C. D. OESTERLEIN AND L. H. BLOOD.

MACHINE TOOL.

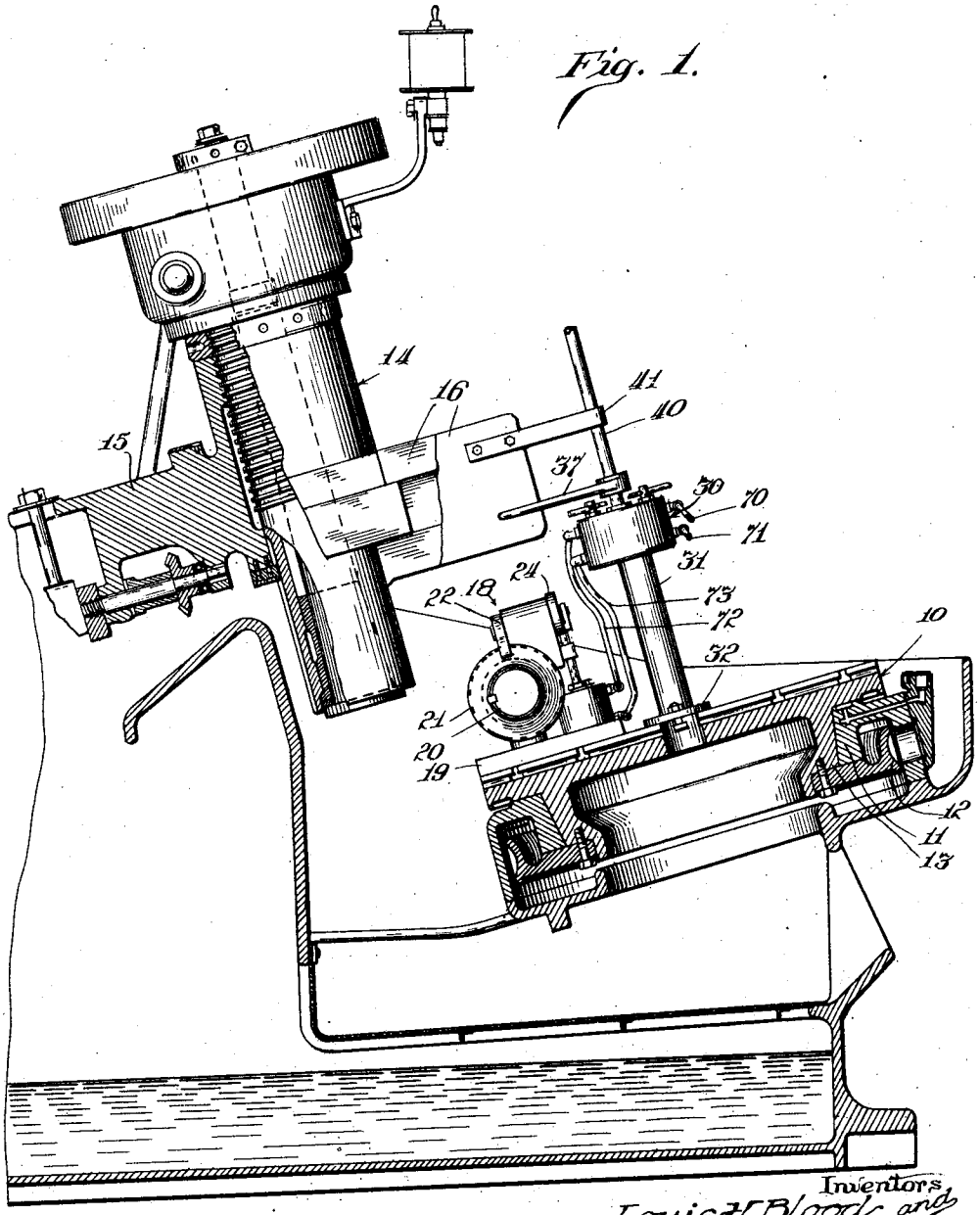
APPLICATION FILED APR. 9, 1920.

1,405,622.

Patented Feb. 7, 1922.

4 SHEETS—SHEET 1.

Fig. 1.



Inventors,
Louis H. Blood and
Charles D. Oesterlein
By Williams, Bradbury & Lee
Attorneys.

