

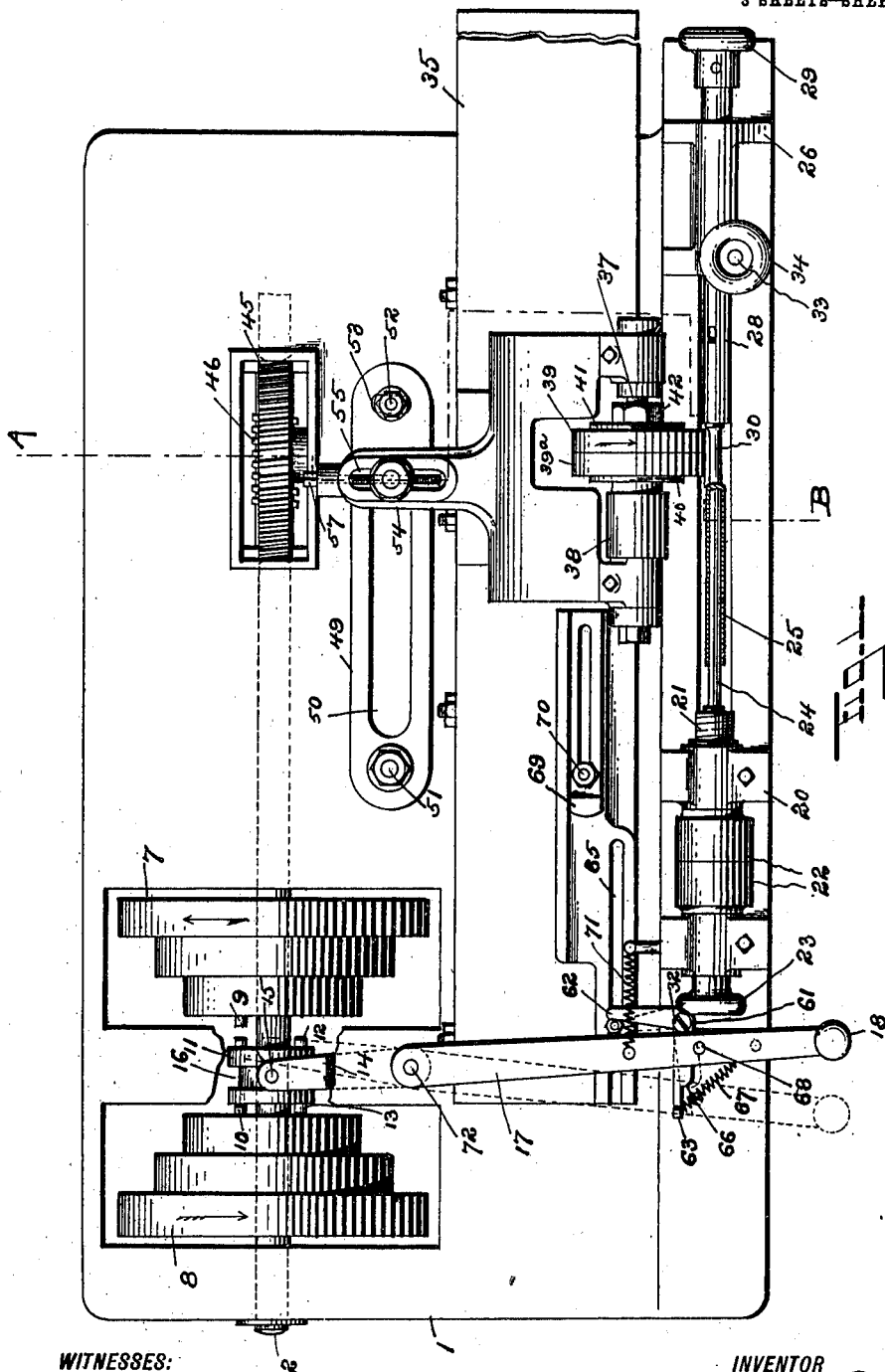
W. D. PIERSON.
GRINDING MACHINE.

APPLICATION FILED JUNE 10, 1909.

