C. F. LINDEBURG.

BEVELING MACHINE.

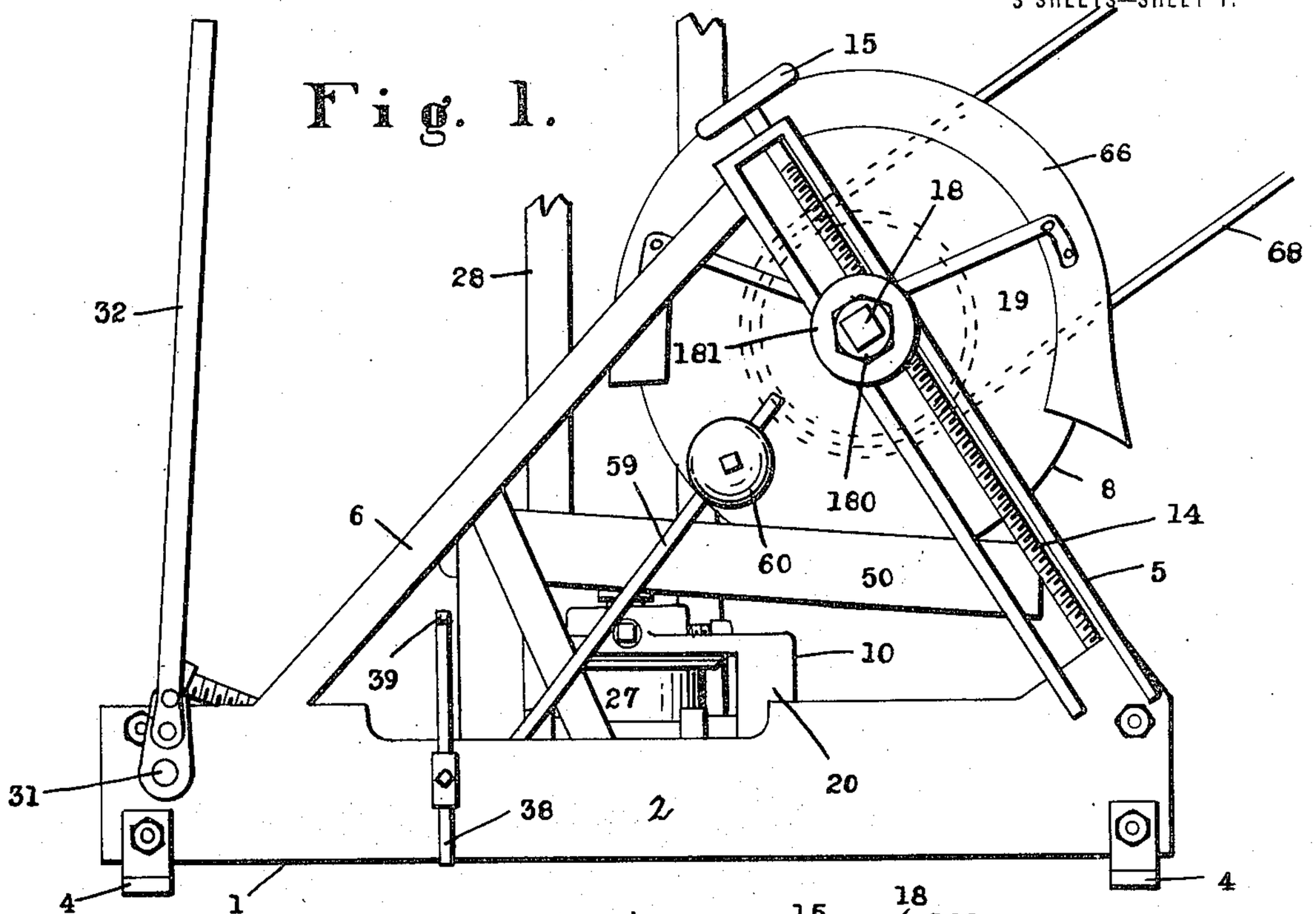
APPLICATION FILED MAY 1, 1915.

1,166,918.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

Fig. 1.