C. D. OESTERLEIN AND L. H. BLOOD.

MACHINE TOOL.

APPLICATION FILED APR. 9, 1920.

1,405,622.

Patented Feb. 7, 1922.

4 SHEETS—SHEET 2.

Fig. 2.

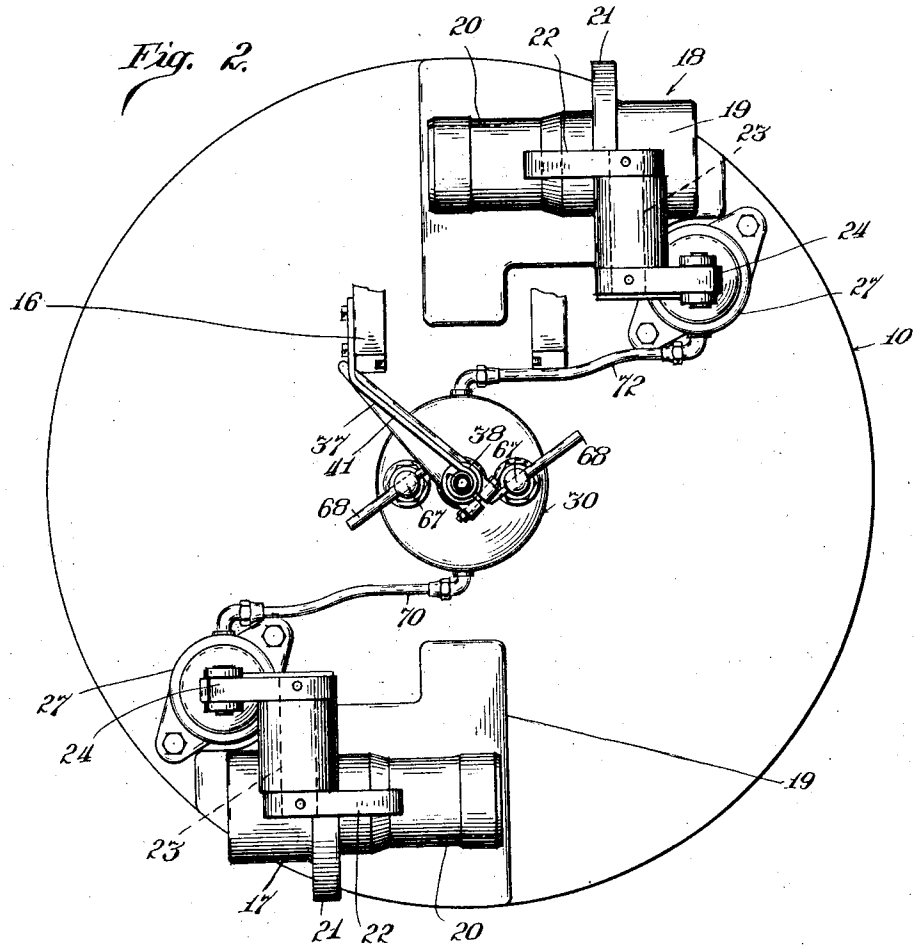


Fig. 3.

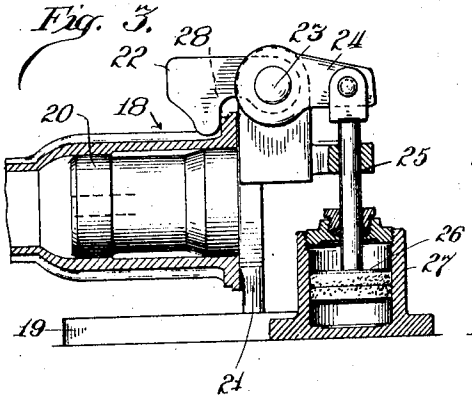
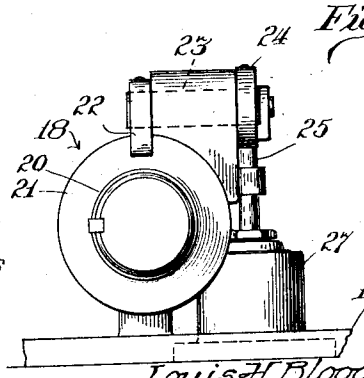


Fig. 4.



Inventors

Louis H. Blood and

Charles D. Oesterlein

Williams, Bradbury

& See

Attorneys.

