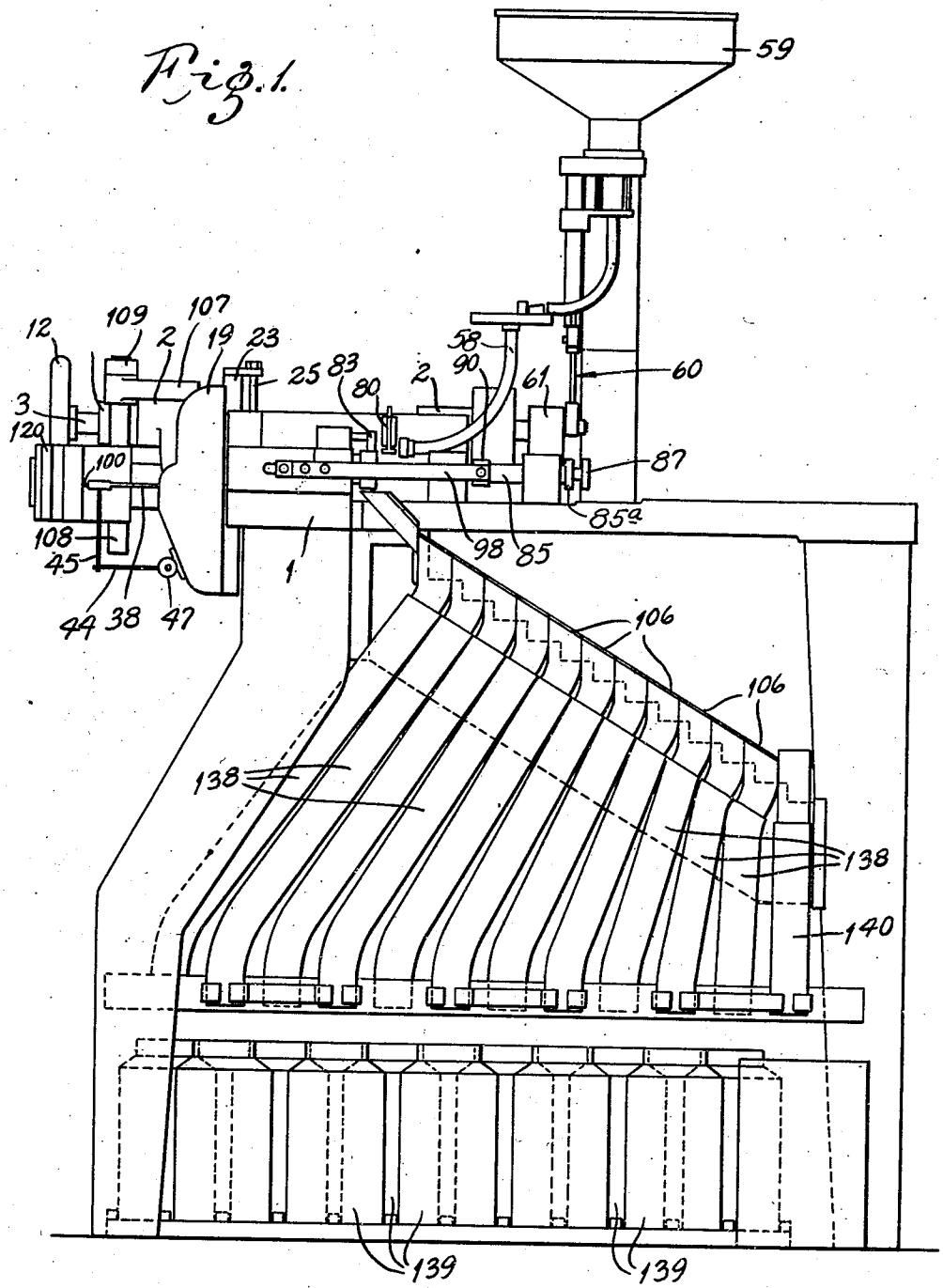
Oct. 6, 1931. O. SCHLAUPITZ 1,826,527

GAUGING MACHINE

Filed Aug. 27, 1928 8 Sheets-Sheet 1

Fig. 1.



INVENTOR:
Oswald Schlaupitz,
by Carr & Carr & Gravely
HIS ATTORNEYS

Oct. 6, 1931. O. SCHLAUPITZ 1,826,527

GAUGING MACHINE

Filed Aug. 27, 1928 8 Sheets-Sheet 2

Fig. 2.

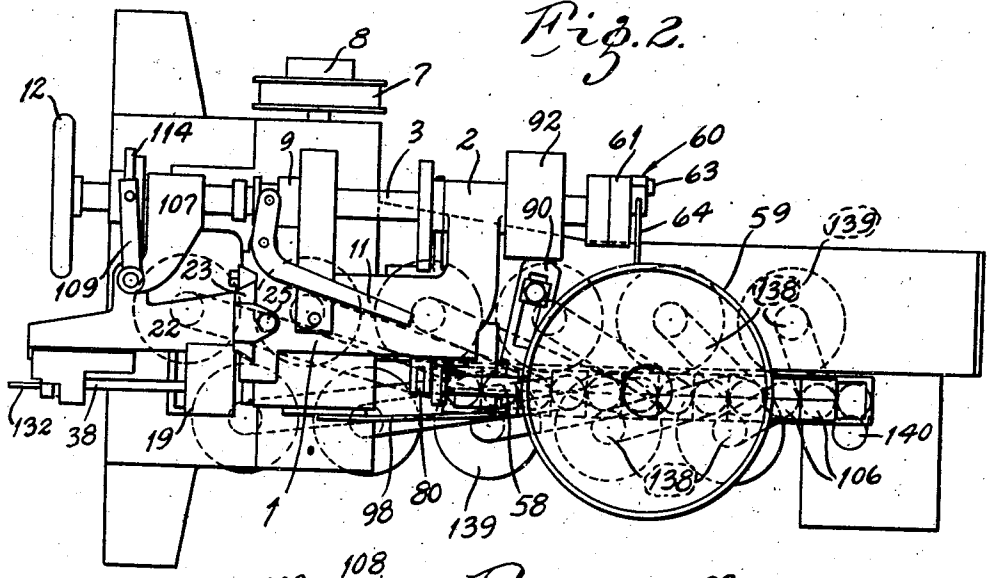


Fig. 9.

