

998,257.

W. E. NICKERSON.  
POLISHING APPARATUS.  
APPLICATION FILED NOV. 16, 1907.

Patented July 18, 1911.

4 SHEETS—SHEET 1.

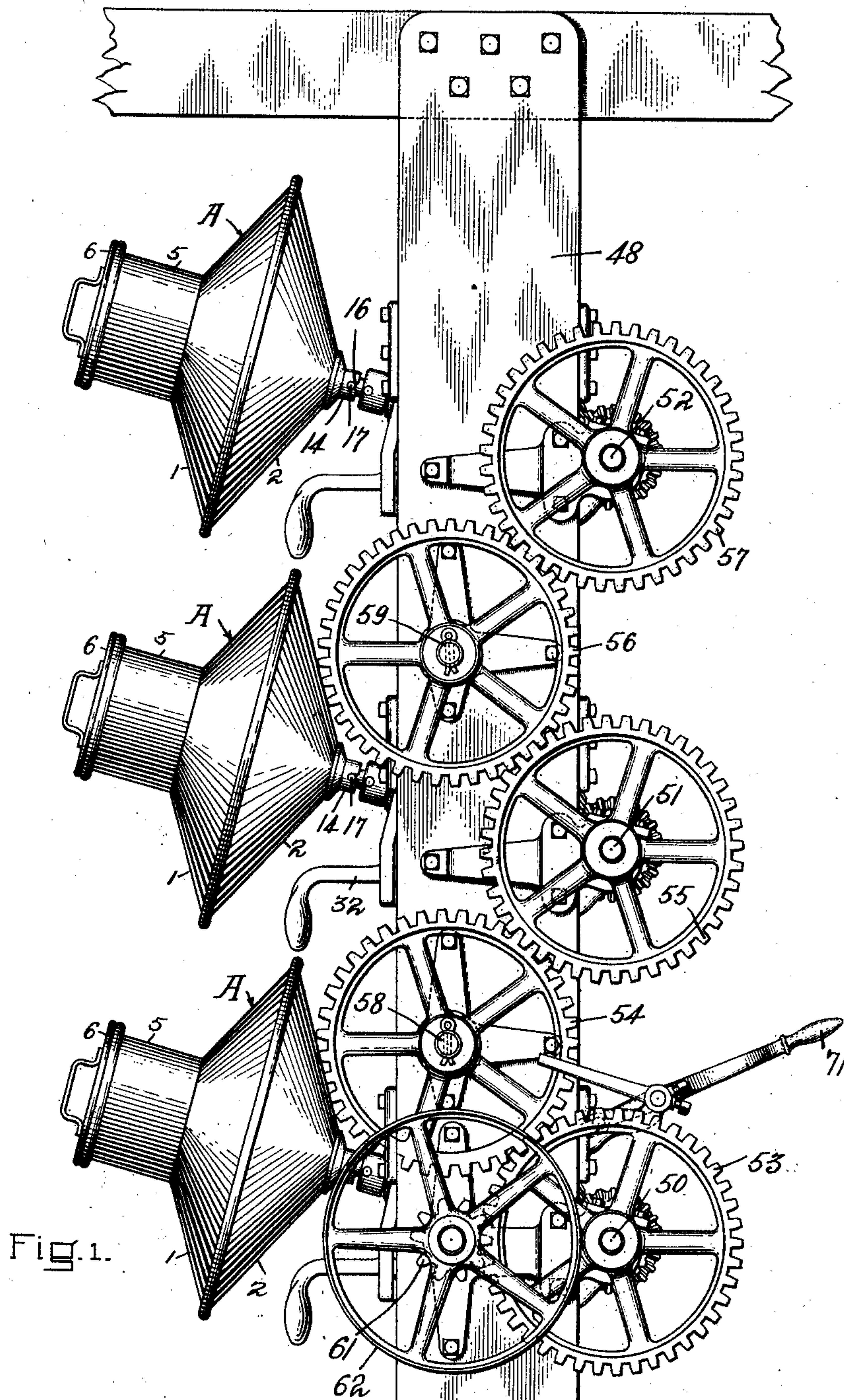


Fig. 1.