C. D. OESTERLEIN AND L. H. BLOOD.

MACHINE TOOL.

APPLICATION FILED APR. 9, 1920.

1,405,622. Patented Feb. 7, 1922.

4 SHEETS—SHEET 3.

Fig. 5.

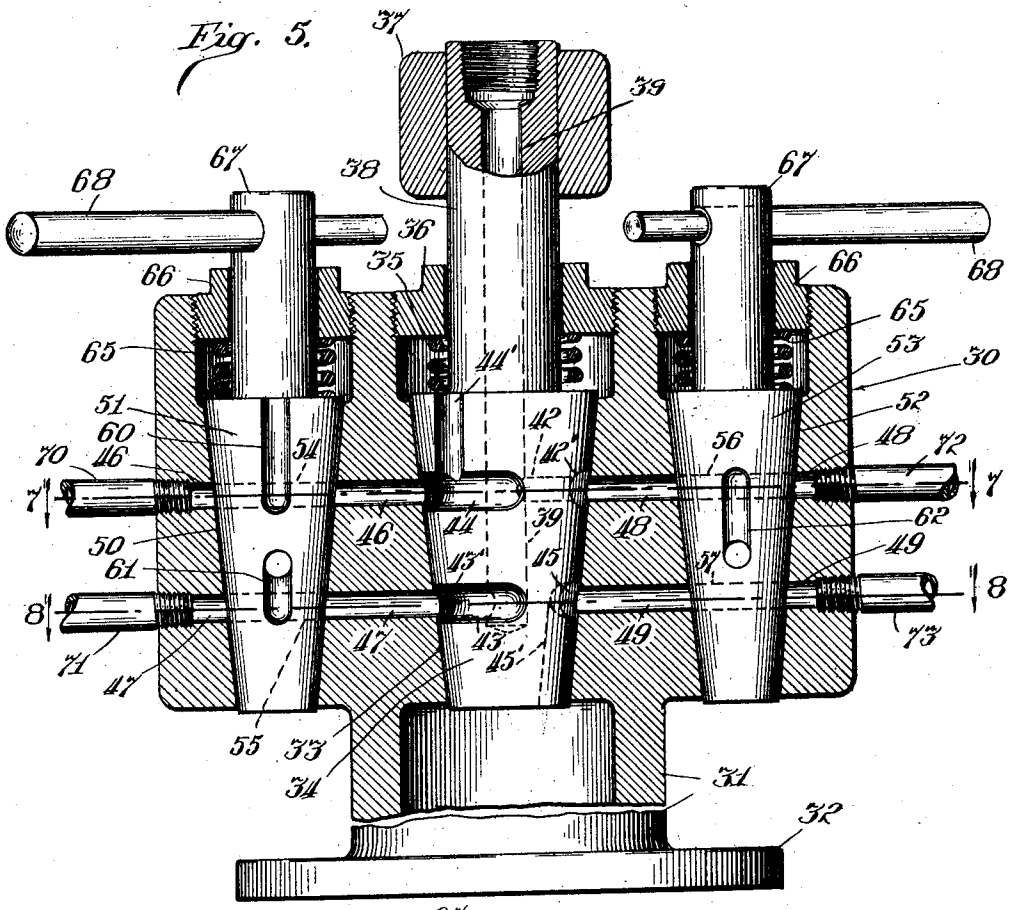
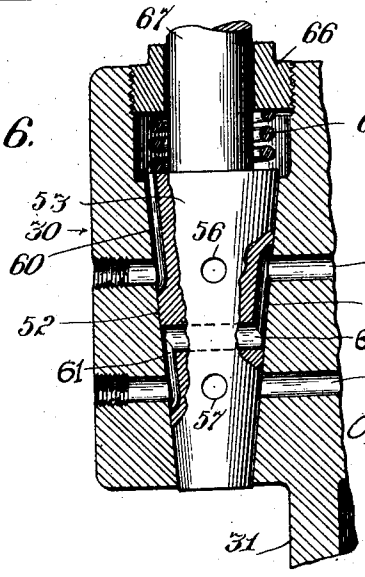


Fig. 6.



Inventors,
Louis H. Blood and
Charles D. Oesterlein
By Williams, Bradbury & See
Attorneys

C. D. OESTERLEIN AND L. H. BLOOD.

MACHINE TOOL.

