

G. LARSON.
GRINDING MACHINE.
APPLICATION FILED FEB. 19, 1909.

939,038.

Patented Nov. 2, 1909.

3 SHEETS—SHEET 1.

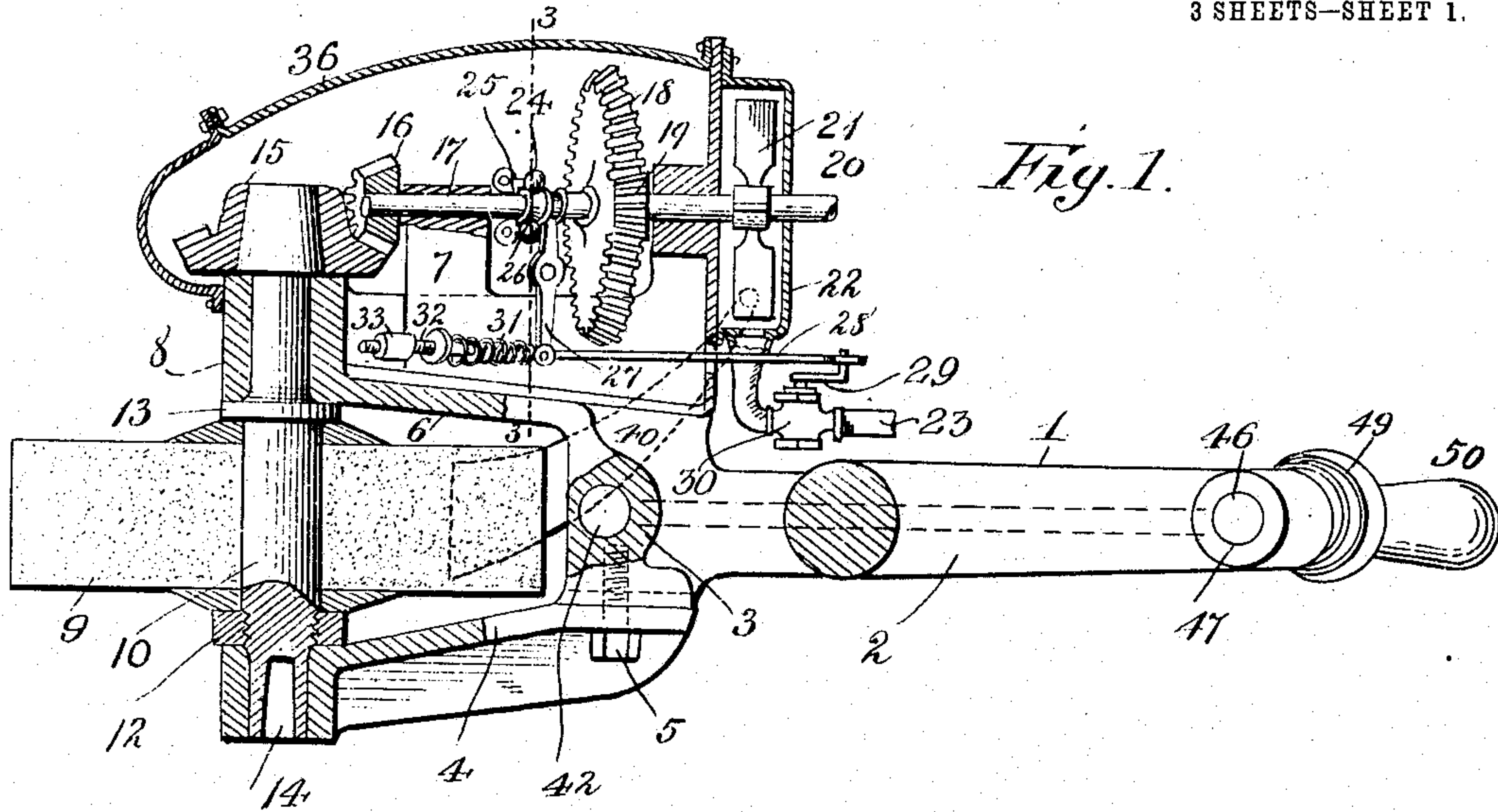


Fig. 1.

