O. R. ANGELL.

COMBINED VALVE GRINDER AND DRILL.

APPLICATION FILED JULY 12, 1909. RENEWED APR. 27, 1910.

977,258. Patented Nov. 29, 1910.

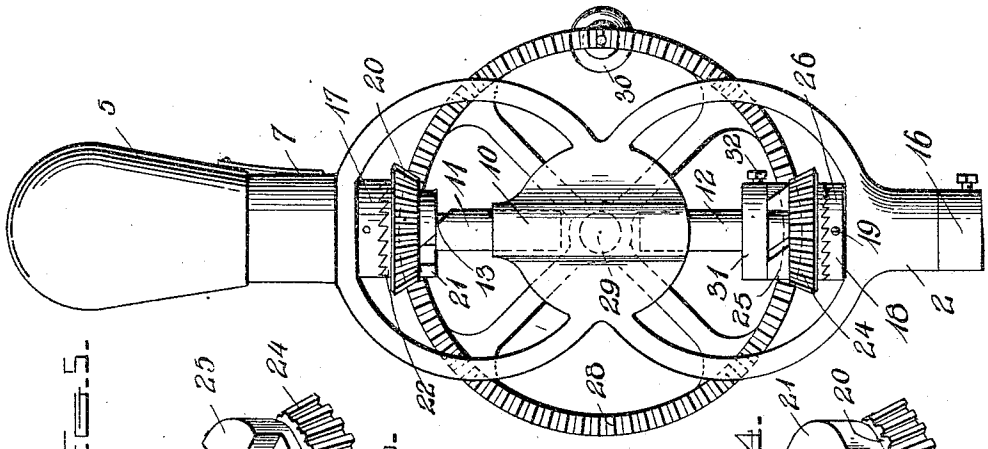

FIG. 5.

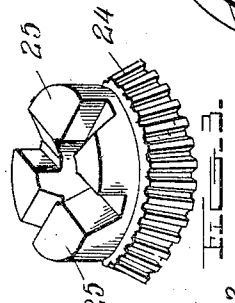

FIG. 3.

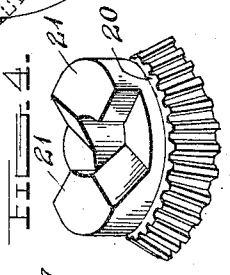

FIG. 4.

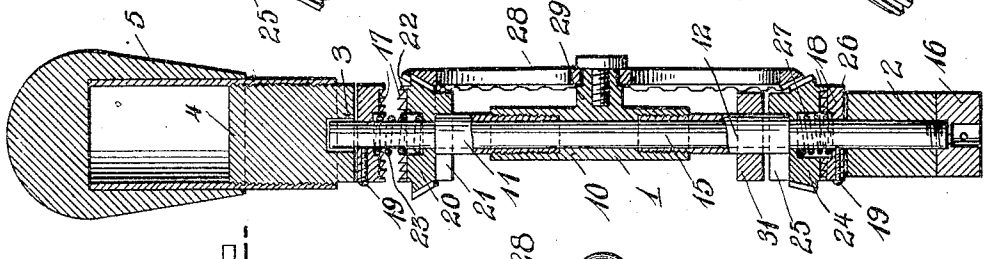

FIG. 2.

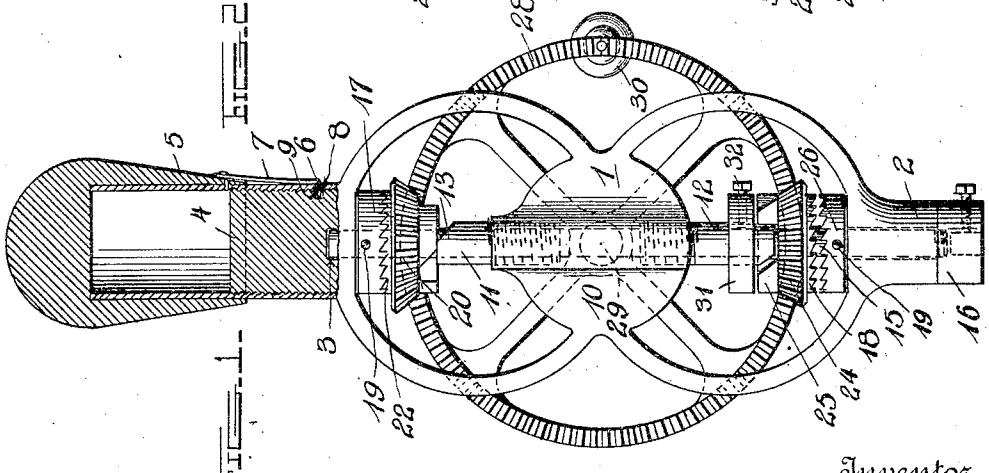

FIG. 1.