Patented Dec. 27, 1910.

3 SHEETS-SHEET 1.

980,122.



WITNESSES:

Frederic H. Mark
Lucy Brewster

INVENTOR

William D. Pierson
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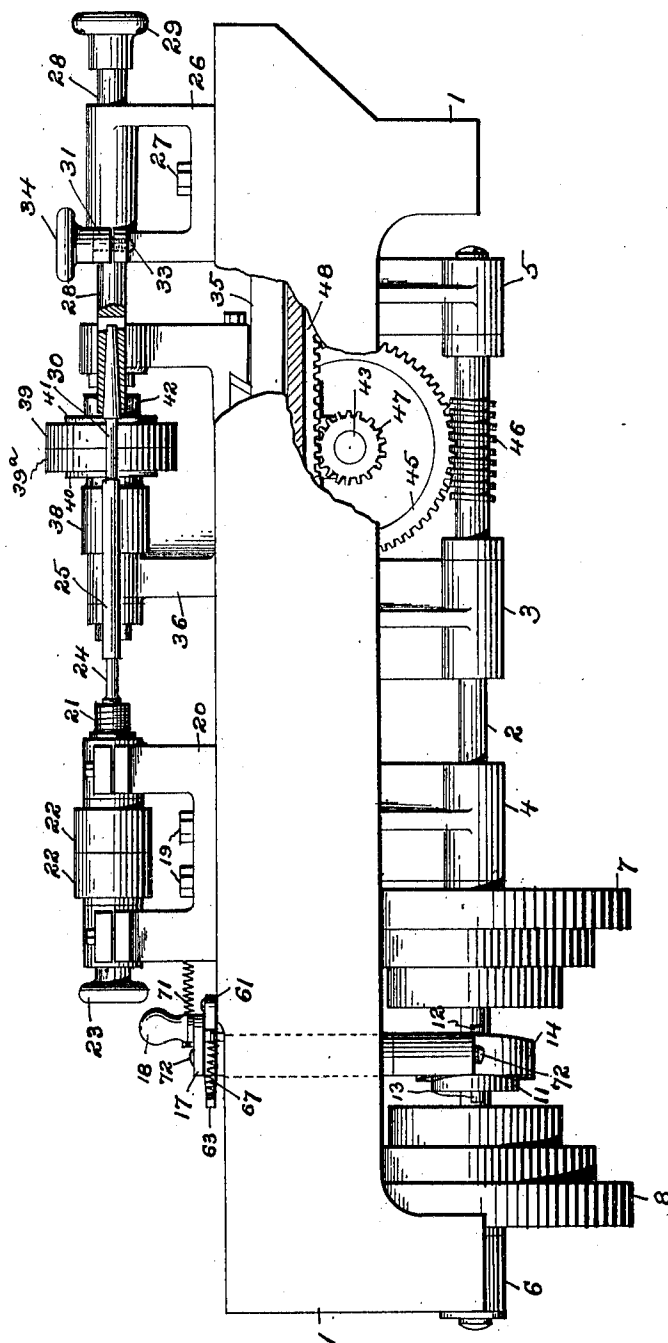
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3 SHEETS-SHEET 2.