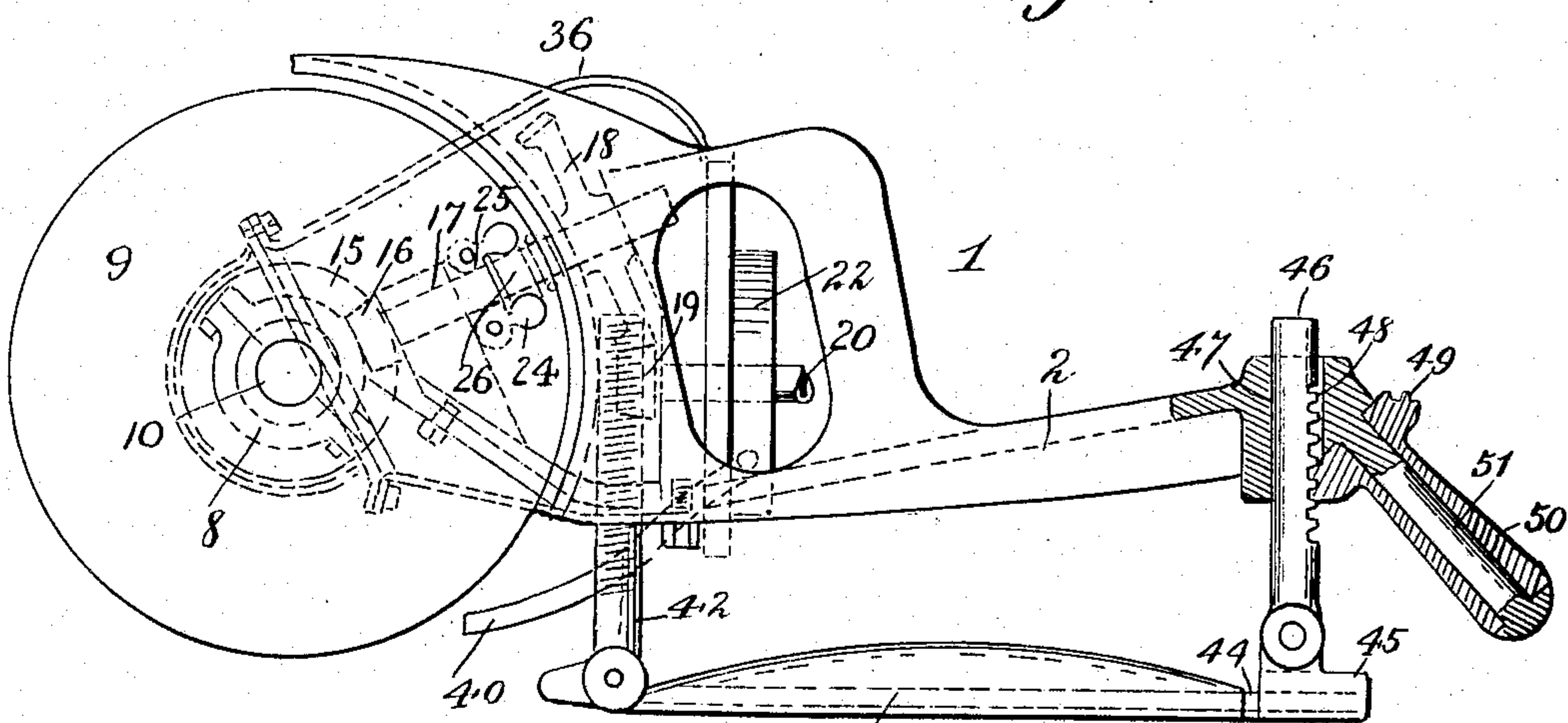


Fig. 2.