WITNESSES

*Charles A. Schuster*  
*Claude C. Neville*

INVENTOR

*William E. Nickerson*  
*By Dunn, Turk & Clark*  
*Atty.*

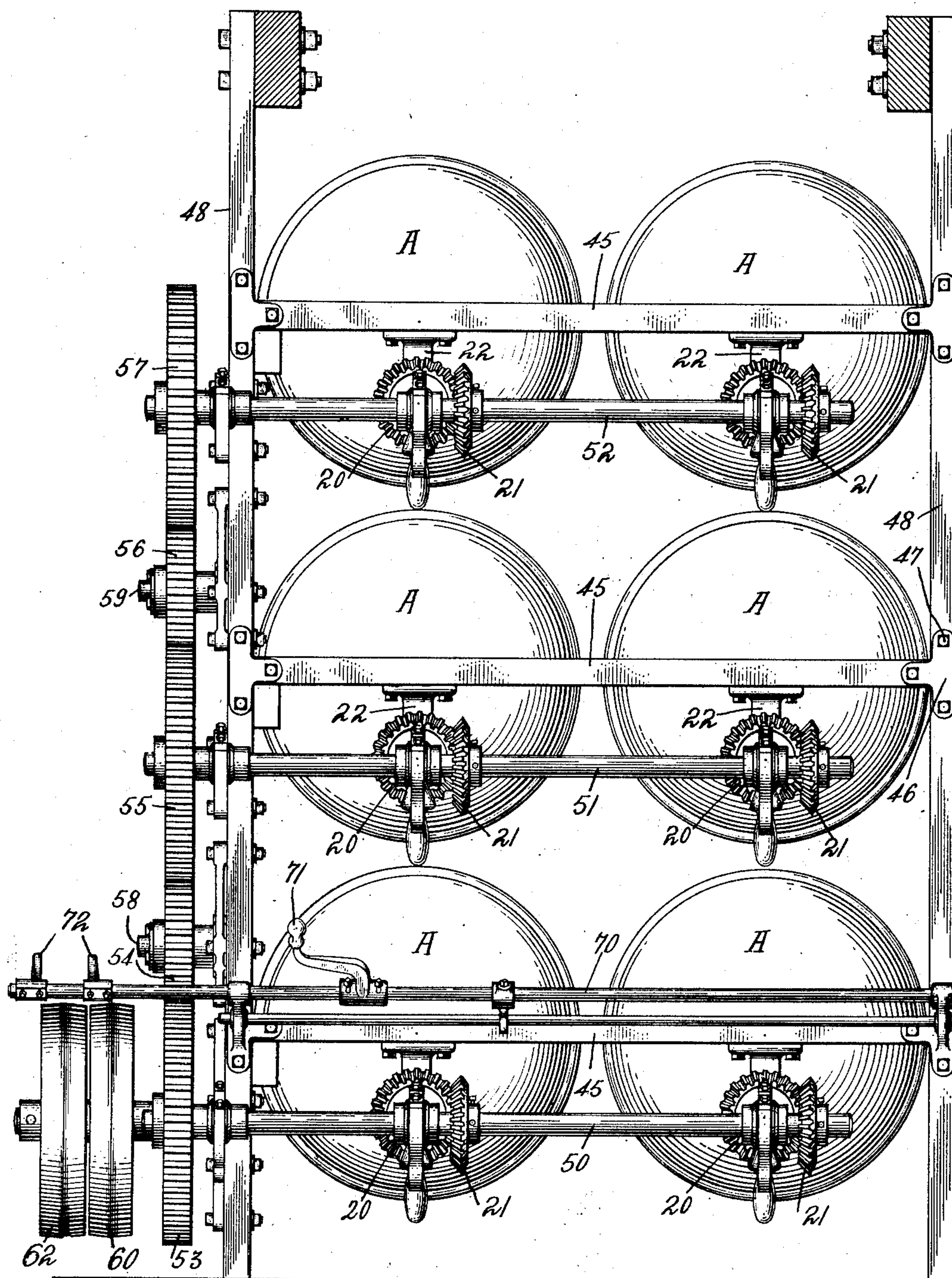


998,257.

W. E. NICKERSON.  
POLISHING APPARATUS.  
APPLICATION FILED NOV. 15, 1907.

Patented July 18, 1911.