Fig. 2



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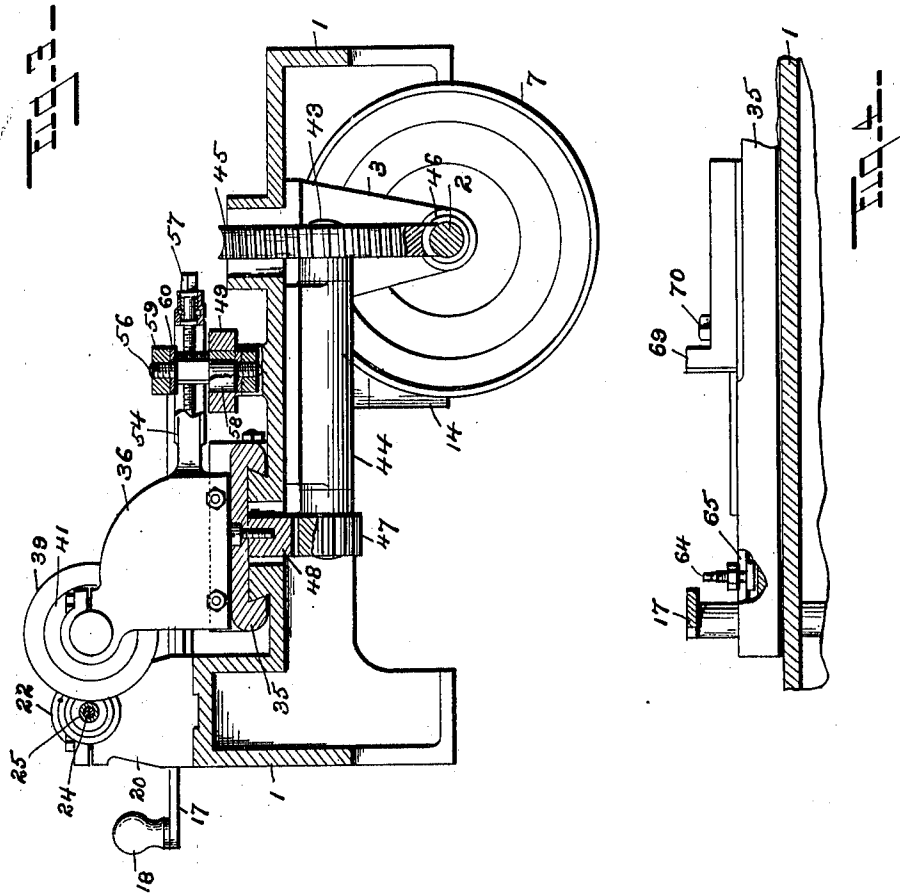
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3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

WILLIAM D. PIERSON, OF WATERBURY, CONNECTICUT, ASSIGNOR TO H. P. AND E. DAY, INCORPORATED, OF SEYMOUR, CONNECTICUT, A CORPORATION OF CONNECTICUT.

GRINDING-MACHINE.

980,122.

Specification of Letters Patent.

Patented Dec. 27, 1910.

Application filed June 10, 1909. Serial No. 501,267.

To all whom it may concern:

Be it known that I, WILLIAM D. PIERSON, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to new and useful improvements in grinding machines, and refers more particularly to that type of machine used for grinding hard rubber tubes, although not limited to such use, and has for its object, among other things, to provide a machine of this character with means whereby the grinding wheel may be caused to move either in a line parallel with the axis of the mandrel, in a straight path at a slight angle thereto, or in a curved or irregular path; means for automatically reversing the direction of the travel of the grinding wheel at one end of its stroke and stopping it at the other end; means for taking a roughing and a finishing cut upon the tube without removing it from the mandrel; and to accomplish these and other desirable results with mechanism that is economical to construct and simple in its operation.

To these, and other ends, my invention consists in the grinding machine having certain details of construction and combinations of parts as will be hereinafter described and more particularly pointed out in the claims.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures; Figure 1 is a plan view of my improved grinding machine, with the grinding wheels shown at the end of the advance stroke; Fig. 2 is a front elevation thereof, partly in section; Fig. 3 is a sectional view upon line A—B of Fig. 1; and Fig. 4 is an elevation of a portion of the slide.

Referring to the drawings, the numeral 1 designates the bed of the machine, which is supported upon a bench or suitable legs as may seem desirable; 2 the driving shaft, which is mounted in the journals 3, 4, 5 and 6, that are all fixed to the underside of the bed; and 7 and 8 are cone pulleys, which are loosely mounted upon said shaft and rotate in opposite directions, the pulley 7 having a laterally projecting pin 9 therein, and a similar pin 10 in the pulley 8. Slidable upon the

shaft 2 between the said pulleys, but held against rotation thereon, is the hub 11 having the pins 12 and 13 therein, said hub being moved in either direction through the yoke lever 14 having the pins 15 therein which enter the annular groove 16 in said hub, and is secured to the lower end of a shaft 72 that passes through a portion of the bed 1 with a lever 17 fixed to the upper end thereof, said lever lying substantially parallel with the top of the bed and having a handle 18 upon its outer end.