APPLICATION FILED APR. 9, 1920.

1,405,622.

Patented Feb. 7, 1922.

4 SHEETS—SHEET 4.

Fig. 7.

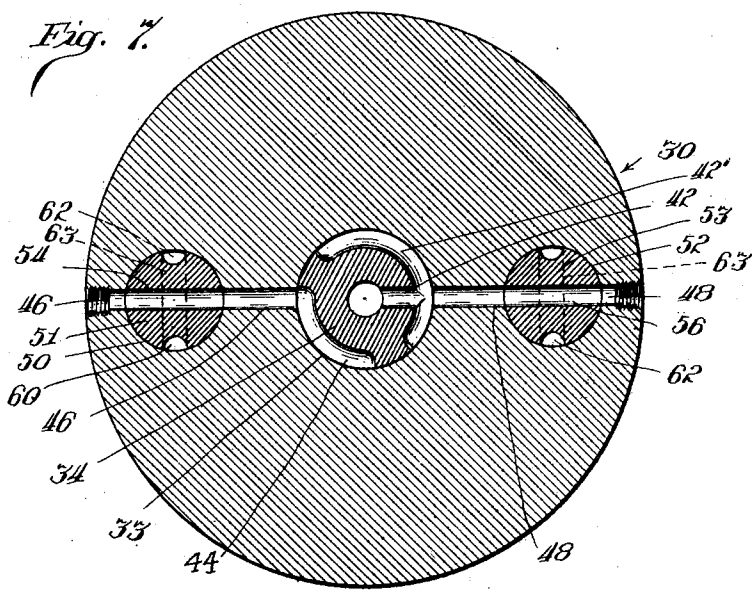
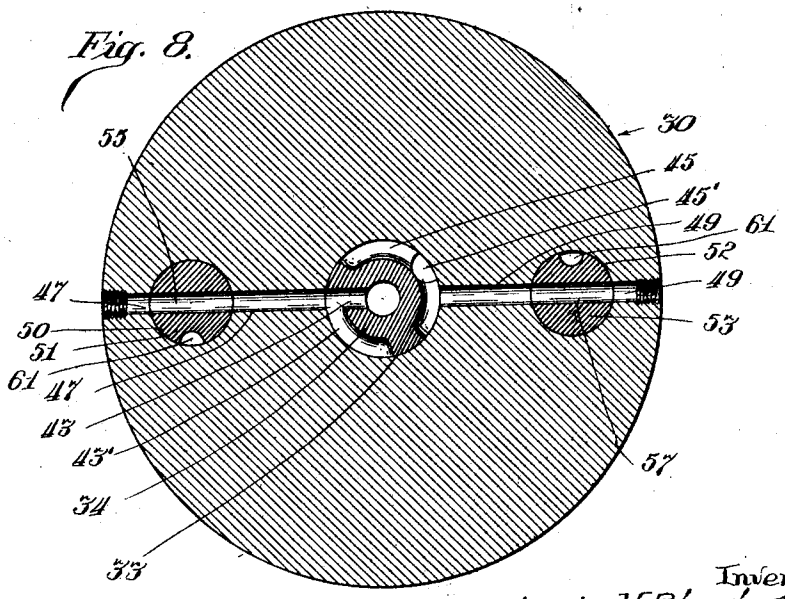


Fig. 8.



Inventors

Louis H. Blood and

Charles D. Oesterlein

By

Williams, Bradbury & Seed

Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES D. OESTERLEIN AND LOUIS H. BLOOD, OF CINCINNATI, OHIO, ASSIGNORS TO THE OESTERLEIN MACHINE CO., OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

MACHINE TOOL.

1,405,622. Specification of Letters Patent. Patented Feb. 7, 1922.

Application filed April 9, 1920. Serial No. 372,430.

To all whom it may concern:

Be it known that we, CHARLES D. OESTERLEIN and LOUIS H. BLOOD, citizens of the United States, and residents of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machine Tools, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to improvements in machine tools and is especially concerned with improvements in machine tools which comprise a turn-table or face plate to which the work is secured, while being machined, by means of fixtures or devices operated by compressed air or other similar fluids.

The objects of our invention are—

First, to provide a machine of the character described, comprising a rotatable turn-table and means located eccentrically thereof and operated by air pressure for securing the work thereto.