Witnesses
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UNITED STATES PATENT OFFICE.

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COMBINED VALVE GRINDER AND DRILL.

977,258. Specification of Letters Patent. Patented Nov. 29, 1910.

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To all whom it may concern:

Be it known that I, OTIS R. ANGELL, a citizen of the United States, residing at Dorchester, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Combined Valve Grinders and Drills; 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 combined valve grinders and drills.

One object of the invention is to provide a device of this character having an improved construction of operating mechanism whereby the grinding tool will be turned first in one direction and then the other and whereby the revolutions of the tool in one direction will gain on the revolutions in the opposite direction.

Another object is to provide means whereby the operating mechanism may be adjusted to drive the tool continuously in one direction.

With the foregoing 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 side view of my improved grinder and drill, showing the parts arranged for driving the tool first in one direction and then the other, and showing the upper driving pinion in operative position; Fig. 2 is a central longitudinal view showing the lower driving pinion in operative position; Fig. 3 is a perspective view of one of the drive pinions; Fig. 4 is a similar view of the other drive pinion; Fig. 5 is a side view of the device showing the parts arranged to operate the tool continuously in one direction.

In the embodiment of the invention, I provide a suitable supporting frame 1, in one end of which is formed a bearing passage 2 and in the opposite end a bearing socket 3. On the outer end of the frame is formed a short threaded shank 4, on which is screwed a handle 5, said handle being securely locked or held against unscrewing by a detent 6, arranged on the end of a flat spring 7 secured to the outer side of the handle. The detent 6 is forced by the spring 7 through an aperture 8 in the handle and into engagement with the socket 9 in the shank 4, thus preventing the handle from becoming unscrewed.

Through the central portion of the frame is formed a vertically disposed passage 10, the outer portions of which are enlarged and threaded to receive the threaded inner ends of bearing sleeves 11 and 12 which project beyond the central portion of the frame, as shown. On the outer end of the sleeve 11 is formed a bevel tooth 13 and on the outer end of the sleeve 12 is formed a bevel tooth 14. The purpose of the teeth 13 and 14 will be hereinafter described. Loosely mounted in the bearing passage 2 and socket 3 of the frame and in the bearing sleeves 11 and 12, is a tool operating shaft 15, on the outer end of which is arranged a chuck 16 adapted to receive the drill or other tool to be operated by this device. On the shaft 15, adjacent to the opposite ends of the frame, are fixedly mounted clutch members 17 and 18, said clutch members being preferably secured to the shaft by set screws 19.

Loosely mounted on the shaft, between the sleeve 11 and the clutch members 17, is a bevel gear pinion 20. The pinion 20 has on its inner side a hub provided with two oppositely disposed cam projections or teeth 21 which are adapted to be engaged with the tooth 13 on the adjacent end of the sleeve 11 when the pinion is revolved on the shaft. On the opposite side of the pinion, is formed a clutch bar 22 which is adapted to be brought into engagement with the clutch member 17 when the cam projections or teeth 21 are in engagement with the tooth 13 on the sleeve, 11. When the clutch 22 on the pinion has thus been engaged with the clutch member 17, the pinion will be locked on the shaft and will revolve the same as long as the projections 21 are in engagement with the tooth 13. When the space between the teeth or projections 21 is brought opposite to the tooth 13 on the sleeve, the pinion and its clutch member 22 will be forced out of engagement with the clutch member 17 on the shaft by a coiled spring 23 which is arranged around the shaft 10 in recesses formed in the engaging faces of the clutch members 17 and 22. When the clutch member 22 and the pinion have thus been separated, the pinion will run loose on the shaft until the next tooth or projection 21 is brought into engagement with the tooth 13 on the sleeve which will again force the

clutch members together and lock the pinion to the shaft.