Secured to the bed 1 by the bolts 19 is the head stock 20, within which is journaled the spindle 21 having the tight and loose pulleys 22 and the hand wheel 23 thereon, and within one end of which is the mandrel 24 that is of substantially the same outside diameter as the inside diameter of the rubber tube, designated 25, and shown in section on the mandrel in Fig. 1. Adjustable upon said bed, toward and away from the head stock 20, is the tail stock 26, which is secured in any of its adjusted positions by the bolt 27, and within which is slidably mounted the shaft 28 having a hand wheel 29 upon one end and a mandrel 30 fixed in its opposite end. Projecting laterally from the tail stock 26 and integral therewith is the split lug 31 through which is threaded the stud 33 having a hand wheel 34 thereon.

In operation, the shaft 28 is moved within the tail stock 26 manually by grasping the hand wheel 29 and when withdrawn a tube in the rough is placed on the mandrel 24, after which the shaft 28 is moved toward said tube until the mandrel 30 abuts against the end thereof and is held in this position by friction through the rotation of the stud 33 by the hand wheel 34.

Slidably mounted upon the bed 1 is the carriage 35 having a bracket 36 thereon within which is journaled the spindle 37 having a pulley 38 fixed thereon and carrying one or more emery or other grinding wheels 39 and 39^a, which are held between the collars 40 and 41 by the nut 42. I prefer to use companion grinding wheels, one being of coarser material and slightly less diameter than the other, the first, designated 39, making the roughing cut, and the latter, designated 39^a, the finish or polishing cut. Movement is imparted to the carriage 35 through the shaft 43 that is journaled in the fixed bracket 44 and has the worm wheel 45

thereon, which meshes into a worm 46 fixed on the shaft 2, and the pinion 47 which meshes into the rack 48 upon the under side of said carriage.

5 The guide plate 49, having a slot 50 therein, is secured to the bed at one end by a stud 51, and at the other end by a stud 52 which passes through the slot 53, thereby permitting the guide plate to have a slight rotary
10 movement about the stud 51, whereby the position of the slot 50 may be made either parallel with or at a slight angle to the axis of the mandrel 24. The slot 50 is straight as shown herein, but it may be
15 curved or given any irregular shape, if desired, to vary the path of movement of the grinding wheels. Projecting laterally from the rear of the bracket 36 is a slotted arm 54 having a stud 56 movable in the slot 55
20 by the screw 57 upon which is a roll 58 that lies within the slot 50, and having a nut 59 and washer 60 thereon, whereby it is held against movement in its adjusted positions.

By means of the mechanism above described the relative position of the wheels 39 and 39^a toward and away from the mandrel 25 can be varied, and by shifting the
25 guide plate 49 upon the stud 51 the said wheels may move in a path either parallel with the axis of said mandrel, at a slight angle thereto, or in a curved or irregular path, as the roll 58 moves within the slot 50 during the movement of the carriage 35.

Connected with a fixed part by a screw 32
35 is a trip lever 61 having an arm 62 which lies in the path of a stop pin 64, adjustably secured within a slot 65 in the carriage 35, and an arm 63 having a shoulder 66 thereon, which is moved by the spring 67 into the
40 path of the pin 68 fixed in the lever 17 when said lever is in one of its positions.

Slidably secured upon the carriage 35 by the bolt 70 is the stop 69 which contacts with the lever 17 during the movement of said
45 carriage.