Second, to provide a machine of the character described, with means for supplying air under pressure to such devices or fixtures and for controlling the supply of air to said devices for securing and releasing the work.

Third, to provide means of the character described whereby the supply of air to the devices or fixtures is automatically controlled to clamp and release the work.

Fourth, to provide means of the character described with hand operable or controlled devices for controlling the supply of air to the fixtures, independently of the automatic control.

Fifth, to provide a machine comprising a turn-table having a plurality of fixtures secured thereto and means such as described above for controlling the supply of air thereto, said means being so constructed that while a piece of work is held in one fixture and being machined, a finished piece of work can be removed from the other fixture, and

Sixth, to provide a machine of the character described which is simple in construction, economical to manufacture, reliable and easy to operate.

Other objects will appear as this description progresses, reference being had to the accompanying drawings, in which—

Figure 1 is a substantially central vertical section through a machine embodying our invention.

Figure 2 is a plan view of a turn-table showing the air operated fixtures secured thereto and our means for controlling the supply of air to the fixtures.

Figure 3 is a side elevation, partially in section showing certain details of construction of one of the fixtures.

Figure 4 is an end elevation of one of the fixtures.

Figure 5 is a central vertical section through our improved means for controlling the supply of air to the fixture.

Figure 6 is a sectional detail showing the hand operable valve shown at the left hand side of Figure 5 turned to a position 90 degrees in advance of the position of the valve shown in Figure 5, and

Figures 7 and 8 are transverse sections taken on lines 7—7 and 8—8, respectively, of Figure 5, showing certain details of construction of the air control apparatus and the relative positions of the various valves.

Throughout the several views, similar reference characters will be used for referring to similar parts.

Referring for the present, to Figures 1 to 4 inclusive, wherein we have shown our invention in connection with a milling machine of well-known construction, the reference character 10 indicates a turn-table which is rotatably mounted on the inverted cone bearing 11 and is driven by a worm, (not shown), through the worm gear 12 secured to the flange 13 of the turn-table in a well-known manner. The reference character 14 indicates the head of the ram 15, both of which are reciprocably mounted in the ram guides 16, one side only of which is shown.

Bolted, or otherwise secured to the turn-table are a pair of fixtures 17 and 18, each comprising a face plate 19, and an arbor or mandrel 20 mounted thereon, at the rear end of which is a face plate 21 against which the end of the work supported by the mandrel is adapted to be secured by the clamping dog 22.

The clamping dog 22 is secured to one end of the rock shaft 23. A lever 24 is secured to the other end of the rock shaft and is actuated to move the clamping dog into holding or releasing position by the piston rod 25, one end of which is pivotally secured to the

free end of the lever 24, and the opposite end of which is provided with a piston 26, reciprocably mounted in the cylinder 27. It will be clear from the above description, that when the piston 26 is forced upwardly, the flange 28 of the work will be clamped against the face plate 21 and that when the piston 26 is forced downwardly the dog 22 will be actuated to release the work.

We do not claim, as our invention, the details of the construction thus far described, except in so far as this construction coacts with the elements which we are about to describe to perform the desired functions.

For supplying air to opposite ends of the cylinders 27, we provide a body member or distributor block 30 which is supported by the column 31 having the flange 32 at its lower end which may be bolted or otherwise secured to the turn-table.

Referring to Figure 5, it will be seen that the distributor block 30 is provided with a central tapered valve seat 33 in which is seated the tapered plug 34 which is held on its seat by the compression spring 35 and the follower 36. Since the distributor block 30 is to rotate about the valve 34, the distributor block is secured to the turn-table in such a manner that the valve seat 33 will be coaxial with the turn-table. For holding the valve 34 stationary, we provide a lever 37, one end of which is secured to the stem 38 of the valve 34 and the other end of which rests against the lower ram guide or arm as shown in Figure 1. From this description, it will be clear that if the turn-table is rotated in a clockwise direction, the free end of the lever will be constantly maintained in contact with the ram arm and the valve 34 will be held stationary.