4 SHEETS—SHEET 2.



WITNESSES  
*Charles H. Schuler*  
*Claude C. Neville*

INVENTOR  
Fig. 2. *William E. Nickerson*  
By *Dunn, Turk & Clarke*  
*Attys.*



W. E. NICKERSON.  
POLISHING APPARATUS.  
APPLICATION FILED NOV. 15, 1907.

4 SHEETS—SHEET 3.



Charles A. Schreber  
Claude C. Neville

William E. Nicholson  
By Dunn, Turk & Clarke  
attys.



998,257.

W. E. NICKERSON.  
POLISHING APPARATUS.  
APPLICATION FILED NOV. 15, 1907.

Patented July 18, 1911.

4 SHEETS-SHEET 4.

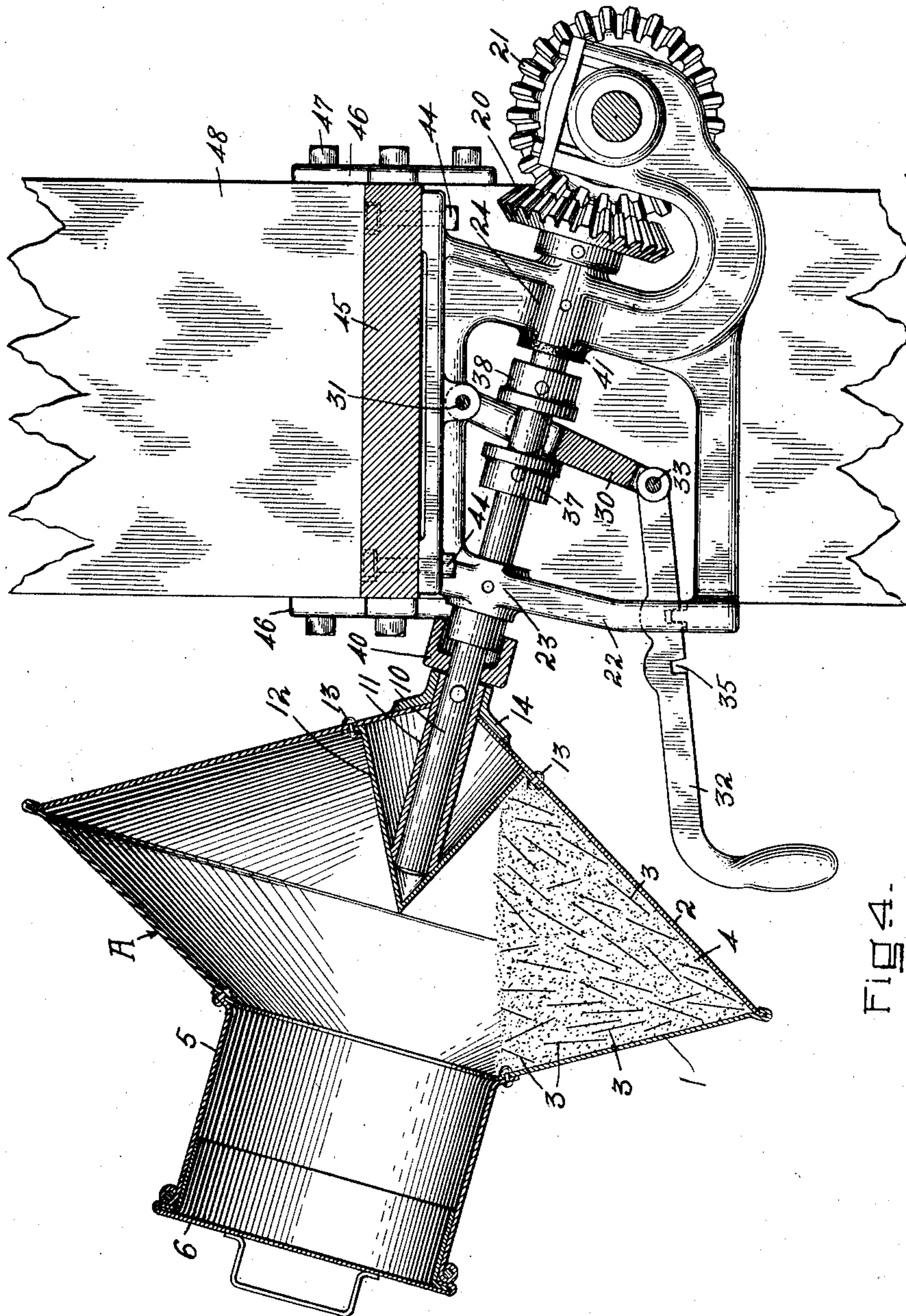


FIG 4.