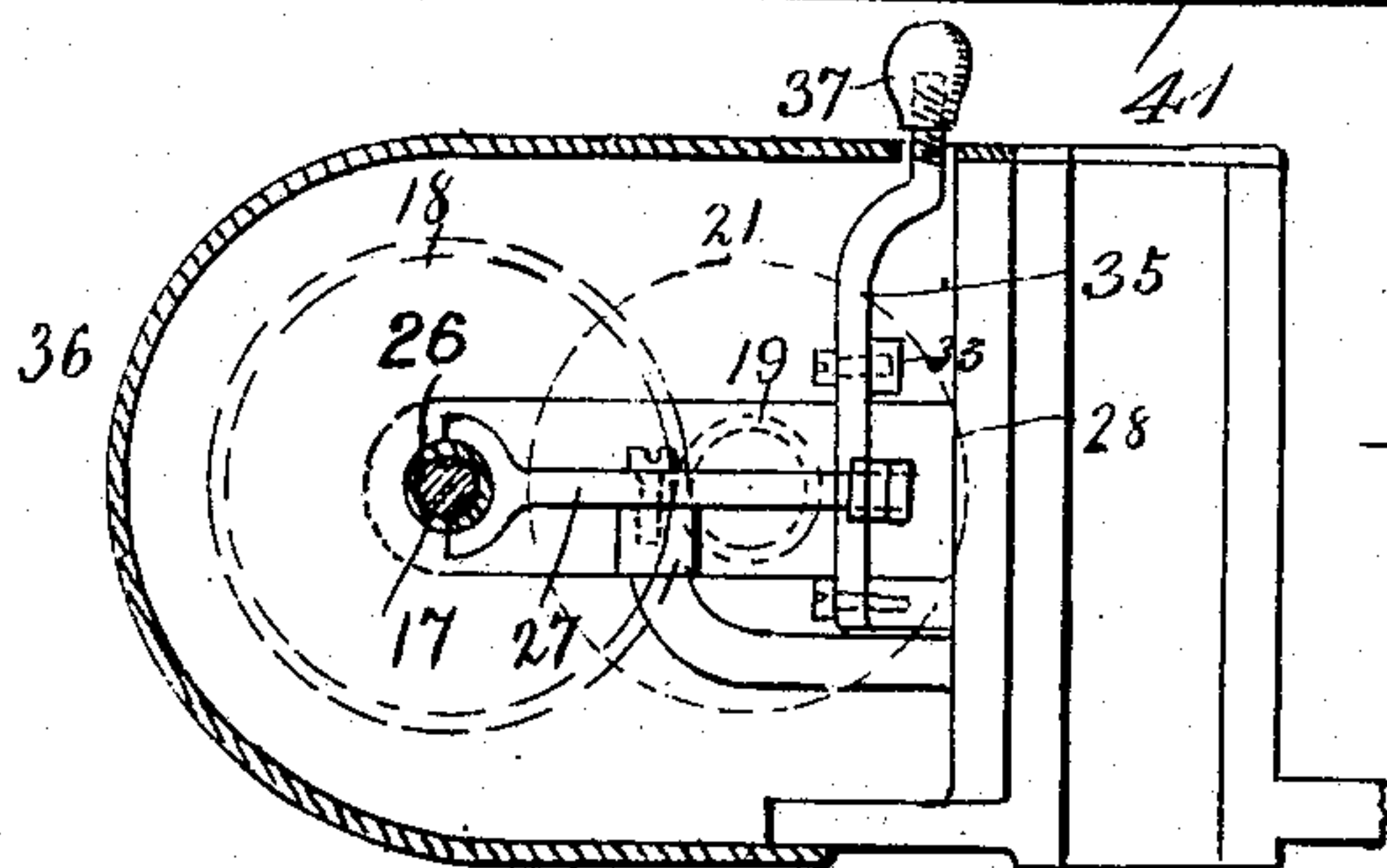


Fig. 3.

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3 SHEETS—SHEET 2.

Fig. 6.