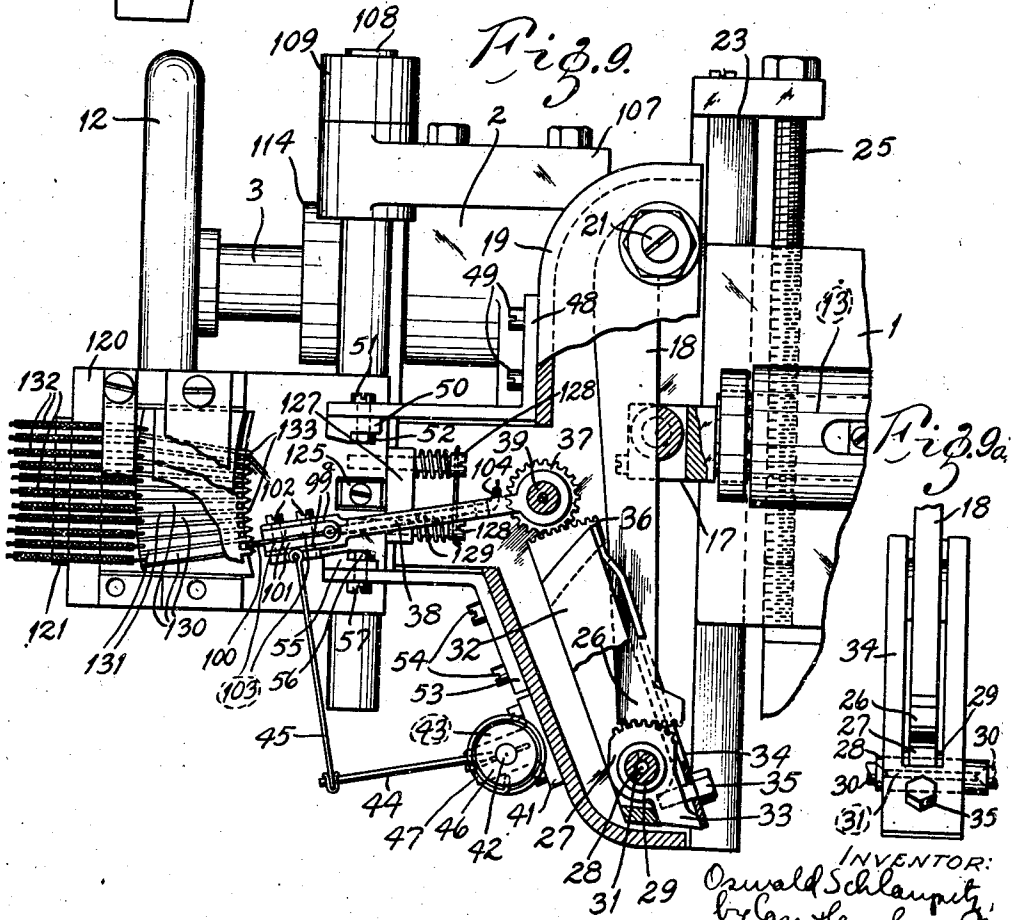


Fig. 9a.

INVENTOR:
Oswald Schlaupitz,
by Cameron & Kenyon,
HIS ATTORNEYS.

Oct. 6, 1931. O. SCHLAUPITZ 1,826,527

GAUGING MACHINE

Filed Aug. 27, 1928 8 Sheets-Sheet 3

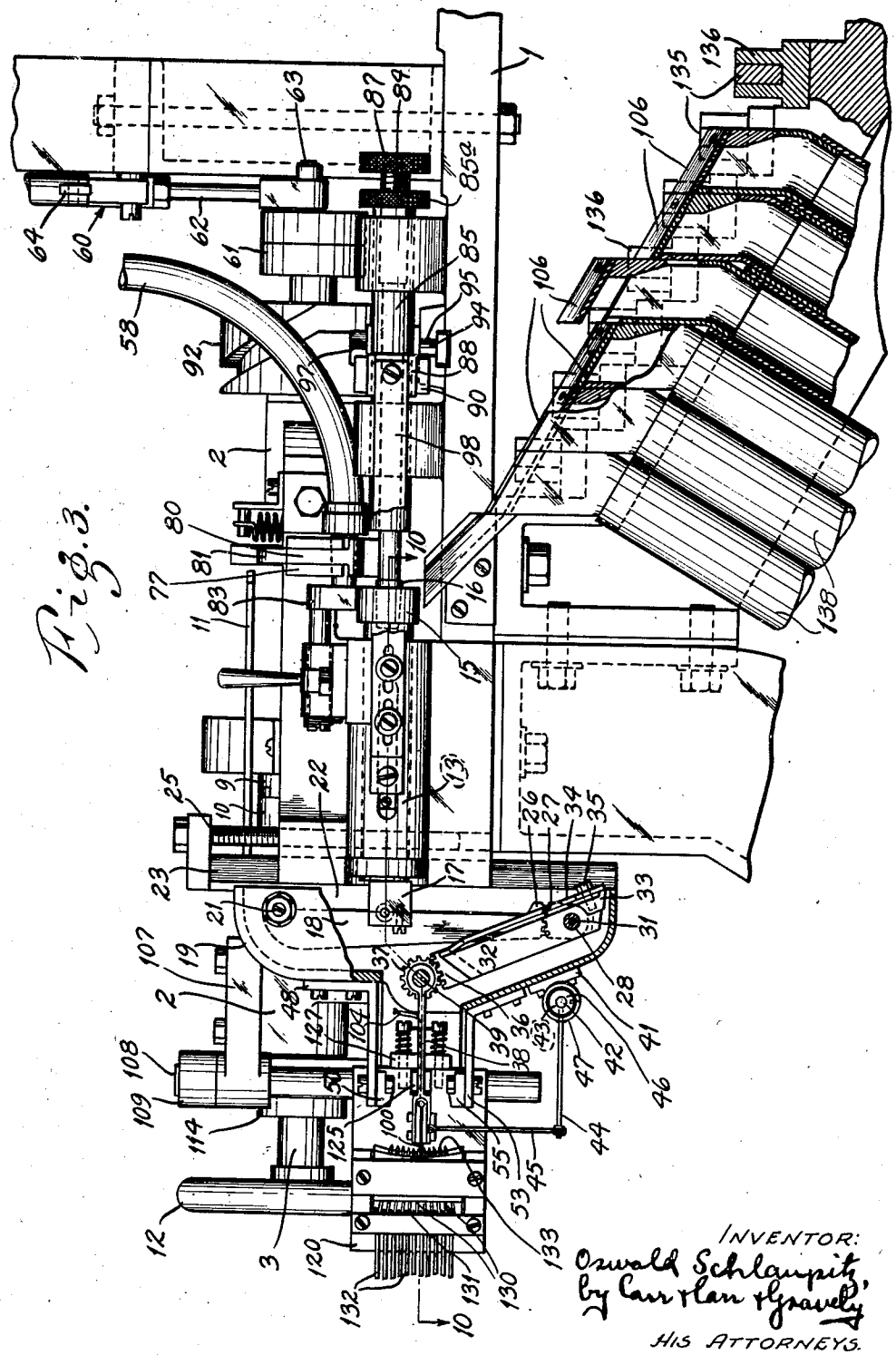


Fig. 3.

INVENTOR:
Oswald Schlaupitz,
by Carr Chan & Gravely,
HIS ATTORNEYS.