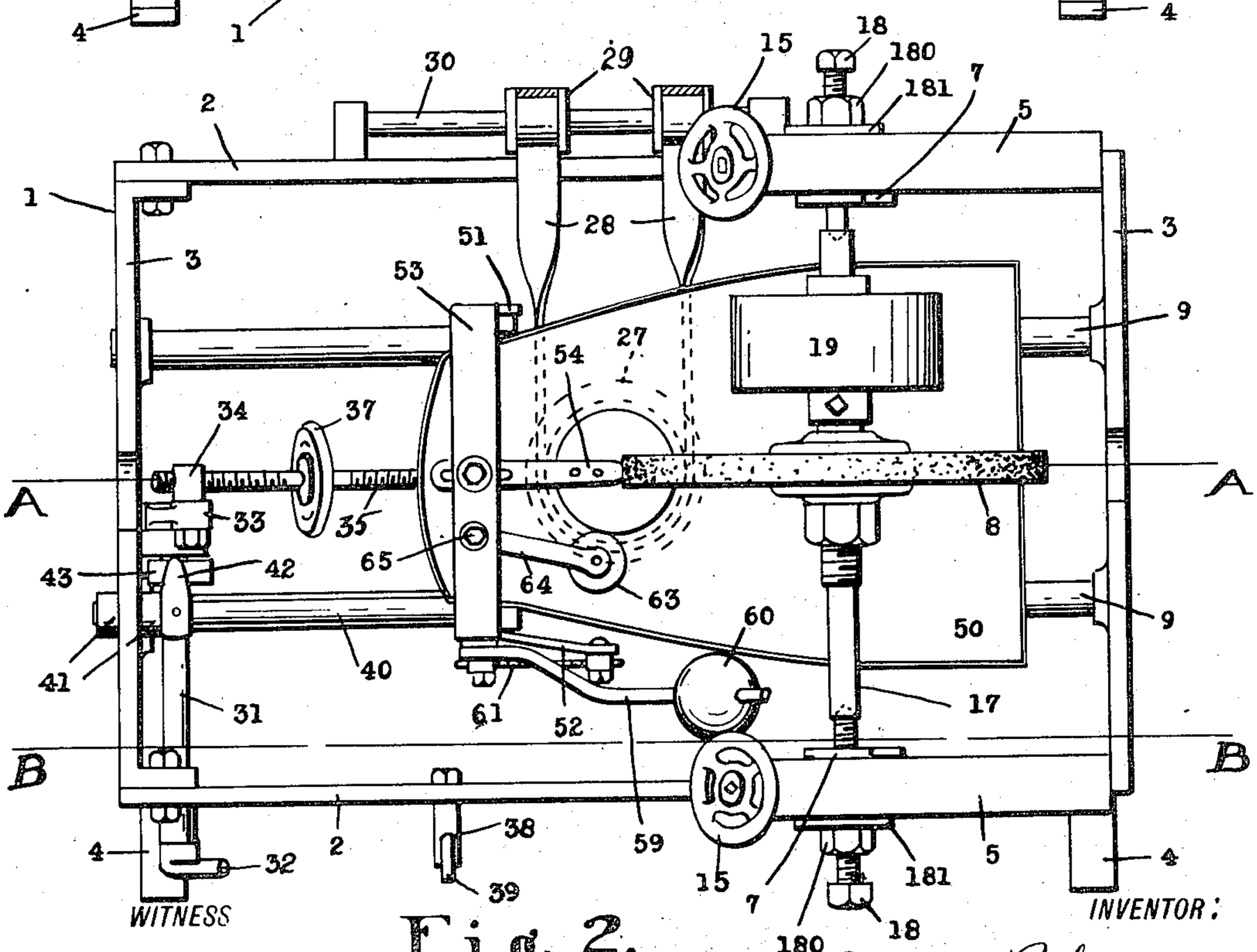


Fig. 2.

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3 SHEETS—SHEET 2