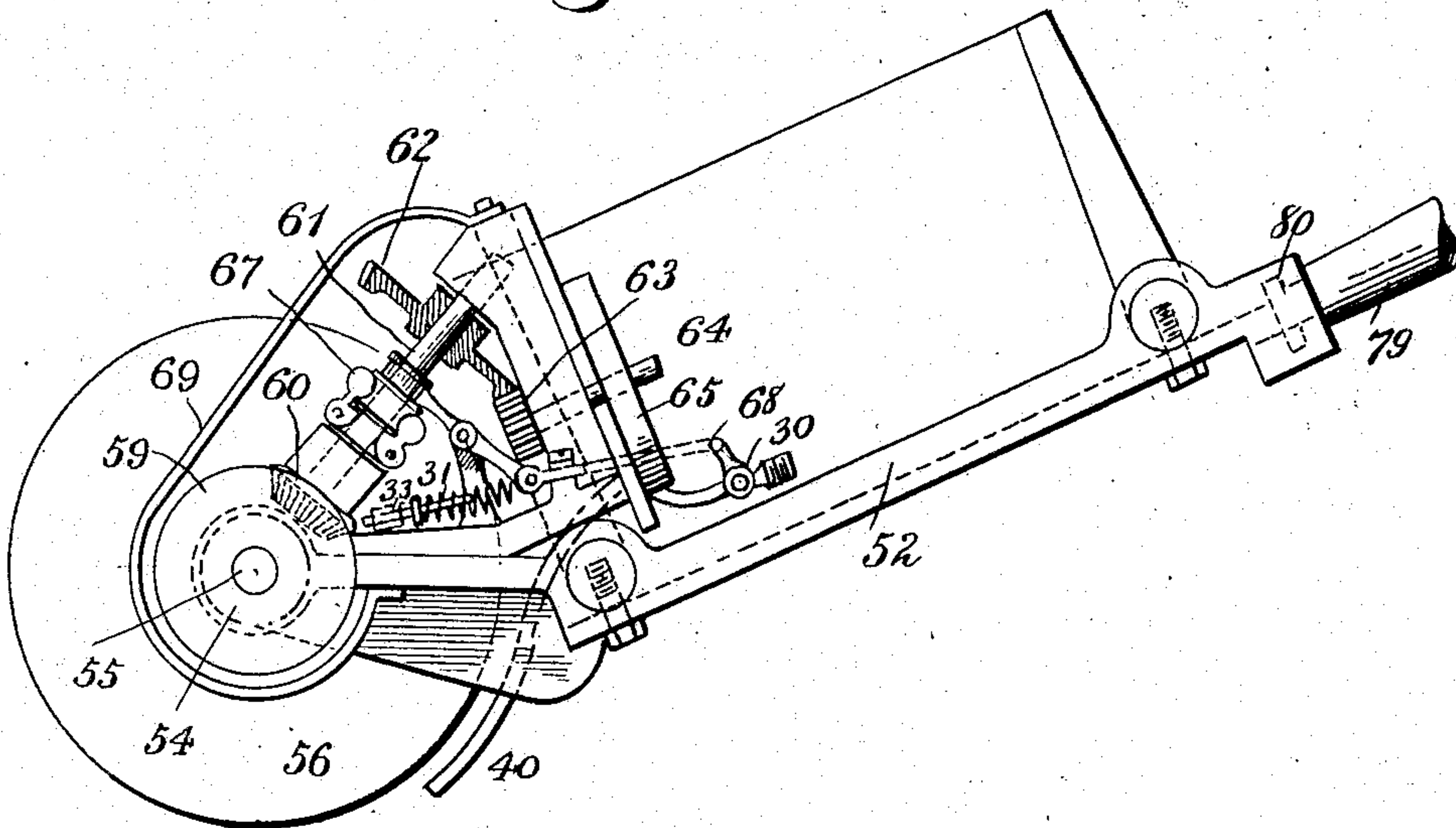
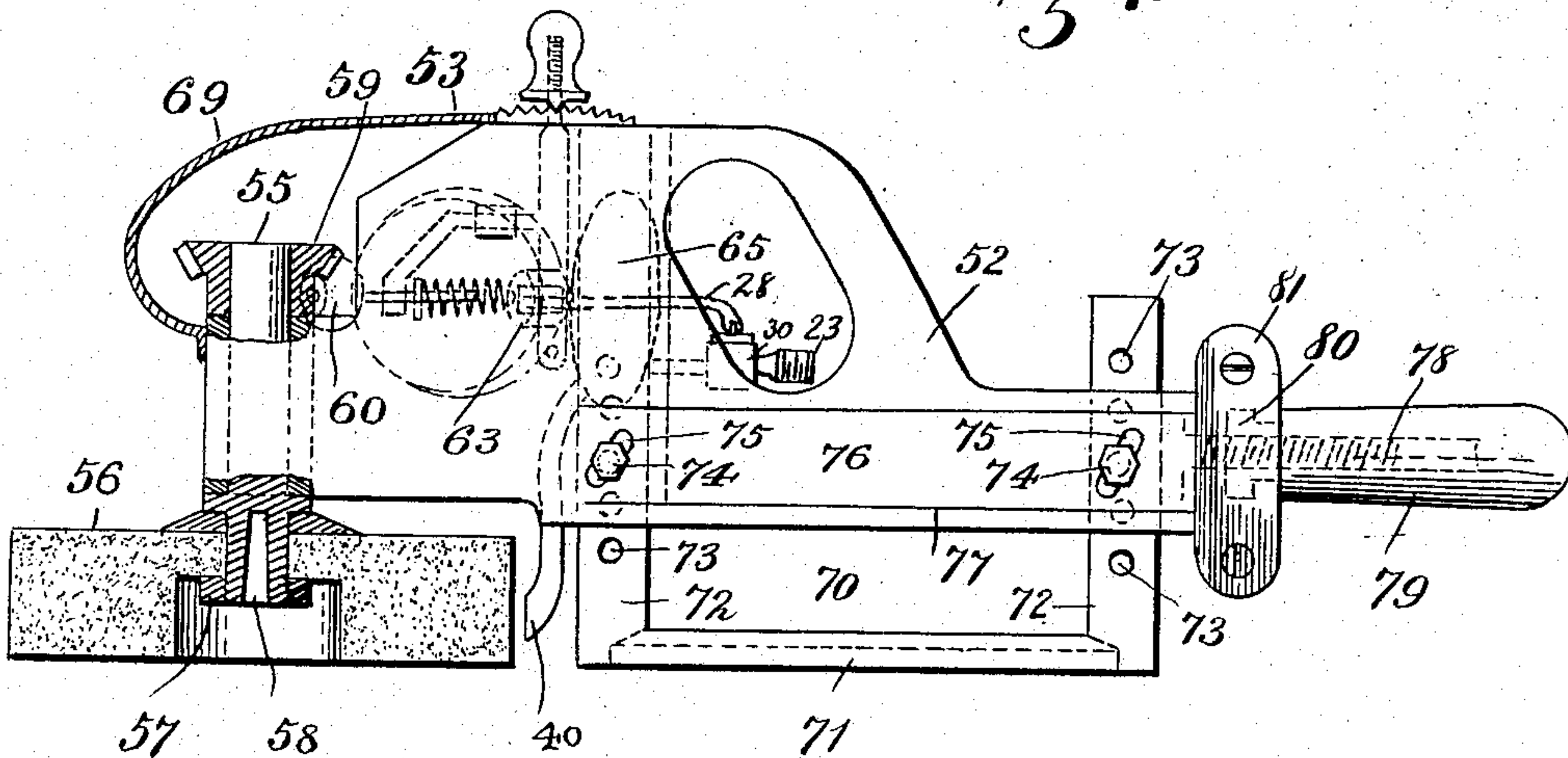