Oct. 6, 1931. O. SCHLAUPITZ 1,826,527

GAUGING MACHINE

Filed Aug. 27, 1928 8 Sheets-Sheet 4

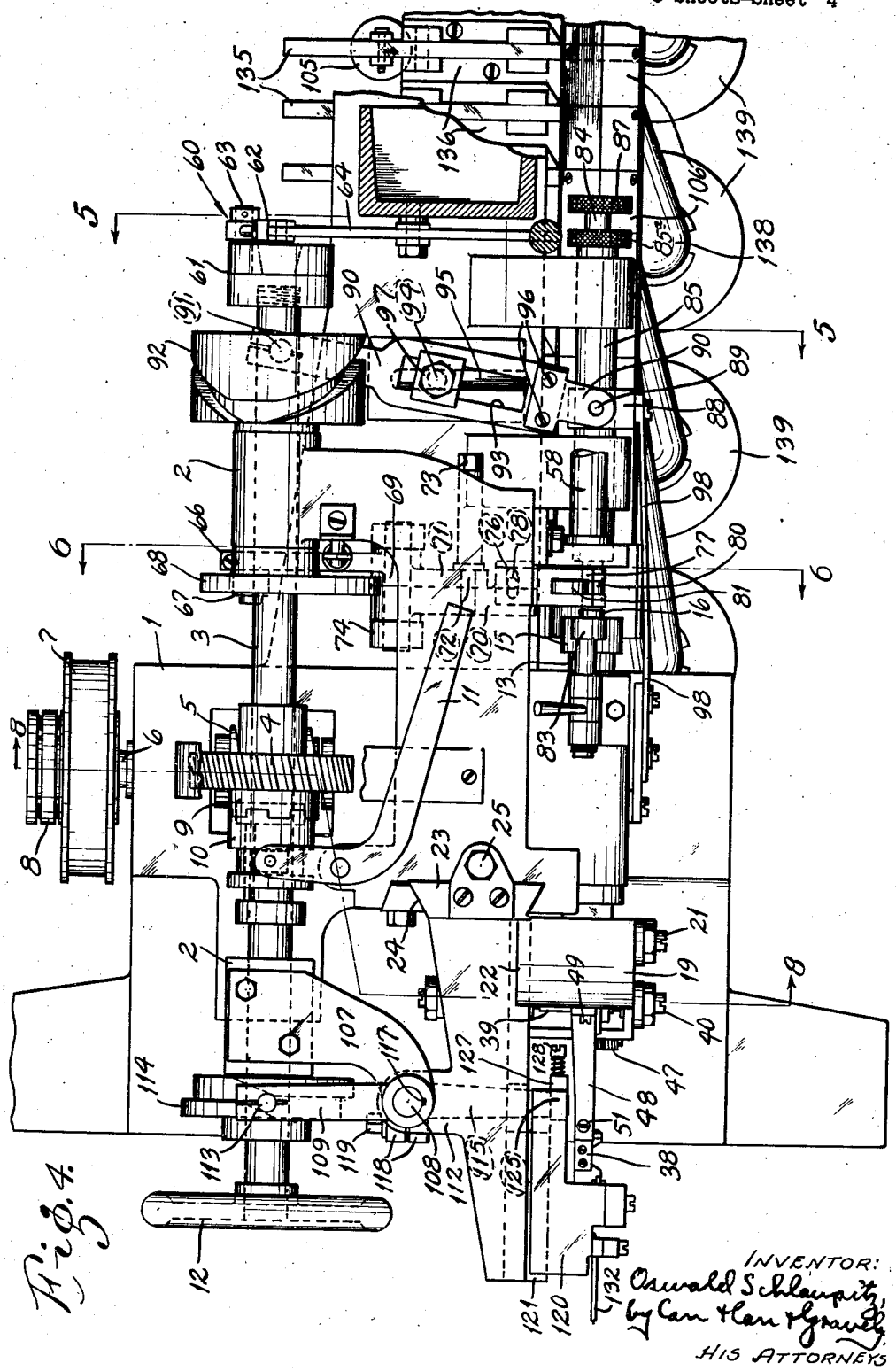


Fig. 4.

INVENTOR:
Oswald Schlaupitz,
by Carr Carr & Gravely
HIS ATTORNEYS

Oct. 6, 1931. O. SCHLAUPITZ 1,826,527

GAUGING MACHINE

Filed Aug. 27, 1928 8 Sheets-Sheet 5

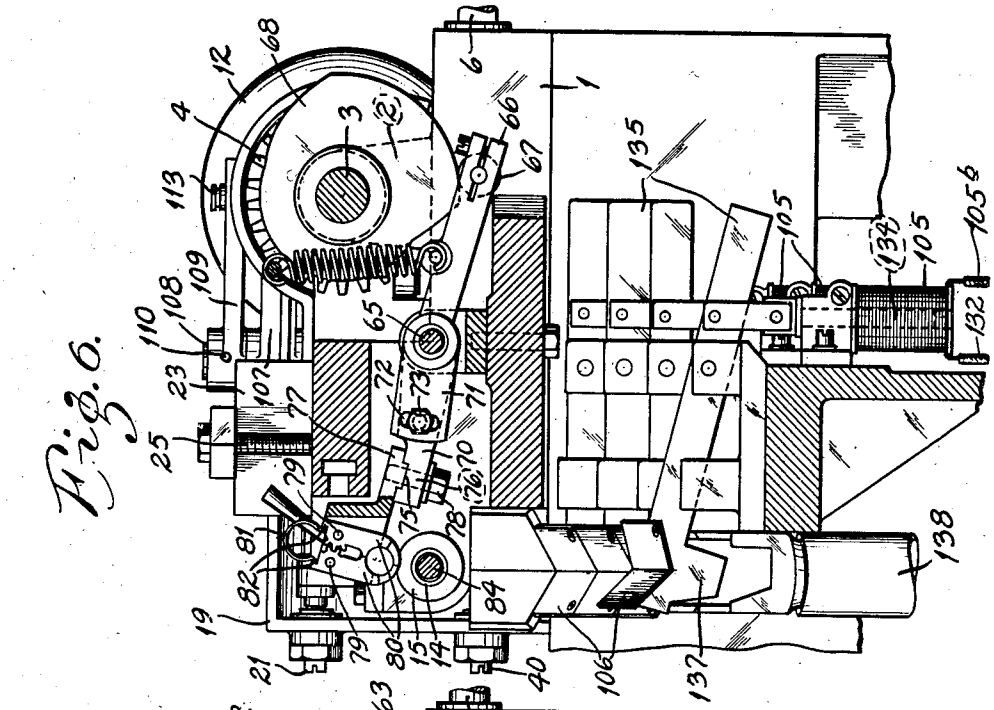


Fig. 6.