Loosely mounted on the opposite end of the shaft, between the toothed end of the sleeve 12 and the clutch member 18, is a bevel gear pinion 24 on the inner side of which is formed a hub having four teeth or projections 25 which are spaced apart and arranged in pairs, as shown. On the outer side of the pinion 24, is formed a clutch member 26 which is adapted to be brought into engagement with the clutch member 18 thereby locking the pinion to the shaft to rotate the same in a direction opposite to that in which it is rotated by the pinion 20.

The pinion 24 is shifted to bring the clutch member thereon into engagement with the clutch member 18, by engagement of the teeth or projections 25 on the pinion with the tooth 14 on the adjacent end of the sleeve 12. When the spaces between the teeth or projections 25 on the pinion are brought opposite to the tooth 14 on the sleeve, the pinion is forced upwardly to disengage its clutch member from the clutch member 18 by a coiled spring 27. When the pinion has thus been disengaged from the clutch member 18, said pinion will run loose on the shaft until the projections thereon are again engaged by the tooth on the sleeve 12 and the pinion again forced thereby into engagement with the clutch member. It will be noted that the cam projection or teeth on the pinions are so arranged that first one pinion and then the other is forced into engagement with the stationary clutch members on the shaft, so that the shaft is driven by the pinions first in one direction and then in the other and by providing a greater number of cam teeth or projections on one pinion than on the other, the revolutions of the shaft in one direction will gain on the revolutions of the shaft in the opposite direction. The pinions are engaged with and continuously operated by a bevel operating gear 28 which is revolubly mounted on a short stub shaft 29 arranged on one side of the frame midway between the toothed sleeves 11 and 12. The gear 28 is preferably provided with a crank handle 30 whereby the gear is operated.

In order to drive the operating shaft continuously in one direction, when it is desired to use the tool as a drill, I provide a stop collar 31 which is arranged on the sleeve 12 and is adjustably secured thereto by a set screw 32. When it is desired to drive the shaft continuously in one direction, the collar 31 is slipped down over the toothed end of the sleeve 12 and into engagement with the teeth or projections on the pinion 24 and the latter forced outwardly and the clutch member 26 thereof held in engagement with the clutch member 18 on the shaft, so that when the gear 28 is operated, the movement thereof is imparted to the shaft through the pinion and clutch device to drive said shaft continuously in the same direction. When the parts are arranged as just described for driving the shaft continuously in one direction, the pin 19 which secures the clutch member 17 to the shaft is removed so that said clutch member will run loose on the shaft, when driven by the gear 28, thus preventing the pinion 20 from turning the shaft in the opposite direction.

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 the invention, as defined in the appended claims.

Having thus described my invention, what I claim is:

1. In a combined valve grinder and drill, a frame, bearing sleeves arranged in said frame, cam teeth formed on said sleeves, a tool operating shaft revolubly mounted in said frame and sleeves, clutch members fixedly mounted on said shaft, operating pinions loosely mounted on the shaft, clutch members on one side of said pinions and cam teeth on the opposite side of said pinions, one of said pinions having a greater number of said teeth than the other, an operating gear engaged with said pinions to revolve the same on said shaft and thereby bringing the cam teeth on first one pinion and then the other into engagement with the teeth on said bearing sleeves, whereby the pinions are shifted to alternately engage the clutch members thereon with the fixed clutch members on the shaft, thus locking said pinions to the shaft and turning the latter first in one direction a certain number of revolutions and then in the opposite direction a different number of revolutions, and means whereby one of said pinions may be continuously driven by said gear to continuously operate the shaft in one direction.

2. In a combined valve grinder and drill, a frame, a tool operating shaft revolubly mounted in said frame, clutch members arranged on said shaft, means to lock said clutch members to the shaft, operating pinions loosely mounted on said shaft, clutch members arranged on said pinions, an operating gear engaged with said pinions, means to alternately shift said pinions to engage the clutch members thereon with the clutch members on said shaft, whereby the gears are alternately locked into engagement with the shaft to operate the same first in one direction and then in the other,

springs arranged in said pinions to disengage the same from the clutch members on said shaft, and a stop collar adapted to hold one of said pinions in engagement with one of said fixed clutch members, whereby said shaft may be continuously driven in one direction when the fixed clutch member of the opposite pinion is released from the shaft.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

OTIS R. ANGELL.

Witnesses:
N. PERRY SIPPRELLE,
WALTER R. MEINS.