WITNESSES  
*Charles H. Schenck*  
*Claude C. Neville*

INVENTOR  
*William E. Nickerson*  
By *Dumas, Park & Clarke*  
*Atty.*



# UNITED STATES PATENT OFFICE.

WILLIAM E. NICKERSON, OF CAMBRIDGE, MASSACHUSETTS.

## POLISHING APPARATUS.

998,257.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed November 15, 1907. Serial No. 402,234.

*To all whom it may concern:*

Be it known that I, WILLIAM E. NICKERSON, a citizen of the United States, residing in the city of Cambridge, county of Middlesex, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Polishing Apparatus, of which the following is a full, clear, and exact specification.

This invention relates to polishing apparatus and has for its object to provide an improved and efficient polishing apparatus and to increase the extent and velocity of movement of the polishing material and articles under treatment in a rumble.

While the apparatus herein disclosed is capable of being used for polishing many different articles which it is not necessary specifically to enumerate, it is especially adapted for use in polishing thin steel blanks, such as are designed for the production of wafer or paper razor blades.

One practicable embodiment of the apparatus is disclosed herein for the purpose of illustration but it is to be understood that changes may be made within the scope of the claims without departing from the spirit of the invention.

In the accompanying drawings forming a part of this specification Figure 1 is a side elevation of one form of apparatus constructed in accordance with my invention. Fig. 2 is a rear elevation thereof. Fig. 3 is an enlarged sectional detail view through one of the polishing elements or rumbles shown in operative connection with its driving mechanism. Fig. 4 is a view similar to Fig. 3 showing the polishing element or rumble out of operative connection with its driving mechanism.

The polishing element or rumble, A, (see Figs. 3 and 4) is shown in the form of an annular trough. A working space is formed between the walls 1 and 2. The space forming faces of the walls are shown disposed at an acute angle one relative to the other. This space for convenience may be said to be V-shaped in cross-section. Each of the walls 1 and 2 is shown substantially conical and of course the cross-sectional radius of either wall, is shown disposed on a line substantially parallel with the diametrically opposite cross-sectional radius of the other wall. The V-shaped trough has its apex at the periphery, and this apex is revoluble on a plane at an acute angle to the vertical, the element A being shown mounted for rota-

tion about an axis disposed at a slight angle to the horizontal. Owing to the relative positions of the walls and the angularity of the axis to the horizontal the working space forming face of the wall 1 is disposed at a more acute angle to the vertical at the lower portion than at the upper portion and the space forming face of the wall 2 is disposed at a less acute angle to the vertical at the lower portion than at the upper portion. As the rumble revolves the faces of the walls 1 and 2 change relative positions in respect to the vertical in passing from the low to the high portion of the orbit of revolution. The mass of polishing material 4 and articles under treatment 3 located in the rumble wall wedge and jam together to a certain extent in the lower portion. Upon rotation of the rumble this mass will be revolved through an orbital path until it has assumed a position above its first position. Gravity will cause the mass to be released and to rumble into position, first rapidly and then constrictedly until the whole mass is again wedged in the trough when it will be carried up again as before. The relative change of position of the walls in respect of the vertical during this revolution of the mass assists in the release of the side-gripping action of the walls upon the mass and the rapid release of the entire mass, so that the rumbling action and effect will be most efficient.

The rumble or element, A, is shown provided with an entrance throat 5 and a removable closure 6 having a flange fitting into the throat 5.

In the illustrated form of the invention the element or rumble A is so mounted and supported that it may be caused to rotate or permitted to remain idle or removed from its operating mechanism whenever it is desired to do this, particularly when it is desired to empty and refill the rumble. In the present illustration a plurality of rumbles are illustrated each of which is independently driven and can be stopped irrespective of the others. Each rumble is shown mounted upon driving shafts 10 which shafts are shown disposed at a slight angle to the horizontal. Each of the rumbles is shown provided with a socket 11 for receiving the free end of the shaft upon which it is mounted. A conical housing 12 is mounted inside of the rumble and in the present instance is shown secured to the inner face of the wall 12 by rivets 13. This



not only braces and supports the socket but also affords a convenient covering for the socket, so that material within the rumble will not become clogged about the socket.