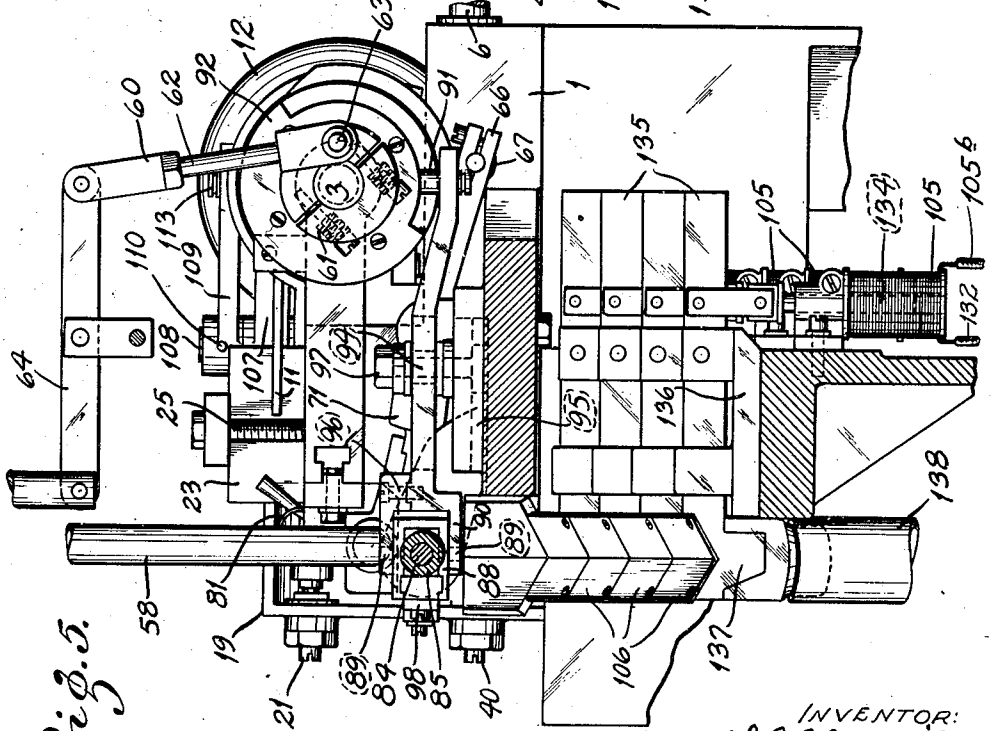


Fig. 5.

INVENTOR:
Oswald Schlaupitz
by Cam Lam & Gravely,
HIS ATTORNEYS

Oct. 6, 1931. O. SCHLAUPITZ 1,826,527

GAUGING MACHINE

Filed Aug. 27, 1928 8 Sheets-Sheet 6

Fig. 7.

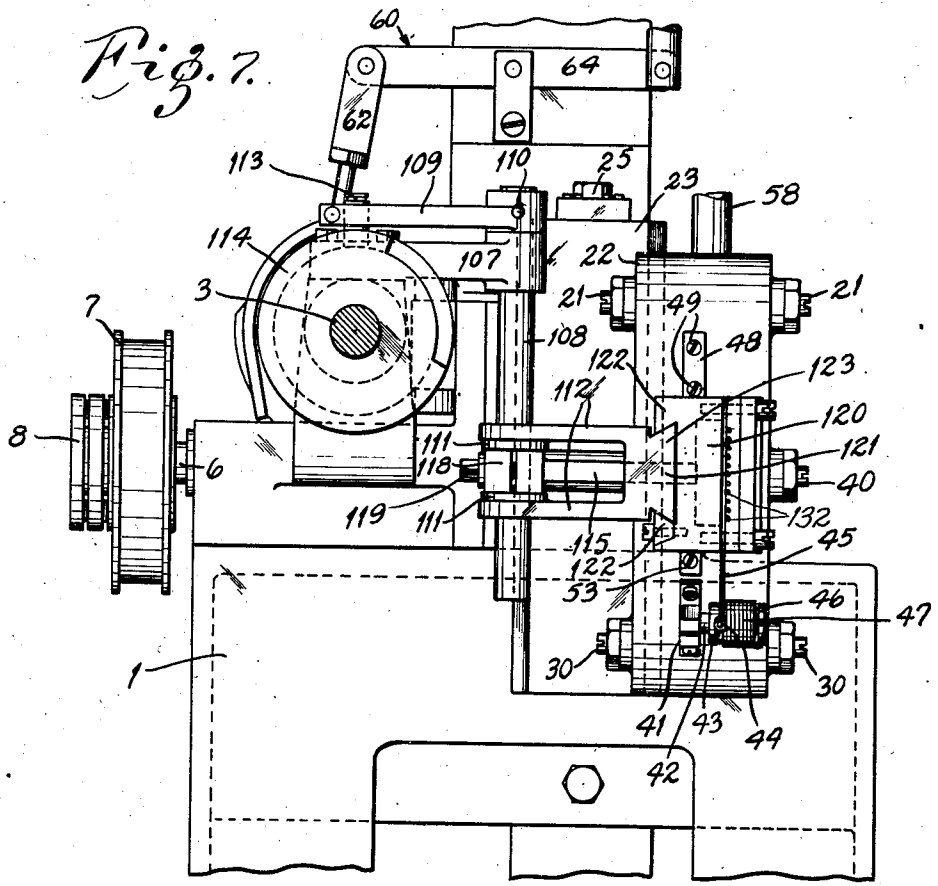
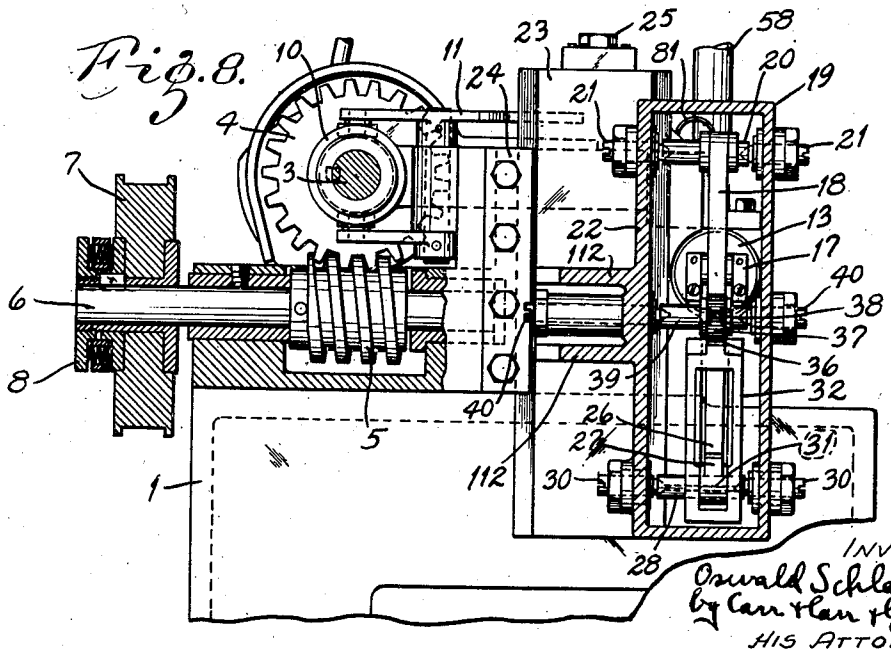


Fig. 8.