Fig. 3.

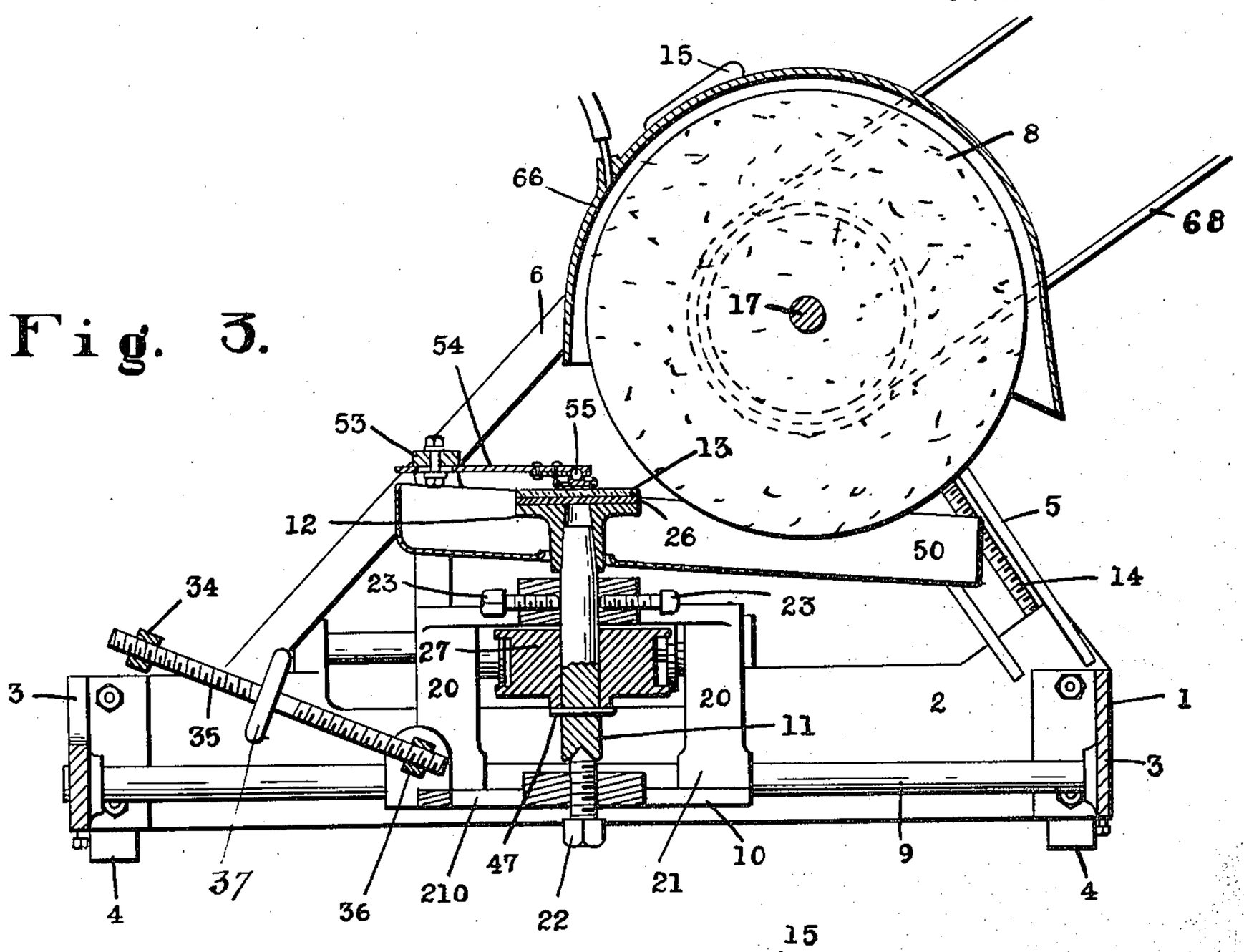
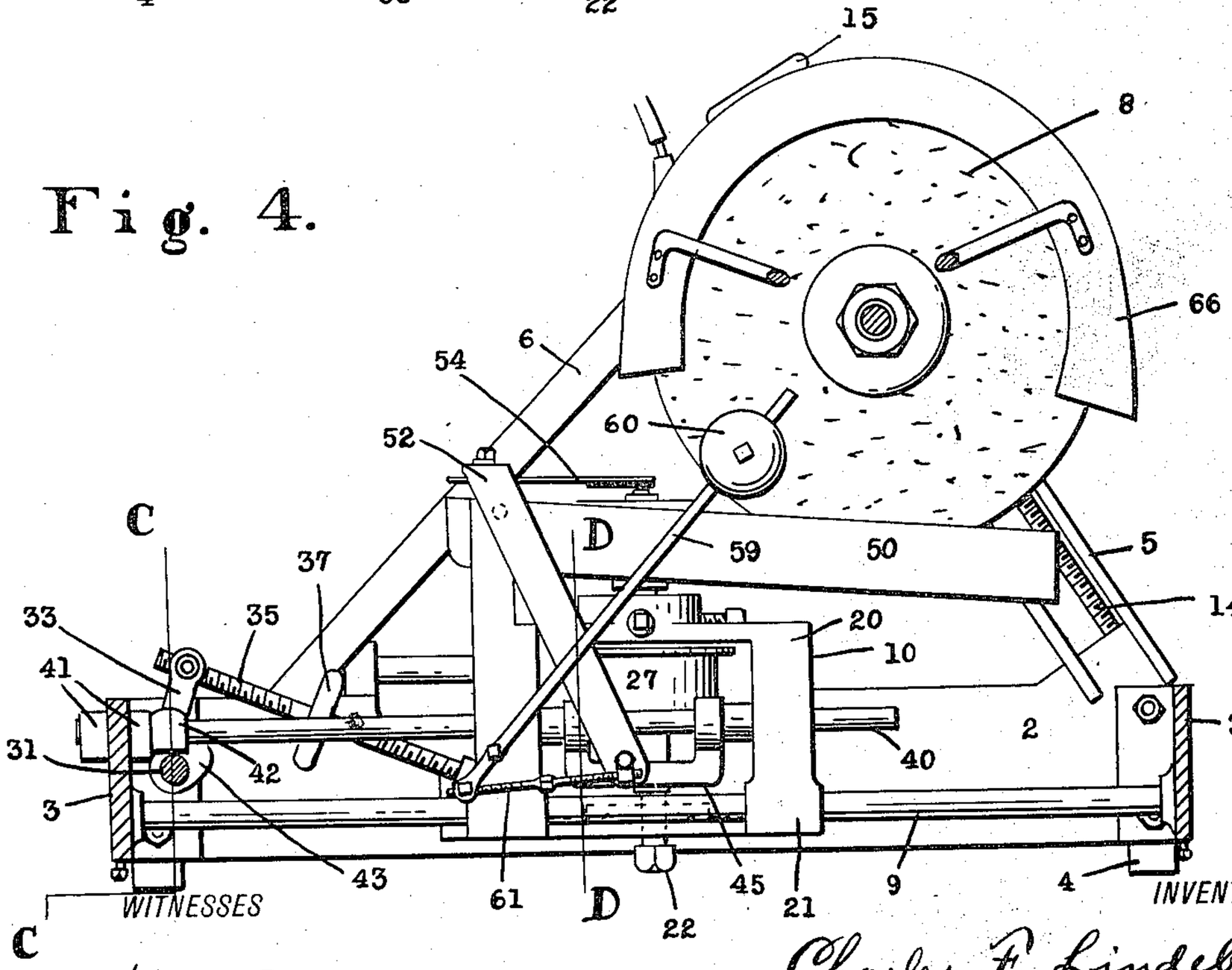