5 The outer end of the socket is braced by means of a strengthening member, which member and the socket 11 are slotted at their lower ends (see 16 Fig. 1) for receiving a transverse pin 17 fastened to the shaft 10.

10 The pin 17 engaging the slot will cause the rumble to rotate with the shaft 10. Such connection will of course, permit the rumble to be readily removed from the shaft when it is desired to do this, as for filling or

15 emptying the same.

When it is desired to remove or replace one of the rumbles the shaft 10 will preferably be stopped in its rotation which will be effected by drawing it out of gear or out of

20 operative connection with its rotating mechanism. The rotating mechanism herein illustrated embodies a bevel gear 20 fast upon the shaft 10 meshing with a bevel gear 21 which will be rotated in some suitable

25 manner preferably in that hereinafter described. A frame or hanger 22 supports the shaft 10, it being provided with bearings 23 and 24 in which the shaft 10 may be longitudinally moved for drawing the gear

30 20 out of engagement with the gear 21. A lever 30, fulcrumed at 31 upon the hanger 22 is shown for the purpose of longitudinally moving the shaft. This lever is shown pivoted at 33 to a drawing rod 32 pro-

35 vided with a suitable handle. The drawing rod is provided with two notches 34 and 35 located in position to engage a detent 36 for holding the drawing rod and with it the connected parts in either of two positions,

40 one of which will bring the gears 20 and 21 into mesh and the other of which will bring them out of mesh and hold them in this position. The lever 30 is shown extending between a pair of collars 37 and 38 fast on the

45 shaft 10. A washer 41 may also be interposed between the collar 38 and the bearing 24. A collar 40 is shown fast upon the shaft 10 for engagement with the bearing 23 and taking the downward thrust of the

50 shaft during the rotation thereof. A handle 22 is shown supported by bolts 44 from a cross piece 45 of the machine frame, said cross piece 45 being secured by brackets 46 and bolts 47 to an upright 48.

55 As before stated in practice a plurality of the polishing elements or rumbles A will be incorporated in a single machine, and each rumble will be provided with independent controlling mechanism, so that it may be

60 stopped or started, filled or emptied irrespective of the other rumbles. The driving gear wheels 21 are shown mounted on shafts 50, 51 and 52 which are shown rotated in the

same direction by a driving train 53, 54, 55, 56 and 57. The gears 53, 55 and 57 of the 65 train are mounted upon the shafts 50, 51 and 52 respectively of the idlers 54 and 56 being mounted on stub-shafts 58 and 59 carried by the upright 48. A pair of fast and loose pulleys 60, 62, are mounted upon a 70 shaft carrying a pinion 61 which measures with the gear wheel 53 for actuating the driving train. The belt for these pulleys will be controlled by a belt shipper which is actuated by a longitudinally moving rod 70 75 having a handle 71 for its actuation and belt-engaging arms 72.

What is claimed is:

1. An apparatus of the character described, comprising a frame, a plurality of 80 inclined shafts mounted thereon, a tumbling element, the periphery whereof is V-shaped in cross-section, removably mounted on the upper end of each shaft, mechanism for rotating each of said shafts, means for inde- 85 pendently moving each of the said shafts into and out of engagement with its rotating mechanism, and means for actuating the same.

2. In a device of the character specified, 90 the combination with an annular revoluble rumble having the space-forming faces of its walls disposed at an acute angle one to the other and sufficiently close one to the other that the mass of polishing material 95 and articles under treatment will be engaged with a side-gripping action by the said walls, whereby the mass may be lifted during the revolution of the rumble, the apex being directed toward the periphery, 100 of means for supporting and revolving the rumble about an axis disposed at a slight angle to the horizontal, one of said wall faces being disposed at a greater angle to the vertical at the upper than at the lower 105 portion of the orbit of revolution, and the other wall face being disposed at a lesser angle to the vertical at the upper than at the lower portion of the orbit of revolution whereby, upon the mass of polishing mate- 110 rial and articles under treatment being forced into such space, the walls will apply a side-gripping action to the mass for lifting the same during the revolution of the rumble until the relative angular positions 115 of the walls change incident to such revolution and permit the mass to be released and rumble into position.

In testimony whereof, I have hereunto set my hand in the presence of two subscribing 120 witnesses.

WILLIAM E. NICKERSON.

Witnesses:

AIME CASTEELS,  
ADOLPH C. KAISER.