Fig. 7.



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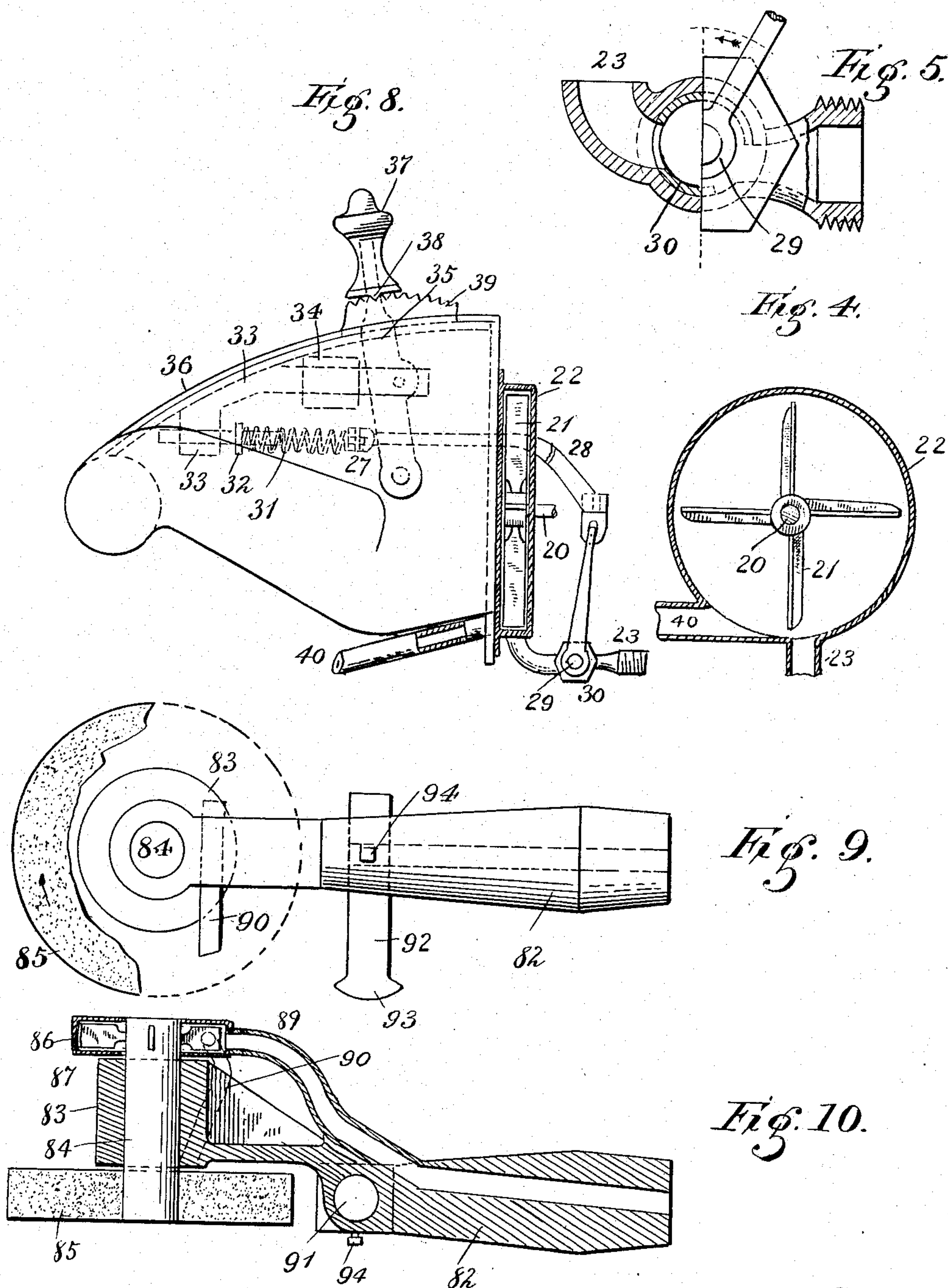
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