Fig. 4.



WITNESSES

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3 SHEETS—SHEET 3.

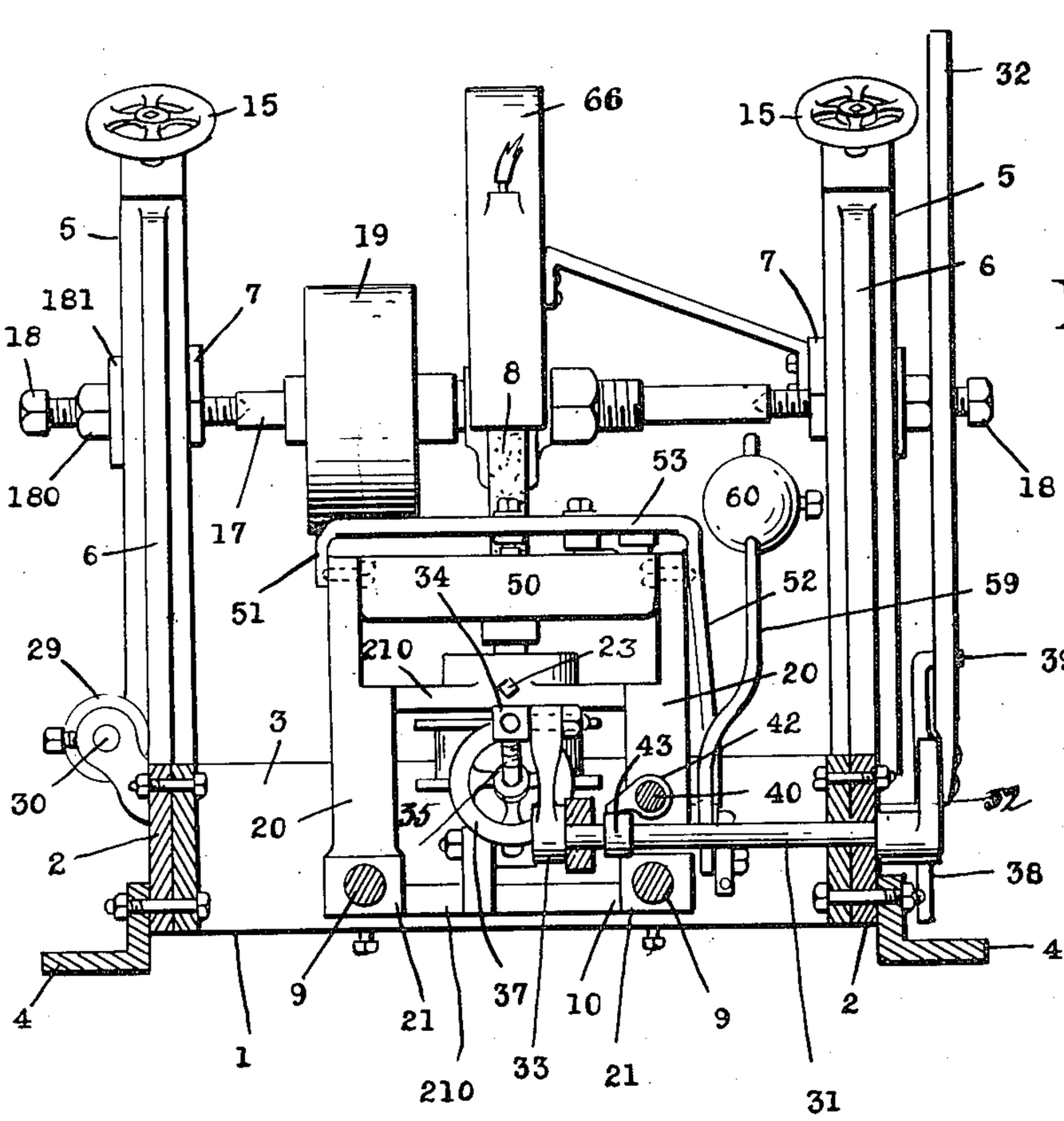


Fig. 5.

Fig. 6.

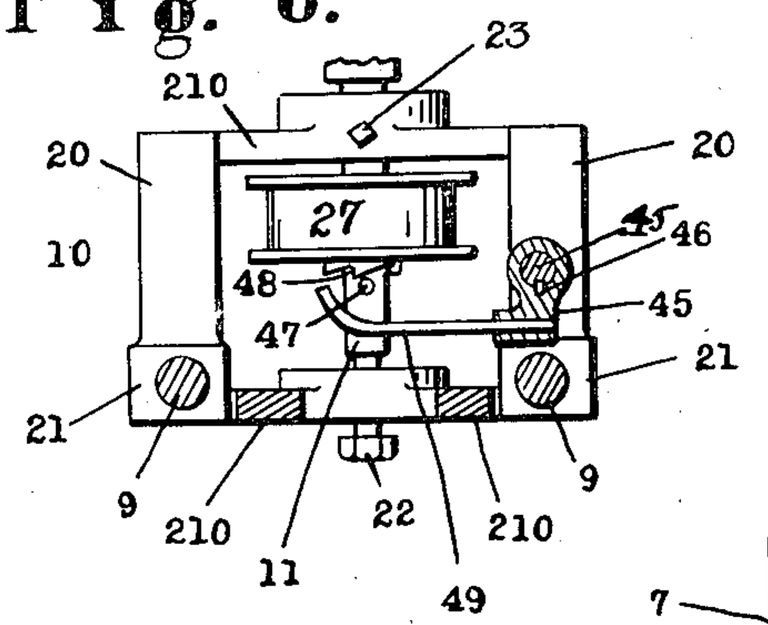
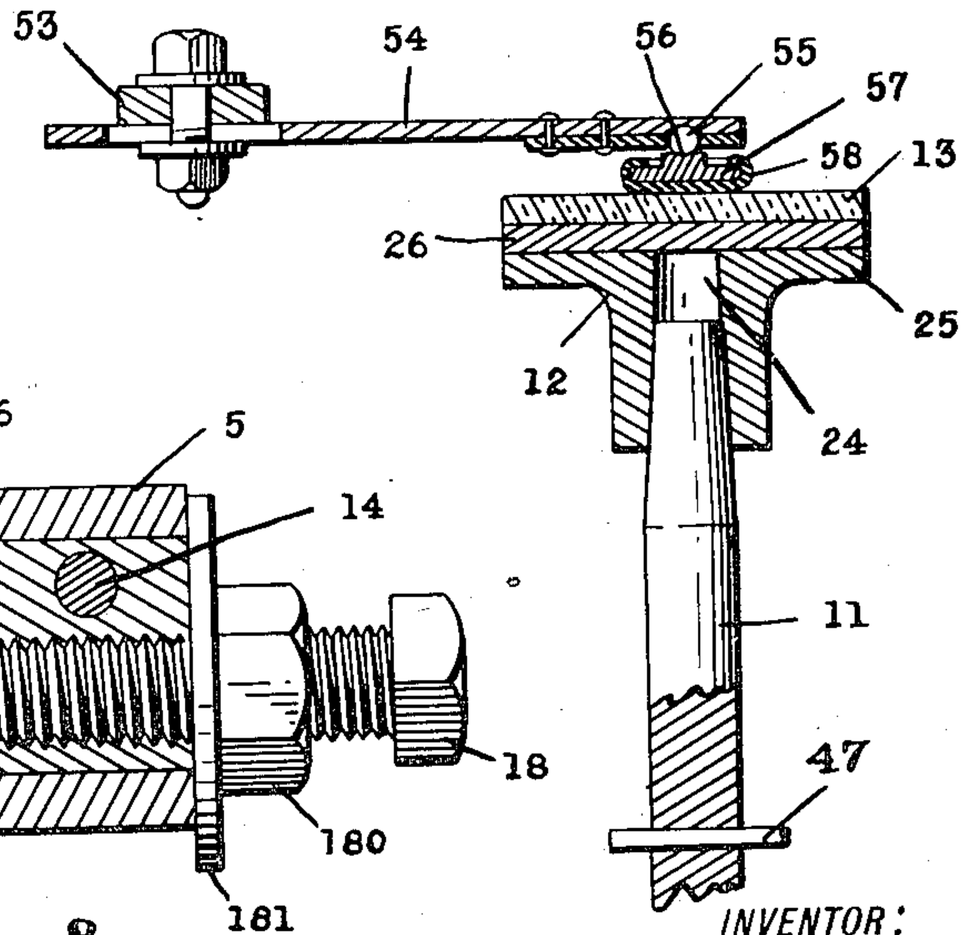


Fig. 7.