The valve 34 is provided with an air inlet passageway 39 shown in dotted outline in Figure 5, which is adapted to be connected with an air supply pipe 40 as shown in Figure 1, which may be supported by a bracket 41, secured to the ram arm. Two ports 42 and 43 formed in the valve 34, radially and in opposite direction from each other, communicate at their inner ends with the inlet passageway 39. The outer ends of the ports 42 and 43 comprise annular grooves 42′ and 43′ respectively, formed in the outer periphery of the valve 34. On the opposite side of the valve from the grooves 42′ and 43′ are formed the annuar grooves 44 and 45, respectively, the groove 44 communicating with the atmosphere through the longitudinally extending groove 44′ and the groove 45 communicating with the atmosphere through the groove 45′. (See Figure 8.) This last mentioned groove extends from the groove 45 to the lower end of the valve 34. The grooves 44 and 45 form means for venting the cylinders 27 in a manner which will presently be described.

Two pairs of ducts 46—47 and 48—49 are formed in the distributor block 30, and the inner ends of the ducts 46 and 48 lying in the plane of the grooves 42′ and 44 and the ducts 47 and 49 lying in the plane of the grooves 43′ and 45.

The ducts 46—47 are interrupted by the conical valve seat 50 which receives the conical valve 51 and the ducts 48—49 are interrupted by the valve seat 52 which receives the valve 53. The valve 51 is provided with ducts 54 and 55 which, when the valve 51 is turned in the position shown in Figure 5, form connecting means between the two ends of the ducts 46—47 so as to form a continuous passageway from the valve seat 33 to the outside of the distributor block.

In a similar manner, the valve 53 is provided with the transverse ducts 56 and 57 forming a connecting means between the interrupted portions of the ducts 48—49, and providing a continuous passageway from the valve seat 33 to the outside of the distributor block.

The valves 51 and 53 are provided on one side with the two grooves 60 and 61 (see the left hand side of Figure 5) and on the other side with the groove 62. (See the right hand side of Figure 5). The groove 60 extends from a point slightly below the duct 46 to the end of the valve and thus forms a vent to the atmosphere. The two grooves 61 and 62 are connected by a transverse duct 63 extending through the valve. It will, therefore, be seen than when the valve is turned to the position shown in Figure 6, it connects the inner portion of one of the upper ducts with the outer portion of one of the lower ducts, thereby reversing, as will be described later on, the flow of air to and from the cylinders. The valves 53 are held on their seats by the compression springs 65 and the followers 66. The upper ends of the stems 67 of the valves are provided with handles 68 by means of which the valves can be turned in their seats. It will be noted that there is a space between all three of the valve stems and their followers, thereby providing means for permitting the escape of air from the vents 44′ and 60.

Two pipes 70 and 71 respectively, connect the ducts 46 and 47 with the upper and lower ends respectively of the cylinder 27 shown in the lower side of Figure 2 and two other ducts 72 and 73 respectively connect the ducts 48 and 49 respectively with the upper and lower ends of the cylinder 27 shown at the upper side of Figure 2.

With the distributor block and the valves in the position shown in Figure 5, air will enter the passageway 39 through the pipe 40 and part of the air will pass through the port 42, groove 42′, ducts 48 and 56 and pipe 72 to the upper end of the cylinder 27 shown in the upper side of Figure 2 thereby

forcing the piston in this cylinder downwardly and moving the dog 22 to its release position thereby permitting the workman to place the work on the mandrel 20. At the same time, air will pass through the passageway 39, port 43, groove 43′, ducts 47 and 55 and pipe 71 to the lower end of the cylinder 27 shown at the lower side of Figure 2, thereby forcing the piston 26 upwardly and actuating the dog 22 to hold the work on the chuck.

As the piston in the first mentioned cylinder moves downwardly, the air in the lower side of the cylinder will be displaced through the pipe 73, ducts 49 and 57 and grooves 45 and 45′ to atmosphere and at the same time the piston in the last mentioned cylinder is forced upwardly, the air in the upper end of the cylinder will be displaced through the pipe 70, ducts 46 and 54, and grooves 44 and 44′ to atmosphere. The connections above described are illustrated in Figures 7 and 8.

If the turn table is then rotated, the ducts 46 and 47 will be placed into communication with the grooves 42′ and 45, respectively and the ducts 48 and 49 will be placed into communication with the grooves 44 and 43′, respectively, thereby reversing the connections to the two cylinders and causing the pistons therein to move in directions opposite to those in which they previously moved, thus releasing the finished work and clamping the new piece of work onto the mandrel brought into cutting position by the rotation of the turn-table.