INVENTOR:
Oswald Schlaupitz,
by Carr & Carr & Gravell,
HIS ATTORNEYS.

Oct. 6, 1931. O. SCHLAUPITZ 1,826,527

GAUGING MACHINE

Filed Aug. 27, 1928 8 Sheets-Sheet 7

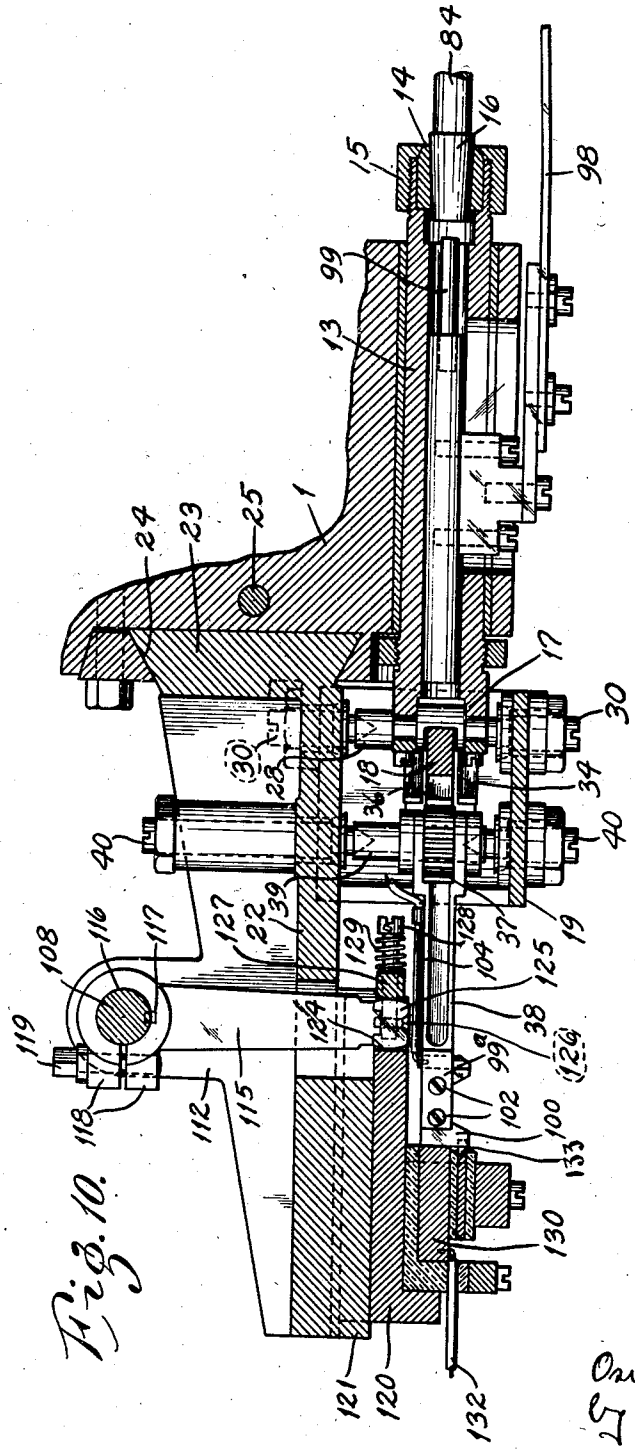


Fig. 10.

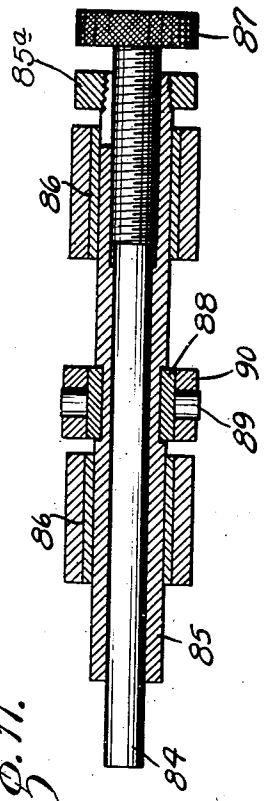


Fig. 11.

INVENTOR:
Oswald Schlaupitz,
by Cameron & Gradely,
HIS ATTORNEYS.