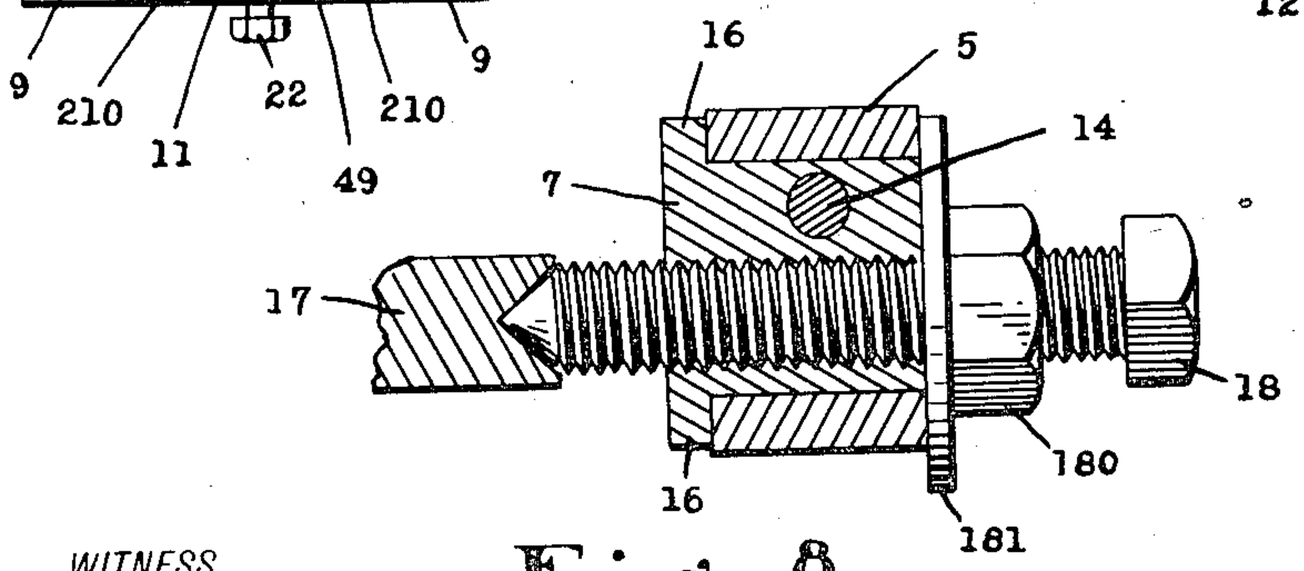


Fig. 8.

WITNESS

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UNITED STATES PATENT OFFICE.

CHARLES F. LINDEBURG, OF NEWARK, NEW JERSEY.

BEVELING-MACHINE.

1,166,918. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed May 1, 1915. Serial No. 25,133.

To all whom it may concern:

Be it known that I, CHARLES F. LINDEBURG, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in Beveling-Machines, of which the following is a specification.

This invention relates more particularly to machines for beveling the edges of round pieces of glass, such as are used for the fronts of speedometers, clocks, for mirrors, etc.

The objects of the invention are to provide an improved machine of this type; to lower the grinding wheel obliquely to accommodate a decrease in size of the wheel from use; to slide the carriage to and from the grinding stone expeditiously and readily; to limit the carriage in its movement toward the grinding stone by an adjustable stop for the handle for moving said carriage; to adjust the movement of the carriage to accommodate change in the size of the stone; to automatically stop rotation of the work-supporting table when the carriage is slid away from the grinding stone and to start rotation as the carriage is slid toward the grinding stone; to provide improved means for holding the work upon the table; to accommodate said holding means to various thicknesses of glass; to retain said holding means in either holding or idle position as desired; to throw said holding means readily from one position to the other; to easily and quickly center the glass on the work-table; to accurately maintain the work-table in proper axial position; to reduce the tendency of dirt and grit to work into the bearings; to secure simplicity of construction and operation, and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings, in which like numerals of reference indicate the same parts throughout the several views, Figure 1 is a side elevation of a grinding machine embodying my invention; Fig. 2 is a plan of the same; Fig. 3 is a central sectional view on line A—A of Fig. 2; Fig. 4 is a similar sectional view on line B—B of Fig. 2; Fig. 5 is a transverse sectional view on line C—C of Fig. 4; Fig. 6 is a transverse sectional view of the carriage on line D—D of Fig. 4; Fig. 7 is a longitudinal cross-sectional view showing the means for holding the glass upon the work-table, but on a larger scale, and Fig. 8 is a longitudinal section of one end of the grinding stone axle and its support.

In the specific embodiment of the invention illustrated in said drawings, the reference numeral 1 indicates the base in general, made up in the present instance of side pieces 2, 2 and end pieces 3, 3 bolted or otherwise held together to form a rectangular frame supported horizontally upon suitable feet or brackets 4. Preferably integral with the side pieces are standards 5, 5, each shown as sloping from one end of the side piece upwardly away therefrom and supported at its upper end by a brace 6 sloping from the opposite end of the side piece. Each of the standards provides a longitudinal slideway in which is mounted an adjustable block 7 for supporting one end of the shaft of a grinding stone 8. It will be understood that the grinding stone is mounted to rotate in a plane substantially parallel to the planes of the side pieces and preferably midway therebetween.

Extending longitudinally of the side pieces 2, 2, and supported by the end pieces 3, 3, are a pair of guide rods or ways 9, 9 slidably carrying a carriage 10 below the grinding stone. A vertical spindle 11 is rotatably mounted in said carriage, substantially in the plane of the stone, and is adapted to receive at its upper end, and rotate, a removable work-table 12 upon which may be positioned a round piece of glass 13 to be ground. The carriage is in such proper relation to the stone as that the edge of the glass is engaged by the adjacent portion of the periphery of the grinding stone in such manner as to grind a bevel thereon at the desired angle. Obviously any desired bevel can be secured by adjusting the grinding stone up or down in connection with movement of the carriage toward or away from the stone, as will be understood by those skilled in the art.