The rest position of the grinding wheels is adjacent to the head stock 20, from which position they move toward the tail stock 26 until they occupy the position shown in
50 Fig. 1. This portion of their movement is known as the advance stroke at the end of which their direction of movement is automatically reversed and the grinding wheels are returned to their original rest position,
55 this latter portion of its movement being known as the return stroke. The shaft 2 during the advance stroke is driven from the cone pulley 7, and during the return stroke from the cone pulley 8. This shifting of direction of rotation of the shaft 2 being accomplished through the movement of the
60 hub 11, which is midway between the inner faces of both of said cone pulleys, when the grinding wheels are in their rest position, so that the pins 12 and 13 thereon do not

engage with either of the pins 9 or 10. In operation the tube is placed on the mandrel when the grinding wheels are in their rest position, after which the grinding wheels begin their advance stroke through the
70 manual shifting of the hub 11 through the lever 17 so that the pins 12 therein are moved into the path of the pins 9, at which time the pin 68 will contact with the shoulder 66 upon the arm 63 and prevent the spring
75 71 from moving said hub until the adjustable pin 64 contacts with the arm 62 on the lever 63 at the end of the advance stroke. This action moves the lever 63 so that the shoulder 66 is disengaged from the pin 68
80 and the spring 71 moves the lever 17 so that the hub 11 is shifted toward the pulley 8 and the pins 13 therein project into the path of the pins 10 and the grinding wheels make their return stroke, which is completed when
85 the stop 69 contacts with the lever 17 and moves the hub 11 to its central position between the cones 7 and 8. The tube is then removed from the mandrel and a new one substituted. During the advance stroke a
90 rough cut over the tube is made by the wheel 39 and a very light finishing and polishing cut is made by the wheel 39^a during the return stroke, upon the completion of which the finished tube is removed from the mandrel
95 and a new one substituted and the operations continued as above described.

There are minor changes and alterations that can be made within my invention, and I would therefore have it understood that I
100 do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of my invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a grinding machine, in combination with a grinding wheel, a carriage for the wheel, and a pair of oppositely rotating
110 pulleys, means between the pulleys to engage alternately with each and having connection with said grinding wheel to reciprocate the latter, a spring pressed lever for shifting said means, a pivoted trip lever of L-shape
115 adjacent the free end of the lever, a stop carried by the carriage for engagement with one arm of the trip lever, a shoulder on the other arm of the trip lever, a spring connected to the said arm of the trip lever, a
120 pin carried by the lever to engage said shoulder of the trip lever, a second stop on the carriage to engage the lever.

2. In a grinding machine, in combination with a grinding wheel, a carriage for the wheel, and a pair of oppositely rotating pulleys, means between the pulleys to engage
125 alternately with each and having connection with said grinding wheel to reciprocate the latter, a spring pressed lever for shifting

said means, means to lock said lever against the action of its spring when said lever is moved in one direction, means on the carriage to engage said locking means at a predetermined point in the travel of said carriage and release said lever, and other means carried by the carriage which engage said lever and move the same to neutral position when the carriage travels in an opposite direction.

3. In a grinding machine, comprising, a rotatable mandrel, a movable carriage carrying grinding means, means for moving said carriage to and from said mandrel, said means consisting of a pair of oppositely driven pulleys, a collar slidably received by said pulleys, a pivoted spring pressed lever connected to said collar, a pin carried by said lever, a trip lever, a shoulder formed on said trip lever to hold said first named lever against the tension of said spring, and a stud carried by the said carriage whereby on the forward movement of said carriage the stud of the carriage trips said lever and releases the first named lever, which by reason of the tension of the spring attached to the lever, causes said lever to shift the collar into the reverse pulley.

4. In a grinding machine, in combination with the bed and the carriage having grinding means thereon, a guide plate on the bed pivotally secured thereto at one of its ends, means to secure the opposite end of the plate to the bed in any position to which the plate may be adjusted, said plate having a longitudinal slot therein, a slotted arm carried by the carriage, a stud movable in the slot of said arm, a screw in said arm slot engaging said stud, and a roll carried by said stud and operating in said slot.

5. In a grinding machine, in combination with the bed and the carriage having grinding means thereon, a guide plate on the bed, said plate having a longitudinal slot, means whereby said plate may be adjusted so that it may have different positions on the bed, a roll carried by the carriage and operating in said slot, and means whereby said roll may be adjusted with respect to said carriage.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM D. PIERSON.

Witnesses:

JAY H. McCLEARY,
WM. SHIRLEY FULTON.