It may sometimes happen that the operator will desire to release or clamp the work on any given fixture independently of the operation of these devices as determined by the valve 34 and for this purpose we have provided the two valves 51 and 53.

Considering for the time being the valve at the left hand side of Figure 5, it will be noted that when the valve is in the position shown therein, air under pressure is transmitted to the lower side of the cylinder 27 and air is vented from the upper side of the cylinder. If the valve is then turned to the position shown in Figure 6, air under pressure will be conducted to the lower side of the cylinder 27 and the upper side of the cylinder will be vented, thereby reversing the operation of the fixture. Either valve 51 or 53 can thus be used for reversing the connections of the air supply to the ends of the cylinder and the operator is thereby provided with means whereby he can control the operation of the fixtures independently of the action of the valve 34.

While we have described the details of the preferred construction of our invention, it is to be clearly understood that our invention is not limited to these details but is capable of other adaptations and modifications within the scope of the appended claims and it is to be clearly understood that throughout the specification and claims, wherever we use the term "turn-table," this term is not limited to the construction shown in the drawings and described in the specification, but includes the face plates of lathes and other similar rotatable work supports.

Having thus described our invention, what we claim is:

1. The combination with a machine, having a turntable and fixtures for securing work thereto, each fixture comprising a cylinder having a piston slidable therein, of means for alternately supplying air under pressure to opposite ends of said cylinders and venting the other end, comprising a distributor block secured to said turntable, and provided with a valve seat coaxial with said turntable, a pair of pipes leading from said distributor block to the opposite ends of each of said cylinders, two pairs of ducts formed in said distributor block for establishing communication between said valve seat and said pipes, a stationary valve coacting with said valve seat and provided with an air inlet passageway and ports communicating therewith and with the ducts in said distributor block for alternately connecting said air inlet with the opposite ends of said cylinders, as said turntable rotates, and hand operable valves, one located intermediate the ends of each pair of ducts for reversing the direction of the flow of air to and from said cylinders.

2. The combination with a machine having a turntable and means for securing work to said turntable comprising a cylinder having a piston slidable therein, of means for alternately supplying air under pressure to opposite ends of said cylinder and venting the other end comprising a distributor block having a valve seat therein coaxial with said turntable, and a pair of ducts formed therein and communicating at one end with said seat, a pair of pipes respectively connecting the opposite ends of said ducts with opposite ends of said cylinder, a stationary valve coacting with said valve seat and having an air inlet passageway, and ports connected therewith for communicating with said valve ports while said turntable is rotating, and a hand operable valve between the ends of said ducts for controlling the operation of said securing means independently of said first mentioned valve.

3. The combination with a machine having a turntable and means for securing work to said turntable comprising a cylinder having a piston slidable therein, of means for alternately supplying air under pressure to opposite ends of said cylinder and venting the other end comprising a distributor block having a valve seat therein coaxial with said

turntable, and a pair of ducts formed therein and communicating at one end with said seat, a pair of pipes respectively connecting the opposite ends of said ducts with opposite ends of said cylinders, a valve coacting with said valve seat and having an air inlet passageway, and ports connected therewith for communicating with said valve ports, and another valve between the ends of said ducts for controlling the operation of said securing means.

4. The combination with a machine having a turntable and means for securing work to said turntable, comprising a cylinder having a piston slidable therein, of means for alternately supplying air under pressure to opposite ends of said cylinder and venting the other end comprising a distributor block having a valve seat therein coaxial with said turntable, and a pair of ducts formed therein and communicating at one end with said seat, a pair of pipes respectively connecting the opposite ends of said ducts with opposite ends of said cylinders, a valve coacting with said valve seat and having an air inlet passageway, and ports connected therewith for communicating with said valve ports.

5. The combination with a machine having a turntable and eccentrically located means for securing work to said turntable comprising a device adapted to be operated by air under pressure, comprising a distributor block secured to said turntable, means for supplying air to said distributor block comprising a stationary member located coaxially with said turntable, means for conducting air to and from said device from and to said distributor block, and hand operable means on said distributor block for controlling the passage of air to and from said device.

6. The combination with a machine having a turntable and eccentrically located means for securing work to said turntable comprising a device adapted to be operated by air under pressure, comprising a distributor block secured to said turntable, means for supplying air to said distributor block, means for conducting air to and from said device from and to said distributor block, and hand operable means on said distributor block for controlling the passage of air to and from said device.