In order to raise or lower the grinding stone, the blocks 7, 7 are slid up or down accordingly in the slideways 5, 5, and for raising or lowering said blocks, screws 14 extend longitudinally of the slideways, each transversely through its block in threaded engagement therewith and held in the slideway against longitudinal movement, so that turning it will cause the desired movement of the block. A handwheel 15 is secured to the end of each screw 14 above the end of the stand-

ard, whereby the screw may be turned, and it will be noted that this handle is always at the same elevation above the standard, which facilitates the use thereof and adds to the durability and appearance of the whole machine. The blocks 7, see Fig. 8, are made substantially as wide as the slideway and project at their ends toward the grinding stone inwardly beyond the slideway with overlapping lips 16, 16 adapted to engage the side edges of the slideway to prevent outward displacement of said blocks. Threaded through each of the blocks, in axial alinement with the axle 17 of the grinding stone, is a bolt 18 having a lock nut 180 at the outer side of the slideway adapted to engage a washer 181 and prevent inward displacement of the block, as well as lock the bolt and block in place, and the inner or facing ends of the bolts 18, 18 are pointed or made conical and extend into the conically recessed ends of the axle 17 for supporting the same with as little friction as possible.

It may here be noted that the diameter of the axle is preferably greater than the diameter of the bolts 18, 18, so that the axle may be sufficiently recessed to entirely cover the conical portion of the bolt. The effect of this construction is to more positively exclude dirt and grit from the bearing, since the dirt and water from the grinding stone which creeps to the end of the axle because of its rotary motion, will pass off of the axle onto the stationary bolt without entering the bearing. Mounted on the axle 17 is also a pulley 19 by which rotary motion may be imparted to the grinding stone by means of a belt 68, and it will be noted that this belt extends away from the inclined slideway provided by the standards 5, 5 substantially perpendicular thereto, and thus as the grinding stone has to be moved along the slideway the belt 68 is tightened or slackened so little that it can be disregarded. I thus avoid having to lengthen or shorten the belt frequently.

The carriage 10 above referred to, and which slides upon the guide rods 9, 9 to carry the work-table 12 toward and away from the grinding stone, comprises corner posts 20 which at their lower enlarged ends 21 are bored to receive the guide rods 9, 9. Furthermore, the upper and lower ends of said corner posts 20 are connected by diagonal cross-pieces 210, 210 respectively, which provide bearings disposed at the center of the top and bottom of the carriage for the work-table spindle 11. This spindle, see Fig. 3 more especially, is mounted at its lower end upon a pivot screw 22 vertically projecting upward from the center of the lower cross-pieces 210, 210 and being adjustable therein, as shown. For an upper bearing, the spindle extends through the center of the upper cross-pieces 210, 210, and preferably a plurality of screws 23 extend horizontally inward through the walls of this bearing to engage the spindle at their inner ends; this enables the bearing to be kept central, by adjusting the screws 23, and for purposes of illustration I have shown four such screws, although obviously more or less could be used if desired.

The top of the spindle 11 is suitably adapted to receive the work-table 12, and to illustrate this I have shown the upper end of the spindle tapered to enter a correspondingly tapered socket 24 of the table base 25. Upon the top of this table base is a facing 26 of any suitable kind on which the glass 13 to be ground can be laid, and obviously I do not wish to restrict myself to this facing or any particular way of connecting the table to its spindle.

For rotating the work-table, its spindle 11 is provided between its upper and lower bearings with a pulley 27 to receive a belt 28, (Figs. 1 and 2) which can be led thereto over idlers 29, 29 loose on a counter shaft 30 arranged upon one of the side pieces of the base of the machine, as shown in Figs. 2 and 5 more clearly. These idlers 29 slide upon the counter shaft 30, it will be understood, and the belt 28 preferably extends downward substantially vertical and across the machine substantially perpendicular to the path of the carriage 10 when the carriage is retracted, so that said belt tightens when the carriage approaches the grinding stone for grinding. Clutch means are further provided for causing this belt to rotate the spindle or not, as desired, and preferably said means are arranged to act automatically with the sliding of the carriage, that is, when the carriage is in position to engage the work with the sliding wheel, the clutch is thrown in so that the spindle and work-table will be caused to rotate, and when the carriage is moved away from the grindstone, disengaging the work therefrom, the clutch is thrown out so that the work-table stands still.

For operating the carriage to slide it so as to engage the work with or disengage it from the grinding wheel, a transverse shaft 31 is provided adjacent the front of the machine, preferably parallel to the end-piece 3 and projecting through one of the side pieces 2, see Fig. 2. Upon this projecting end of the transverse shaft is fixedly mounted a handle 32 whereby the shaft may be rocked, and substantially midway between the side pieces 2, 2 is an arm 33 fast upon the shaft and extending upwardly therefrom. A stud 34 substantially parallel to the shaft 31 is rotatably mounted in the free end of the arm 33 and receives the end of an adjusting screw 35, the other end of which is received by a similar stud 36 mounted upon the carriage 10. By an in-

spection of the drawings, it will be seen that the screw is threaded in both of said studs, one of the threads being left-hand and the other right-hand, the screw extending transversely with respect to each of the studs and having a hand-wheel 37 for manipulating the same.

In operation, as the handle 32 is swung, a corresponding movement of the lever 33 is caused, thereby sliding the carriage. By virtue of the pivotal mounting of the studs 34, 36 angular movement of the adjusting screw with respect to both the carriage and the lever 33 is permitted. Obviously if the handle is swung toward the grinding stone, the carriage is also moved toward the stone so as to cause the work to be engaged and ground thereby. Preferably a stop is provided for limiting the swing of the handle, the same being here shown as a rod 38 supported vertically and adjustably by the side piece 2 and having a bent-over upper end 39 projecting in the path of movement of the handle. Obviously this stop may be adjusted as required by material reduction in the size of the grinding stone or when it is desired to set the machine for grinding a piece of glass of greater or less diameter. For ordinary adjustment requiring no very great change in the position of the carriage, the screw 35 is turned the necessary amount.

It will be noted that when the carriage is retracted the arm 33 is substantially upright and at right angles to the connecting screw 35, and when the carriage is slid to bring the work up against the grinding stone, said arm 33 is substantially in alinement with said connecting screw 35. The result of this is that as the carriage is slid toward the grinding stone it moves slower as it approaches, so that the work is brought gently and gradually against the stone.