Oct. 6, 1931. O. SCHLAUPITZ 1,826,527

GAUGING MACHINE

Filed Aug. 27, 1928 8 Sheets-Sheet 8

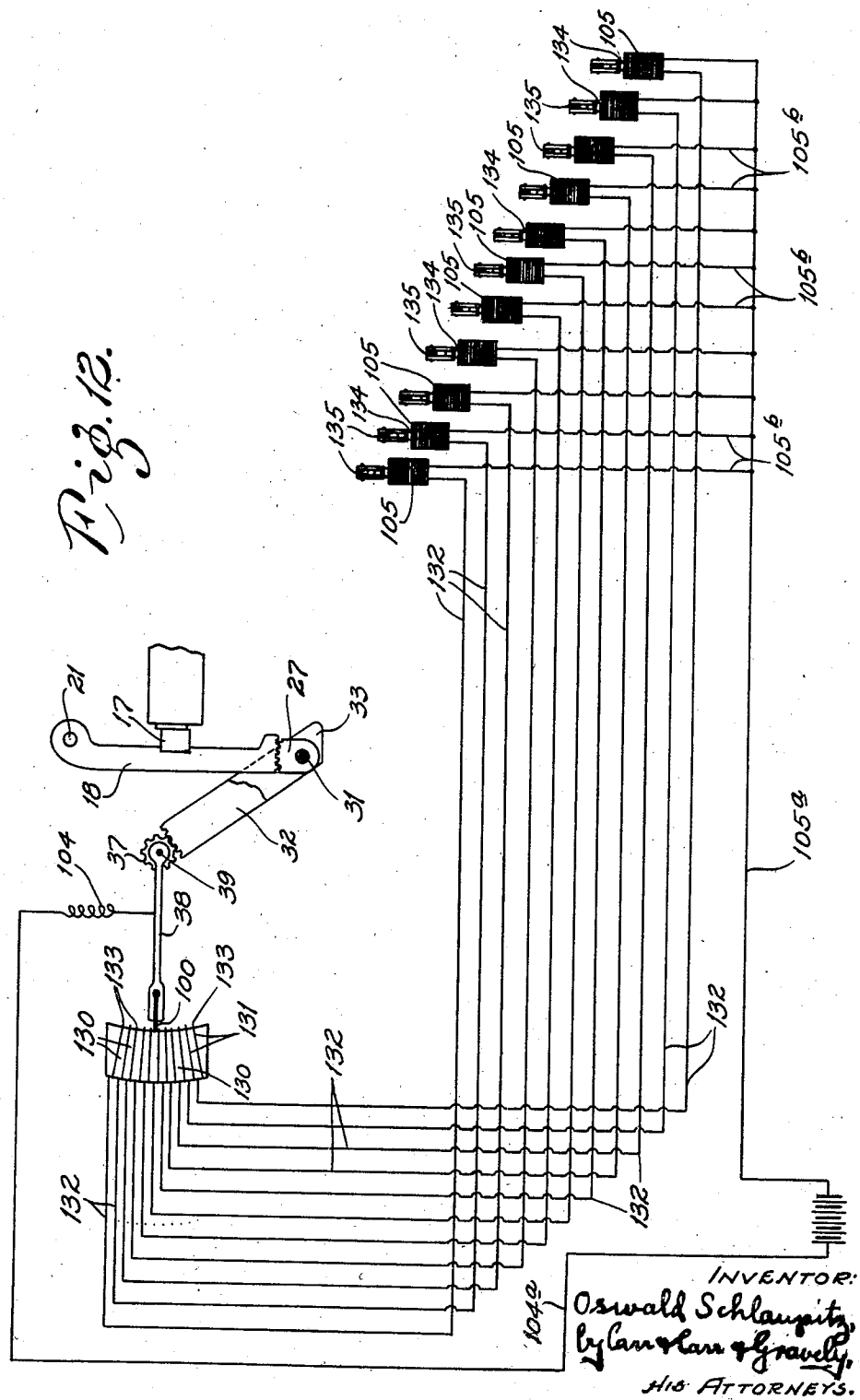


Fig. 12.

INVENTOR:
Oswald Schlaupitz,
by Carr Carr & Gravely,
HIS ATTORNEYS.

Patented Oct. 6, 1931 1,826,527

UNITED STATES PATENT OFFICE

OSWALD SCHLAUPITZ, OF CANTON, OHIO, ASSIGNOR TO THE TIMKEN ROLLER BEARING COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO

GAUGING MACHINE

Application filed August 27, 1928. Serial No. 302,278.

My invention relates to gauging machines, particularly such as are adapted for gauging the diameter of conical pieces, such as taper rollers for roller bearings. The invention has for its principal object a machine which is quick and accurate in operation, which requires only a maximum and minimum setting for the entire range of sizes covered by the machine, the intermediate sizes being automatically cared for, which can be very easily adjusted to work of different sizes and tapers and which has a very simple and accurate sorting device.

The invention consists principally in providing a size gauging machine with a single gauging station which operates a single contact lever, and electrically connecting a plurality of discharge gates with contact members arranged to contact with said contact lever. The invention further consists in an inclined sectional discharge chute and means actuated by the work being gauged for raising the several sections of said discharge chute. The invention further consists in the gauging machine and in the parts and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, wherein like reference characters indicate like parts wherever they occur.

Fig. 1 is a side elevation of a gauging machine embodying my invention,

Fig. 2 is a top plan view thereof,

Fig. 3 is a partial side elevation of a somewhat larger scale, some parts being shown in section,

Fig. 4 is a partial top plan view,

Fig. 5 is a sectional view on the line 5—5 of Fig. 4,

Fig. 6 is a sectional view on the line 6—6 of Fig. 4,

Fig. 7 is an end elevation,

Fig. 8 is a sectional view on the line 8—8 of Fig. 4,

Fig. 9 is an enlarged elevation of the devices that make the electrical contact, certain parts being broken away,

Fig. 9*a* is a detail view of the work actuated lever, looking in the direction opposite to Fig. 8,

Fig. 10 is a horizontal sectional view through the work receiving member and the electric contact devices,

Fig. 11 is a detail sectional view of the work positioning ram and plunger, and

Fig. 12 is a wiring diagram.

A suitable base 1 is provided with bearings 2 through which extends a cam shaft 3 which controls the operation of the several parts of the gauging machine. Said cam shaft 3 is rotated by a worm gear 4 that meshes with a worm 5 on a drive shaft 6 that is mounted in the base. Said drive shaft 6 is rotated in any suitable way as by a pulley wheel 7, and is preferably provided with a friction clutch 8 to permit the parts to slip, if necessary, to avoid injury to the machine. Said worm gear 4 is loose on said cam shaft 3 and is provided with a clutch member 9 adapted to mesh with a cooperating clutch member 10 keyed on said cam shaft 3 and provided with an operating handle 11 by means of which the two clutch members may be engaged or disengaged. Said cam shaft 3 is also provided with a hand wheel 12 by which it may be rotated.

A gauging seat member 13 (Figs. 4, 8, 9 and 10) is slidably mounted in the base and has a roll receiving member 14 secured to the end thereof as by means of an internally threaded cap 15 fitting over said roll socket member 14 and screwed onto the threaded end of the seat member 13. The tapered socket of said socket member 14 has the same taper as that of the rolls 16 being gauged.

Said slidable gauging seat member 13 has a floating contact block 17 (Figs. 8, 9, 10 and 12) secured to the end opposite the roll receiving socket member 14. Said contact block 17 contacts with a lever 18 that is pivotally mounted in a housing 19 its pivot pin 20 having centers in its ends fitting over pivot studs 21 in said housing. Said housing is provided with a supporting frame 22 that has a slide portion 23 fitting in a slideway 24 on the base so as to be slidable up and down on the end of the base. A screw 25 is provided for adjusting the position of said frame 22 and lever housing 19.

Said level 18 is provided with a sector 26 at its free end that meshes with a sector 27 that is rotatable on a hollow rotatable pin 28, a bushing 29 (Fig. 9) being interposed between said pin 28 and the bore of the sector 27. Said pin 28 has conically bored end portions that receive the conical ends of pivot studs 30 mounted in the housing 19. A cross bore 31 permits the admission of lubricant for the pivot portions. Secured to said pin 28 is a lever 32 having an open body receiving said lever 18 and said sector 27. Said sector member has a projecting end portion 33 engaging the lower end of said open lever 32. A bifurcated spring 34 secured to said sector member by a screw 35 engages the upper end of said open lever 32 causing said lever and said sector member 27 to move as a unit under normal conditions. On the upper end of said open lever 32 is a gear sector 36 meshing with the teeth of a pinion 37 secured to an indicator arm 38 that is mounted on a pin 39. Said pin 39 has conical recesses in its ends receiving pivot studs 40 (Fig. 10) that are mounted in said housing 19.

Secured to a bracket member 41 (Figs. 3, 7 and 9) on said housing 19 is a stud 42 on which a sleeve 43 is rotatably mounted. An arm 44 projecting from said sleeve 43 is connected to a link 45 that is connected to said indicator lever 38. Secured to the outer end of said stud 42 is a collar 46. A spring 47 coiled around said sleeve has one end secured to said arm 44 and the other end secured to said collar 46. A bracket 48 is secured to the housing by screws 49. To the outer end of said bracket 48 is secured a stop member 50 for said lever, as by a bolt 51 and nut 52. To the lower part of said housing a similar bracket member 53 is secured by a screw 54, said lower bracket 53 also having a stop member 55 secured thereto by a bolt 56 and nut 57.

Obviously a roll 16 whose taper is the same as the socket of the roll socket member 14 will project from said socket member a distance depending on its mean diameter; and if said slidable member 13 be given a predetermined movement after a roll has been placed therein, the position assumed by the slidable member will depend upon the diameter of the roll therein. Different positions of said slidable member will cause correspondingly different positions of the indicator lever 38.

