhesively secured emery dust or similar abrasive or polishing material. It is preferred to employ relatively coarse abrasive material on the wheel 28 and progressively finer materials on the wheels 30, 32 and 34 in order that a smoothly polished surface may be imparted to the articles when they have been fed past the latter wheel.

In order to compensate for the wearing of the polishing surfaces of the polishing wheels, provision is made for adjusting the relative positions of the polishing wheels and work radially of the former. To this end, in the illustrated embodiment of the invention, provision is made for vertically adjusting the position of the portions of the guide rails beneath the polishing wheels. As shown in Figs. 2, 3, 4, 6, 7 and 8, the portions 100 and 102 of the guide rails 12 and 14 beneath the polishing wheels are secured to slide members 104 vertically adjustable in the work support 10. In order to adjust the slides 104 screw-threaded recesses are formed therein which are engaged by similarly threaded bolts 106

rotatively secured in lugs 108 and 110 formed on the work support 10 and having hand wheels 112 secured to their lower ends (Figs. 2, 3 and 4). In order to retain the slides 104 and guide members 100 and 102 in adjusted position, clamping bolts 114 are provided which pass through slots 116 in the slides 104 and are threaded into openings 118 in the work support 10.

In order that the guide members 100 and 102 may be oscillated beneath the polishing wheels their upper surfaces 120 are formed as a portion of a cylinder of the same or slightly less diameter than the cylinder of which the surfaces 20 of the work form a part and having the same axes (see Figs. 4 and 8). Also in order that the work may be readily fed from the guide members 12 and 14 onto the guide members 100 and 102 when the latter have been adjusted upwardly from the position shown in Fig. 7, the left hand or entering ends of the guide members 100 and 102 are formed with downwardly curved portions 122, as shown in the above figure.

From the above description it will be evident that during the operation of the illustrated machine, the caps placed by the operator upon the conveyor chain are secured from relative movement thereto by the cooperation of the stud and prongs of each cap with the openings between the rollers of the chain. At the same time, as each cap passes beneath each successive polishing element, an oscillating movement relative to the polishing element is given thereto by the operation of the constantly driven eccentric operatively connected with the support on which is mounted the sprockets carrying the chain, thereby reducing to a minimum the formation of scratches or grooves in the surface of the work.

While the different features of the invention have been illustrated as embodied in a polishing machine, it will be understood that they may be embodied in a grinding machine, and while the preferred embodiment of the invention has been illustrated and described, it is to be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:—

1. In a machine of the character described, in combination, a plurality of abrasive wheels mounted for rotation in planes extending in the same direction and adapted to successively engage the work fed beneath them, a unitary work supporting member extending under all of the wheels and mounted to be capable of oscillation in a direction at right angles to the planes of said wheels, a travelling member for engaging and moving the work mounted upon and oscillatory with the work supporting member, and means for oscillating the unitary work supporting member to simultaneously oscillate the work being engaged by all of the wheels.

2. In a machine of the character described, in combination, an abrasive wheel, a work support, means for oscillating the work support in a curved path including an eccentric and connections between the eccentric and work support, a travelling work engaging member oscillatory with the work support for moving the work in engagement with the wheel and at right angles to the oscillation of the work support.

In testimony whereof I have signed my name to this specification.

SAMUEL B. FIELD.