As stated above, sliding the carriage toward and away from the grinding wheel throws the clutch in or out accordingly. For this purpose a rock shaft 40 is provided extending parallel to the guide rods or ways 9, 9 and preferably above one of the same in a vertical plane therewith. Said rock shaft is rotatably journaled in the front end piece 3 and carriage 10, the shaft being prevented from longitudinal movement with respect to the frame by collars 41, 41 fast on the shaft at opposite sides of the front end piece, the journal in said carriage being slidable with respect to said shaft and supporting the same. In the drawings, the rock shaft is shown crossing above the transverse shaft 31 and has secured upon itself substantially over said transverse shaft a cam lever 42 adapted to be swung by a cam 43 upon the transverse shaft, see Figs. 2 and 5. The other end of the rock shaft rotatably passes through two corner posts 20, 20 of the carriage 10 and carries upon itself between said posts a cradle 45. The cradle is longitudinally slidable upon said rock shaft, but cradle is slidable upon said rock shaft longitudinally thereof, and is nonrotatable with respect thereto so that rocking the shaft will tilt the cradle. In order to so mount the cradle upon the shaft, the cradle is long enough to abut at its ends against the posts 20, 20 and carry keys or splines 46 riding in suitable key slots in the rock shaft. The cradle accordingly will move backward and forward with the carriage and will be rocked with the rock shaft. Preferably the vertical spindle 11 is provided with a transverse pin 47 projecting diametrically therefrom below the pulley 27 and the under side of said pulley is notched as at 48 to normally engage the projecting ends of said pin and rotate the spindle therewith. The pulley is, however, slidable upon the spindle, and suitable fingers 49 project laterally from the cradle 45 under the pulley, whereby tilting the cradle will swing the fingers, raise the pulley and release the transverse pin 47 from the notches 48 so that the spindle may stop its rotation. Obviously, since the rock shaft is operated by sliding the carriage, rotation of the spindle and work table may be stopped by sliding the carriage away from the grinding stone. As the carriage is again slid toward the grinding stone, the fingers swing down and allow the pulley to lower so its notches 48 are engaged by the pin 47 and the spindle again rotated.

The front pair of corner posts 20 of the carriage extend upwardly beyond the rest of the carriage and carry between themselves a pan or trough 50 which lies above the top bearing of the spindle and slopes rearwardly beneath the grinding wheel for carrying off water used for cooling the glass while being ground. I have shown said water supplied by a tube projecting through the guard 66 for the grinding stone, but obviously other means could be employed if desired. Said extensions of the front pair of corner posts 20 also have pivoted thereto the downwardly bent ends 51, 52 of a cross bar 53 which extends above the pan or trough 50 from one post to the other, and one of said bent ends as 52 is continued downward past its point of pivoting to swing in an upright plane, as shown in Figs. 4 and 5. The cross bar 53 has substantially midway between its downwardly bent ends 51, 52 a lateral resilient arm 54 projecting toward the grinding stone and overlying at its free end the center of the work-table. Upon the under side of said arm at its free end or end overlying the table, is a ball 55 free to rotate and exposed so as to engage in a socket 56 provided in a suitable shoe 57 laid upon the glass to be ground. Preferably the shoe is covered upon its under side with

some soft material 58, such as rubber, which will not slip readily when pressed upon the glass, and it will be understood that as the table and the glass rotate, the rubber-covered shoe 57 also rotates, the ball 55 riding in the socket with comparatively little friction.

Preferably, in operation, the arm 54 is pressed downward so as to hold the glass disk firmly against the table, and to do this the cross bar 53 is swung upon its pivots. For obtaining a considerable leverage and for maintaining the arm pressed down during operation, a lever 59 is pivoted upon one post 20 adjacent the long end 52 of the cross bar 53 and carries at its upper end an adjustable weight 60, see Fig. 4. At its other end upon the opposite side of the fulcrum, the lever is pivotally connected by an adjusting screw 61 to the lower end of the long end 53 of the cross bar, which will accordingly be rocked by swinging the lever 59. As shown in the drawings, the lever is swung past a vertical position toward the grinding wheel so that the weight retains the lever swung by gravity and thereby provides the desired pressure upon the glass being ground. Obviously glass of various thicknesses may be accommodated by adjustment of the screw 61 connecting the cross bar and lever, and preferably the arm 54 is also longitudinally adjustable with respect to the cross bar 53. Furthermore, as is usual in machines of this type, the table is faced or covered with a pad upon which the glass will not readily slip, and by preference I use a pad of cork 26 for this purpose.

In order to readily center the glass upon the table so as to grind the entire periphery, I mount a wheel, preferably horizontally, adjacent the work-table and adapted to be moved toward or away from the table and engage the edge of the glass. In the drawings such a wheel 63 is mounted rotatably upon an arm 64 pivoted upon the cross bar 53 by means of a bolt 65 which may be clamped more or less to obtain proper resistance against swinging of the arm 64. In operation, the glass is clamped upon the table as nearly in the center as can be done readily and the wheel 63 then brought into contact with the peripheral edge of the glass. As the carriage is moved toward the grinding stone, the glass is revolved before it engages the stone and by engaging the wheel 63 will be pushed to central position upon the table. Continued sliding of the carriage brings the glass into contact with the grinding stone and the edge is accordingly beveled, after which the carriage is withdrawn, the glass removed or replaced by a new blank and the operation repeated, it being understood that a number of pieces of glass may be ground a minute.

Obviously detail modifications may be made in manufacturing my improved beveling machine without departing from the spirit and scope of the invention, and I do not wish to be understood as limiting myself except as required by the following claims when construed in the light of the prior art.

Having thus described the invention, what I claim is:—

1. In a machine of the character described, the combination of a supporting frame providing slideways, bearings in said slideways, means for adjusting said bearings, pivot screws having pointed ends extending through said bearings toward each other, a shaft having recessed ends to receive said pointed ends of the pivot screws, a grinding stone mounted on said shaft, and means for driving said shaft, whereby the bearings at the ends of the shaft are protected from water following said shaft outward from the grinding stone.

2. In a machine of the character described, the combination with a grinding stone, of a rotatable work-table, a carriage for said table adapted to move toward and away from said grinding stone, a rock shaft having an arm, means connecting said arm to said carriage, and means for rocking said shaft to move the work-table toward and away from the grinding stone.