GOTTFRID LARSON, OF JAMESTOWN, NEW YORK.

GRINDING-MACHINE.

939,038.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed February 19, 1909. Serial No. 478,784.

To all whom it may concern:

Be it known that I, GOTTFRID LARSON, a citizen of the United States, residing at Jamestown, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Grinding-Machines; and I do 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.

This invention relates to improvements in grinding machines.

The object of the invention is to provide a grinding machine which may be moved back and forth by hand over the surface being ground or polished or which may be secured upon a bench or table and the work engaged therewith.

A further object is to provide a device of this character adapted to be operated by means of compressed air and having means whereby after the air has been employed for operating the grinder, said air may be utilized for blowing the dust from the surface being ground or polished.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a plan view of the grinder with parts broken away; Fig. 2 is a side view of the same partly in section; Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 1; Fig. 4 is a vertical cross sectional view through the operating wheel; Fig. 5 is a sectional view taken through certain parts of Fig. 1. Fig. 6 is a top plan view of a modified form of the grinder, parts of the latter being broken away; Fig. 7 is a side view of the same with parts broken away; Fig. 8 is a cross sectional view of Fig. 6; Fig. 9 is a side view of another modified form of the device; and Fig. 10 is a horizontal sectional view of the same.

Referring more particularly to Fig. 1 to 5 of the drawing, 1 denotes the grinder which consists of a handle portion 2 having on its outer end a forked head 3, one member 4 of which is detachably secured to the head by a set screw 5 or other suitable fastening mechanism, whereby said member may be removed to permit the insertion or removal

of the grinding wheel. On the opposite member 6 of the forked head is arranged a suitable supporting frame 7 in which is mounted the operating mechanism herein-
after described.

In the outer ends of the members 4 and 6 of the head are formed bearings 8 in which is revolubly mounted a vertically disposed grinding and polishing wheel 9. The wheel 9 is mounted on an axle 10 and is detachably secured thereto by a jam nut 12 which clamps the same into engagement with the flange or collar 13 on the shaft as shown. In one end of the shaft 10 is formed a socket 14 adapted to receive a drill or boring-bit. On the opposite end of the shaft 10 is fixedly mounted a bevel gear pinion 15 which is engaged by a similar pinion 16 mounted on the lower end of an operating shaft 17 which is mounted in a suitable bearing in the frame 7 of the grinder. On the shaft 17 is also fixedly mounted a bevel gear pinion 18 which is adapted to mesh with a bevel gear pinion 19 mounted on the inner end of a drive shaft 20 which is also revolubly mounted in a suitable bearing on the frame 7.

On the drive shaft 20 is fixedly mounted an operating wheel or turbine 21 which is inclosed in a suitable casing 22 arranged on the frame 7. With the casing 22 is connected a flexible air supply pipe 23 whereby compressed air is conducted to the casing and applied to the wheel 21 thereby driving the same and the shaft 20. The movement of the shaft 20 is imparted to the grinding wheel through the operating mechanism herein before described.

On the operating shaft 17 is arranged a governor mechanism which is here shown and preferably consists of a pair of governor balls 24 which are pivotally mounted on one of the bearing brackets of the shaft 17 and are provided adjacent to their pivotal connections with offset projections 25 which are adapted to engage a collar 26 which is slidably mounted on the shaft 17 and with which is connected the forked end of a valve operating lever 27 which is pivotally mounted on a suitable bearing in the frame 7. The opposite end of the lever 27 is connected by an operating rod 28 to the stem 29 of a rotary valve 30 which is arranged in the air supply pipe 23 whereby when the machine runs beyond a normal or predetermined speed the governor balls will operate the

shaft, the collar 26 and the operating lever 27 to partially close the air supply valve thus cutting off or limiting the supply of air to the turbine.