The rolls 16 are fed into a feeder tube 58 from a hopper 59 by any suitable device, such as that shown diagrammatically in the drawings (Figs. 1, 5 and 7). As shown in the drawings, a feeder actuating crank device 60 is secured to said cam shaft 3, a frictional clutch device 61 preferably forming part of the mechanism. A link 62 is pivotally secured to a pin 63 on the rotary member and to a feeder actuating rocker arm 64. Said feeding device is similar to that fully shown and described in my co-pending application Serial No. 207,373 filed July 21, 1927. Any suitable feeding device may be substituted for that indicated in the drawings.

Shifter mechanism is provided to transfer rolls from said feeder tube 58 to said roll socket member 14. Pivotally secured to the base as by a pivot pin 65 (Figs. 4 and 6) is a lever 66 on which is mounted a roller 67 that is in operative engagement with a cam 68 on said cam shaft 3. Said cam lever 66 has a bushing 69 at its pivot and on the projecting portion of this bushing is mounted the hub portion of an extension 70 of said lever 66. Said lever 66 has a projecting portion 71 in which is a slot 72. Said lever extension 70 rests against said projecting portion 71 of said lever 66, extending beyond the end thereof, and is secured thereto by means of a screw 73 extending through said slot 72 and into a threaded hole in said lever extension 70. Said pin 65 has a collar 74 thereon that bears against said lever extension 70. Said lever extension 70 has a transverse slideway 75 in its end and the bottom of said slideway is provided with a slot 76. A block 77 has a portion fitting in the slide portion of said lever extension 70 and is secured in place by means of a screw 78 extending through said slot 76 and into a threaded hole in said block 77. Pivotally mounted on pins 79 in said block 77 are roll receiving jaw members 80 that are normally forced together by means of a leaf spring 81 whose ends are disposed in notches 82 in the end of said jaw members.

A roll 16 leaving the bottom of said feed tube 58 passes between the ends of said jaw members 80 and, as the cam 68 moves, said lever 66 and said jaw members 80 are swung to bring the roll into alinement with the roll socket of said slidable member 13. A stop member 83 (Figs. 1 and 4) is provided for preventing a roll from sliding through said jaw members. Said stop member may be swung out of position in case it is desired to empty the feeder tube 58. As the lever 66 is swung the block closes the end of the tube 58 to prevent rolls from dropping therefrom.

A ram 84 is provided for pushing a roll from the feed jaws 80 into the socket member 14. Said ram is mounted in a sleeve 85 (Figs. 3, 4 and 11) that is slidable in bushings 86, a lock nut 85*a* being provided therefor. A knob 87 is provided on the end of the ram 84 for adjusting the position of the ram in the sleeve 85.

Secured to the ram sleeve 85 is a collar 88 that has projecting pins 89 on which is pivotally mounted the end of a lever 90 whose other end is provided with a roll 91 engaging a cam 92 on said cam shaft 3. Said lever 90 is slotted at 93 and a pin 94 extends through said slot 93 and through a slot 95 in the base, being secured in position by screws 96 and

nut 97. Thus the length of the arms and the stroke of the ram 84 may be adjusted.

Secured to said collar 88 on the ram sleeve 85 is an elongated arm 98 to whose other end is secured a knockout pin 99 that extends through the bore of the slidable seat member 13 to eject a roll 16 therefrom on the return stroke of the ram 84.

The ram 84 has a fixed stroke and the slidable member 13 is spring pressed into position to receive the work. Thus when a roll 16 is fed into the slidable member 13, the final position assumed by said slidable member will depend upon the diameter of the roll. The indicator lever 38 has jaws 99*a* between which is disposed an electric contact member 100 (Figs. 3, 9 and 12) that is insulated from the lever 38 and jaws 99*a* by means of a bushing 101. The contact member 100 is secured in place by means of screws 102 and insulating bushings 103 are provided for said screws. The contact member 100 is connected by an electric wire 104 to the return line 104*a* of an electric circuit whose feed line 105*a* is connected by wires 105*b*, to each of a number of solenoid windings 105. Said solenoids operate discharge or sorting gates 106.

Rotatably mounted in the end of an arm 107 is a vertical rod 108 to whose upper end is secured one end of a cam lever 109 as by a pin 110 (Figs. 5 and 6). Said rod 108 extends through holes provided therefor in bosses 111 on spaced plates 112 forming part of said housing frame. At the other end of said cam lever 109 is a cam pin 113 that engages a cam 114 on said cam shaft 3. A lever 115 (Fig. 7) has an opening 116 in one end through which said rod 108 passes. A key 117 fitting in keyways in said rod 108 and lever 115 prevents said lever from turning on said rod. The end portion of said lever 115 is split and bosses 118 are provided at the sides of the split. A screw 119 connecting said bosses 118 permits them to be drawn together to clamp said lever 115 in any desired vertical position on said rod 108. This adjustment is necessary to accommodate the vertical movement of said housing 19.

A carrier member 120 (Figs. 1, 4 and 10) slidably mounted in guides 121 has undercut jaw portions 122 fitting over a slide 123 formed on said housing frame 19. Said carrier 120 is actuated by said lever 115 and the end of said lever extends into a recess 124 in the end of said carrier 120. Preferably said actuating lever 115 has a separate engaging member 125 secured at its end, as by a screw 126, said member 125 having convexly curved sides. Said recess 124 in said carrier 120 is covered by a block 127. Said block 127 has holes through which extend screws 128 that are screwed into said carrier 120. Springs 129 coiled around said screws 128 press against the block.

Said carrier 120 has a plurality of arcuate electrical contact pieces 130 (Figs. 3, 9 and 12) separated from each other by insulating members 131 and each connected by a suitable wire 132 to one of said solenoid windings 105. As the contact carrier 120 moves towards the indicator lever 38, the electrical contact member 100 on said lever will be brought into engagement with one of said contact pieces 130 on said carrier. Knife edge members 133 are provided at each side of each contact piece and the end of the contact member 100 of the lever 38 is beveled; so that the contact members 100 and 130 are guided into accurate and full engagement with each other.

When the contact member 100 of the lever 38 engages one of said contact pieces 130 on the carrier 120 it closes an electric circuit through the solenoid 105 to which said contact piece is connected. The energization of the solenoid 105 attracts (lowers) its solenoid core 134. The upper end of each solenoid core 134 is connected to a lever 135 that is pivotally mounted on a frame member 136. To the other end of each lever 135 is secured a gate member 106, which is shown as an inclined trough or V-shaped member having a depending apron 137.

Said gate members 106 are arranged end to end in a series, (Figs. 1, 3, 5 and 6) constituting an inclined chute into which a roll drops when it is ejected from the gauging seat 14. If the solenoid for any gate is actuated, said gate is raised (Fig. 6), permitting the roll to drop down into a tube 138, from whence it goes to a suitable receptacle 139. At the lower end of the chute is a tube 140 that is permanently open to receive all undersize rolls. When a solenoid is deenergized the gate 106 drops by gravity.