3. In a machine of the character described, the combination with a grinding stone, of a rotatable work-table, a carriage for said table adapted to move toward and away from said grinding stone, a rock shaft having an arm, means connecting said arm to said carriage, and means for rocking said shaft to move the work-table toward and away from the grinding stone, said arm adapted to lie substantially in alinement with the connecting means when the work-table is nearest the grinding stone and at an angle thereto when the work-table is away from the grinding stone, whereby the work is brought against the grinding stone slowly.

4. In a machine of the character described, the combination with a grinding stone, of a rotatable work-table, a carriage for said table adapted to slide toward and away from said grinding stone, a rock shaft transverse to the path of movement of said carriage and having an arm, an adjusting screw connecting said arm to said carriage, and a hand lever for rocking said shaft to move the work-table toward and away from the grinding stone.

5. In a machine of the character described, the combination with a grinding stone, of a rotatable work-table, a carriage for said table adapted to slide toward and away from said grinding stone, a rock shaft transverse to the path of movement of said carriage and having an arm, an adjusting

screw connecting said arm to said carriage, a hand lever for rocking said shaft to move the work-table toward and away from the grinding stone, and an adjustable stop for said hand lever.

6. In a machine of the character described, the combination with a grinding stone, of a slidable carriage and having a tapered upper end, an upright spindle rotatably mounted in said carriage, means for rotating said spindle, a work-table having a tapered socket adapted to be removably seated on and to be frictionally carried by said tapered upper end of the spindle above the carriage, and means for giving said carriage a predetermined movement toward and away from the grinding stone.

7. In a machine of the character described, the combination with a grinding stone, of a slidable carriage, an adjustable pivot screw in the bottom of said carriage, a spindle rotatably seated on said screw, means for rotating said spindle, a work-table removably secured to the top of said spindle above the carriage, and means for giving the carriage a predetermined movement toward and away from the grinding stone.

8. In a machine of the character described, the combination with a grinding stone, of a slidable carriage, a bottom bearing in said carriage, a top bearing having a plurality of radially disposed screws, a spindle mounted in said bearings, means for rotating said spindle, a work-table removably secured to the top of said spindle above the carriage, and means for giving the carriage a predetermined movement toward and away from the grinding stone.

9. In a machine of the character described, the combination with a supporting frame providing diverging slideways, of a grinding stone mounted in one of said slideways, a carriage mounted on the other slideway, a rotatable work-table mounted in said carriage adapted to present work to the grinding stone, belt pulleys at the side of the work-table slideway and slidable parallel thereto, a belt extending around said idle pulleys and table pulley substantially perpendicular to the table slideway when the table is withdrawn from the grinding stone, and means for sliding said table.

10. In a machine of the character described, the combination with a grinding stone, of a carriage adjustable toward and away from said grinding stone, a work-table mounted in said carriage, means for rotating said work-table, means for sliding said carriage, and means operated by the sliding of said carriage to start and stop rotation of said work-table.

11. In a machine of the character described, the combination with a grinding stone, of a carriage adjustable toward and away from said grinding stone, a work-table mounted in said carriage, means for rotating said work-table, a clutch for starting and stopping rotation of the work-table, and means for simultaneously sliding said carriage and operating said clutch.

12. In a machine of the character described, the combination with a grinding stone, of a carriage adjustable toward and away from said grinding stone, a work-table mounted in said carriage, means for rotating said work-table, a clutch for starting and stopping rotation of the work-table, a rock shaft having a cam to operate said clutch and an arm, and means connecting said arm to said carriage.

13. In a machine of the character described, the combination with a grinding stone, of a carriage adjustable toward and away from said grinding stone, a work-table mounted in said carriage upon a spindle, a pulley on said spindle having clutch means adapted to engage coöperating clutch means on the spindle, means for sliding said pulley to disengage said clutch members, and means for sliding said carriage, said carriage-sliding means adapted to operate the clutch-sliding means to throw out the clutch when the carriage is slid away from the grinding stone and throw it in when the carriage is slid toward the grinding stone.

14. In a machine of the character described, the combination with a work-table adapted to receive a sheet of glass, means for rotating said work-table, a central shoe adapted to bear against the glass, an arm for pressing said shoe against the glass, and means for swinging said arm into either idle or holding position and retaining it there.

15. In a machine of the character described, the combination with a table adapted to receive a piece of glass, means for rotating said table, a shoe adapted to rest upon said glass, an arm for pressing said shoe against the glass, a pivoted bar carrying said arm, means for rocking said bar to throw said arm into either idle or holding position and retain it there, and means for adjusting the position of the arm to various thicknesses of glass.

16. In a machine of the character described, the combination with a table adapted to receive a sheet of glass, means for rotating said table, a shoe adapted to rest upon the glass, an arm for pressing said shoe against the glass, a pivoted bar carrying said arm and having one end bent at an angle to the arm-carrying portion, a control lever adapted to be thrown to one side or the other of upright position to throw the holding arm into idle or holding position, means connecting said control lever and bent end of the pivoted bar, and means for retaining said control lever releasably in its extreme position.

17. In a machine of the character described, the combination with a work-table adapted to receive a sheet of glass, means for rotating said work-table, a shoe adapted to bear against the glass at the center of the work-table, means for pressing said shoe against the glass, an idle wheel adapted to engage the edge of the piece of glass, and means for supporting said idle wheel so that it will swing in substantially the plane of the piece of glass toward and away from the same.

18. In a machine of the character described, the combination with a grinding stone, of a slidable carriage, an adjustable member in the bottom of said carriage having a pointed upper end, a spindle having a conical socket at its lower end seated on the pointed upper end of said member, means for rotating said spindle above the carriage, and means for giving the carriage a predetermined movement toward and away from the grinding stone.

19. In a machine of the character described, the combination with a grinding stone, of a carriage, a bottom bearing in said carriage, a top bearing having a plurality of radially disposed screws, a spindle mounted in said bearings, means for rotating said spindle, and a work-table secured to the top of said spindle above the carriage.

20. In a machine of the character described, the combination with a work-table adapted to receive a sheet of glass, means for rotating said work-table, an arm for pressing said glass flatwise on to the table, a ball rotatably mounted in said arm and adapted to reduce the frictional engagement between said arm and glass, and means for swinging said arm to either idle or holding position and retaining it there.

CHARLES F. LINDEBURG.