5 The speed at which it is desired the governors should operate is determined by means of a regulating spring 31, one end of which bears against the outer end of the valve operating lever 27, while the opposite
10 end of the spring is engaged with a shouldered adjusting rod 32, the outer end of which has a screw threaded engagement with a spring adjusting bar 33 which is slidably mounted in a suitable bearing 34 in
15 the frame 7. Connected with the free end of the adjusting bar 33 is a lever 35, one end of which is pivotally mounted in the frame 7, while the upper end projects through a slot formed in the hood or casing 36 of the
20 operating mechanism and is provided with an operating knob or handle 37. On the handle 37 is arranged a fixed pawl or tooth 38 which is adapted to be engaged with the teeth of a segmental rack 39 arranged on the
25 casing 36 whereby the lever 35 may be held in its adjusted position to regulate the tension of the spring 31 as will be understood. By regulating the tension of the spring 31 the same will bear with greater or less pres-
30 sure against the free end of the valve operating lever 27 and thus hold said lever more or less firmly against operation by the governor balls so that the speed at which said governor balls operate to cut off the air supply may be regulated. Connected with the
35 casing 22 of the turbine wheel is an air discharging tube 40, the outer end of which flares to substantially the width of the grinding wheel and is disposed in close proximity
40 to the surface of the object being ground whereby the discharge air from the casing 22 is utilized to blow the dust from the surface being ground or polished.

The handle 2 is preferably supported by
45 means of an adjustable supporting mechanism comprising a base plate 41 the forward end of which is hingedly connected to a front adjusting rod 42 which preferably has a screw threaded engagement with a
50 socket 43 formed in the forward end of the handle. The rear end of the base plate 41 is provided with a rearwardly projecting dove-tail extension 44 with which is slidably engaged a foot piece 45 to which is hingedly
55 connected the lower end of a rear adjusting rod 46 which is slidably engaged with a passage 47 formed in the rear end of the handle. The rod 46 is provided with a series of worm gear teeth 48 with which is adapted to be en-
60 gaged a worm gear 49 formed on the upper end of a handle 50 which is revolubly mounted on a shank 51 which is preferably an extension of the rear end of the handle 2. By revolving the handle 50 in one direction or
65 the other the worm gear thereon will en-

gage the teeth 48 on the adjusting rod 46 thereby raising or lowering the rear end of the handle portion 2 thus tilting the grinder frame up or down on the hinged connection between the rod 42 and the forward end of
70 the plate 41 thereby raising or lowering the grinding wheel.

In Figs. 6, 7 and 8 is shown a slightly modified form of grinder in which a hori-
75 zontally disposed grinding wheel is employed. The grinder shown in the last mentioned figures consists of a handle portion 52 on the forward end of which is arranged a supporting frame 53 provided in its outer
80 end with a vertically disposed bearing 54 in which is mounted a shaft 55 on the lower end of which is secured a grinding wheel 56 having on its lower face an abrasive surface. The center of the wheel 56 is recessed to re-
85 ceive the lower end of the shaft 55 on which is screwed a clamping nut 57 to secure said wheel in place. In the lower end of the shaft 55 is formed a socket 58 to receive a drill or boring-bit.

On the upper end of the shaft 55 is fixedly
90 mounted a bevel gear 59 with which is engaged a bevel gear pinion 60 on the operating shaft 61 which is mounted in suitable bearings in the frame of the machine. On the
95 shaft 61 is also fixedly mounted a bevel gear 62 which engages a bevel gear pinion 63 on the end of a drive shaft 64 on which is mounted an operating wheel or turbine 65 and is adapted to receive a current of com-
100 pressed air whereby the same is driven in the same manner as described in connection with the operating wheel shown in the first five figures of the drawing.

The operating mechanism shown in Figs. 6, 7 and 8 is provided with a governor mech-
105 anism 67 and a valve regulating mechanism 68 which is similar in construction to that shown in connection with the first figures of the drawing and a description of the same is not thought to be necessary.
110

The operating mechanism is preferably covered by a hood 69 and the handle 52 is adjustably engaged with a supporting mech-
115 anism 70 comprising a base plate 71 having at its opposite ends upwardly projecting supporting posts or rods 72 in which are formed a series of transversely disposed screw holes 73 with one of which is adapted to be engaged set screws 74 which pass
120 through inclined slots 75 in a longitudinally disposed adjusting bar 76 which is slidably mounted in a groove or channel 77 formed in the side of the handle and is provided on its outer end with a threaded extension 78
125 on which is screwed an adjusting sleeve or handle 79 the forward end of which has a swiveled connection 80 with a swivel head 81 arranged on the rear end of the handle as shown. By thus engaging the adjusting sleeve with the threaded extension 78 of the
130

adjusting bar 76, said bar may be moved longitudinally on the handle in either direction, which movement by reason of the engagement of the inclined slots 75 with the bolts or screws 74 will raise or lower the handle and the grinding wheel on the supporting plate 71 and posts 72 thus engaging or disengaging the grinding wheel from the work.