In setting the machine to gauge work of any particular taper and general size, a maximum master roll is placed in the gauging seat 14 and the levers, feed devices and ram are all adjusted so that said maximum master roll will actuate the gate that is next to the top of the chute. A minimum master roll is then placed in the machine and the parts adjusted so that said minimum roll actuates the bottom gate (that is the gate next to the permanently open outlet). Obviously rolls in between the maximum and minimum size will be automatically separated into groups of different sizes, the number of groups depending upon the number of contact elements and discharge gates.

The above described machine has numerous advantages. It dispenses with the usual requirement of a plurality of gauging stations each required to be set with its own master roll. It is very easy to change the machine to accommodate different kinds of work. The machine is very quick and accurate in operation and economical to oper-

ate and it is very compact, thus economizing floor space.

Obviously numerous changes may be made without departing from the invention and I do not wish to be limited to the precise construction shown.

What I claim is:

1. A machine for gauging the diameter of tapered rolls comprising a hollow reciprocatable member having a tapered seat adapted to receive a roll, a ram having a predetermined stroke for engaging said roll and moving said work receiving member, gauging levers actuated by the movement of said work receiving member, and a knockout pin connected to said ram and extending into said work receiving member to eject a roll therefrom on the return stroke of said ram.

2. A machine for gauging the diameter of tapered rolls comprising a hollow reciprocatable member having a tapered seat adapted to receive a roll, a ram having a predetermined stroke for engaging said roll and moving said work receiving member, means for adjusting the stroke of said ram, gauging levers actuated by the movement of said work receiving member, and a knockout pin connected to said ram and extending into said work receiving member to eject a roll therefrom on the return stroke of said ram.

3. A machine for gauging the diameter of tapered articles comprising a reciprocatable member having a tapered seat adapted to receive the work, means having a fixed stroke for moving said work receiving member, levers actuated by the movement of said work receiving member, one of said levers having an electrical contact member thereon, a plurality of solenoid windings, each having a core, said electrical contact member being electrically connected with all of said solenoid windings, a gate operatively connected to each core, a plurality of arcuately disposed electrical contact members, a carrier therefor, means for moving said contact carrier toward said lever having said first mentioned contact member so as to close an electric circuit through one of said solenoids to open one of said gates and an extension on said means for moving said work receiving member and operable on the return stroke thereof having an ejector pin extending into the rear of said work receiving member for ejecting a roll from said seat after said roll has been gauged.

4. In a gauging machine, a pivoted lever responsive to the work, a contact member on said lever, a plurality of arcuately disposed contact members, a carrier therefor, means for moving said carrier towards said lever after it has been moved by the work, the size of the work determining which one of the arcuate series of contact members is engaged by said contact member on said lever and means for adjusting the position of said carrier in the plane of the swinging movement of said lever.

5. A gauging machine comprising a frame, a work receiving member reciprocatable thereon, means having a predetermined stroke for moving such work receiving member, whereby the movement of said work receiving member is proportional to the size of the work, a housing adjustably mounted on a vertically disposed slide on said frame, a lever pivotally mounted in said housing and having a rotary movement dependent upon the movement of said work receiving member, an electrical contact device on said last mentioned lever, a plurality of arcuately disposed electrical contact devices adapted to engage said lever contact device in its different positions, a carrier therefor reciprocatable towards and away from said lever, a slide on which said carrier is mounted and means for adjusting the vertical position of said slide.

6. A gauging machine comprising a frame, a work receiving member reciprocatable thereon, means having a predetermined stroke for moving such work receiving member, whereby the movement of said work receiving member is proportional to the size of the work, a contact block at the end of said work receiving member, a housing adjustably mounted on a vertically disposed slide on said frame, a lever in said housing engaged by said contact block, said lever being pivoted at its upper end and having a gear sector at its lower end, a gear sector rotatably mounted on a pin that is rotatably mounted in said housing and meshing with said lever sector, a lever secured to said pin and having an open body portion into which said first mentioned lever extends, said open lever having a gear sector at its upper end, said sector member having depending portion engaging the lower end of said open lever, a bifurcated spring secured to said depending portion and engaging the sides of said open lever, whereby said sector member and said open lever are caused to normally move together, a lever pivotally mounted in said housing and having a pinion meshing with said sector on said open lever, whereby said last mentioned lever is given a rotary movement depending upon the size of the work being gauged, an electrical contact device on said last mentioned lever, a plurality of arcuately disposed electrical contact devices adapted to engage said lever contact device in its different positions, a carrier for said electrical contact devices, a slide on which said carrier is mounted to move towards and away from said lever and means for adjusting the position of said slide in the plane of movement of said lever.

7. A gauging machine comprising a frame, a work receiving member reciprocatable thereon, means having a predetermined

stroke for moving such work receiving member, whereby the movement of said work receiving member is proportional to the size of the work, a contact block at the end of said work receiving member, a housing adjustably mounted on a vertically disposed slide on said frame, a lever in said housing engaged by said contact block, said lever being pivoted at its upper end and having a gear sector at its lower end, a gear sector rotatably mounted on a pin that is rotatably mounted in said housing and meshing with said lever sector, a lever secured to said pin and having an open body portion into which said first mentioned lever extends, said open lever having a gear sector at its upper end, resilient means causing said sector member and said open lever to normally move together, a lever pivotally mounted in said housing and having a pinion meshing with said sector on said open lever, whereby said last mentioned lever is given a rotary movement depending upon the size of the work being gauged, an electrical contact device on said last mentioned lever, a plurality of electrical contact devices adapted to engage said lever contact device in its different positions and resilient means for restoring said lever to normal position.

8. In a gauging machine or the like, a work shifting device comprising a pivotally mounted lever and a cam for swinging said lever, said lever having a bushing on which is mounted an extension of said lever, said lever and extension being adjustably secured together by a screw disposed in a hole in one member and extending through a hole in the other, and a work holding member at the end of said lever extension, said work holding member being adjustable transversely of said lever extension.

9. In a gauging machine or the like, a work feeding device comprising jaw members having work receiving depressions in their meeting edges, resilient means for normally holding said jaw members closed, means for feeding work into the cavity formed by said work receiving depressions, means for bodily moving said jaw members and a plunger for ejecting work from said jaw members, the return movement of said jaw members starting before the return stroke of said plunger, said resilient means on said jaw members permitting said jaws to open to clear said plunger.

10. In a gauging machine, a plurality of troughed gate members arranged end to end to form a continuous inclined discharge chute for the work gauging devices, said gate members being fulcrumed at a point remote from said chute formed by them, means controlled by said gauging devices for raising said trough members respectively to permit work to drop from said chute, and containers for receiving work dropping from said chute, a discharge tube leading from each container to a point beneath a gate, each of said gate members having a depending apron portion to insure that the work falls into the tube immediately below the gate member.

Signed at Canton, Ohio, this 22 day of August, 1928.

OSWALD SCHLAUPITZ.