7. The combination with a machine having a turntable and eccentrically located means for securing work to said turntable comprising a device adapted to be operated by air under pressure, comprising a distributor block secured to said turntable, means for supplying air to said distributor block, means for conducting air to and from said device from and to said distributor block, and hand operable means for controlling the passage of air to and from said device.

8. The combination with a machine having a turntable and eccentrically located means for securing work to said turntable comprising a device adapted to be operated by air under pressure, comprising a distributor block secured to said turntable, means for supplying air to said distributor block, and means for conducting air to and from said device from and to said distributor block.

9. The combination with a machine having a turntable and means for securing work to said turntable comprising a device adapted to be operated by air under pressure and comprising a distributor block secured to said turntable, means for supplying air to said distributor block and means for conducting air to and from said device from and to said distributor block.

10. The combination with a machine having a turntable, of means located eccentrically of said turntable for securing work thereto comprising a device adapted to be operated by air pressure, and means for supplying air to and venting air from said device comprising a member coaxial with said turntable and having means controlled by the movement of said turntable for first supplying air to said device and then venting said device.

11. The combination with a machine having a turntable, of means located eccentrically of said turntable for securing work thereto comprising a device adapted to be operated by air pressure and means for supplying air to and venting air from said device comprising a member having means controlled by the movement of said turntable for first supplying air to said device and then venting said device.

12. The combination with a machine having a turntable, of means located eccentrically of said turntable for securing work thereto comprising a device adapted to be operated by air pressure, and means for supplying air to and venting air from said device comprising a member, having means for first supplying air to said device and then venting said device.

13. The combination with a machine having a turntable, of means located eccentrically thereof for securing work thereto and comprising means to be operated by air under pressure, of means located centrally of said turntable for supplying air to said device while said turntable is moving, means controlled by the movement of said turntable for controlling the flow of air to and from said device, and other means for controlling the flow of air independently of said first named controlling means.

14. The combination with a machine having a turntable, of means located eccentrically thereof for securing work thereto and comprising means to be operated by

air under pressure, of means for supplying air to said device while said turntable is moving, means controlled by the movement of said turntable for controlling the flow of air to and from said device, and other means for controlling the flow of air.

15. The combination with a machine having a turntable, of means located eccentrically thereof for securing work thereto and comprising means to be operated by air under pressure, of means for supplying air to said device while said turntable is moving, and means controlled by the movement of said turntable for controlling the flow of air to and from said device.

16. The combination with a machine having a turntable, of means located eccentrically thereof for securing work thereto and comprising means to be operated by air under pressure, of means for supplying air to said device, and means controlled by the movement of said turntable for controlling the flow of air to and from said device.

17. The combination with a machine comprising a turntable, of means located eccentrically thereof for securing work thereto, comprising an air-operated device, means for supplying air thereto while said turntable is moving, and means for controlling the flow of air.

18. The combination with a machine comprising a turntable, of means for securing work thereto, comprising an air-operated device, means for supplying air thereto while said turntable is moving, and means for controlling the flow of air.

19. The combination with a machine comprising a turntable, of means for securing work thereto, comprising an air-operated device, means for supplying air thereto, and means for controlling the flow of air.

20. The combination with a machine having a turntable, of a pair of means for securing work thereto, each of said means being located eccentrically of said turntable and comprising an air-operated device, means for supplying air to said devices and means controlled by the movement of said turntable for controlling the supply of air to said devices to lock the work in one of said work securing means and release the work in the other work securing means.

21. The combination with a machine having a turntable, of a pair of means for securing work thereto, and comprising an air-operated device, means for supplying air to said devices, and means controlled by the movement of said turntable for controlling the supply of air to said devices to lock the work in one of said work securing means and release the work in the other work securing means.

22. The combination with a machine having a turntable, of a pair of means for securing work thereto, and comprising an air-operated device, means for supplying air to said devices and means for controlling the supply of air to said devices to lock the work in one of said work securing means and release the work in the other work securing means.

In witness whereof, we hereunto subscribe our names this 30th day of March, 1920.

CHAS. D. OESTERLEIN.
LOUIS H. BLOOD.

Witnesses:
CHAS. W. SCHILLING,
ERWIN H. SCHROEDER.