10 In Figs. 9 and 10 of the drawing is shown a similar form of the grinder in which the turbine wheel is directly connected to the shaft of the grinding wheel. The form of the device shown in Figs. 9 and 10 comprises a tubular handle portion 82 on the outer end of which is formed a bearing head 83 provided with a horizontally disposed bearing aperture in which is revolubly mounted an operating shaft 84 on one end of which is mounted a grinding wheel 85, while on its opposite end is mounted a turbine wheel 86 arranged in a suitable casing 87. With one side of the casing 87 is connected an air supply pipe 89 which connects at its opposite end with a tubular handle 82 to which is secured a flexible air conducting pipe not shown. By this arrangement the compressed air is conducted to the fan and the grinding wheel thus directly operated. 20 The wheel casing 88 is provided with an exhaust tube 90 by which the exhaust air is conveyed to the surface being ground to blow the dust and dirt therefrom.

The handle 82 is provided near its outer end with a vertically disposed passage 91 with which is engaged a supporting bar 92 provided on its lower end with a segmental foot 93 which engages the surface being ground and thereby supports the machine which may be readily tilted by means of the segmental foot 93. The handle is adjustably secured to the support 92 by means of a set screw 94 or other suitable fastening device.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended claims.

55 Having thus described and ascertained the nature of my invention, what I claim as new and desire to secure by Letters-Patent, is:--

1. In a device of the character described a handle, a grinding wheel revolubly mounted in the outer end of said handle, a turbine wheel carried by said handle, an operating mechanism to connect said turbine wheel with said grinding wheel, means to regulate the speed of said operating mechanism and the wheel, a handle supporting

mechanism and means to adjustably connect the handle with said supporting mechanism whereby the grinder may be tilted to engage the grinding wheel with uneven surfaces.

2. In a grinding machine of the character described, a supporting handle, a grinding wheel revolubly mounted in said handle, an operating shaft geared to said grinding wheel, a turbine wheel carried by said handle and geared to said operating shaft whereby the latter and said grinding wheel are driven, a casing arranged around said turbine wheel, a fluid supply pipe connected to said casing, a controlling valve in said supply pipe, a valve controlling mechanism, a governor mechanism arranged on said operating shaft and connected to said valve controlling mechanism and means to regulate said governor mechanism whereby the speed of the grinding wheel is determined. 70 75 80 85

3. In a grinding machine of the character described, a supporting handle, a grinding wheel revolubly mounted in said handle, an operating shaft geared to said grinding wheel, a turbine wheel carried by said handle and geared to said operating shaft, a fluid supply pipe connected with said turbine, a controlling valve arranged in said pipe, a valve regulating mechanism, a centrifugal governor mechanism arranged on said operating shaft and connected with said valve regulating mechanism, a spring engaged with said governor to regulate the movement of the same, and an adjusting lever connected with said spring whereby the tension of the same is regulated and the speed of the grinder thereby controlled. 90 95 100

4. In a grinding machine of the character described, a supporting handle, a grinding wheel revolubly mounted in said handle, means to detachably secure the wheel in operative position in the handle, means whereby a drill may be operated by the shaft of said grinding wheel, an operating mechanism geared to said grinding wheel, a compressed air turbine geared to said operating mechanism, a speed controlling and regulating mechanism and means whereby the exhaust air from the turbine is employed to blow the dust from the work. 105 110 115

5. In a grinding machine of the character described, a supporting handle, a grinding wheel revolubly mounted in said handle, means whereby said grinding wheel is driven, a handle supporting mechanism, said mechanism comprising a base plate, a supporting rod hingedly connected to the forward end of said plate and having a threaded engagement with said handle, a foot piece slidably engaged with the rear end of said base plate, a rear supporting bar hingedly connected to said foot piece and slidably engaged with the rear end of the handle, worm gear teeth arranged on said bar, a revolubly mounted 120 125 130

adjusting sleeve, and a worm gear on said sleeve to engage the teeth on said adjusting bar whereby the rear end of the handle may be raised or lowered thereby tilting the forward end of the same and the grinding wheel mounted therein.

In testimony whereof I have hereunto set

my hand in presence of two subscribing witnesses.

GOTTFRID LARSON.

Witnesses:

JOHN JOHNSON,
EMIL JONES.