A. J. LAVOIE.

CHUCK.

APPLICATION FILED MAR. 26, 1919.

1,341,015. **Patented May 25, 1920.**

2 SHEETS—SHEET 1.

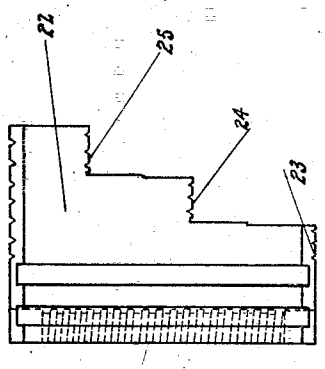
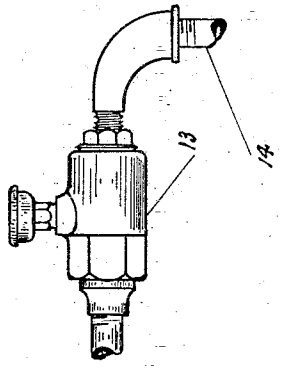


FIG. 9



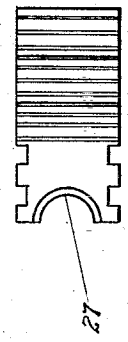


FIG. 10

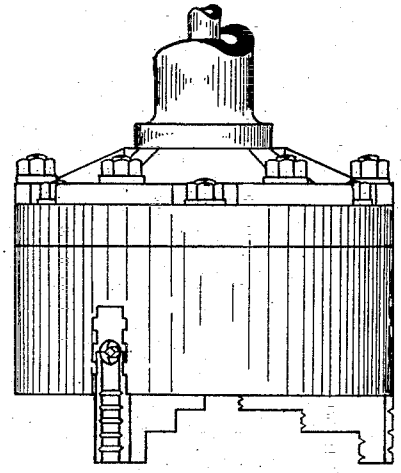


FIG. 1

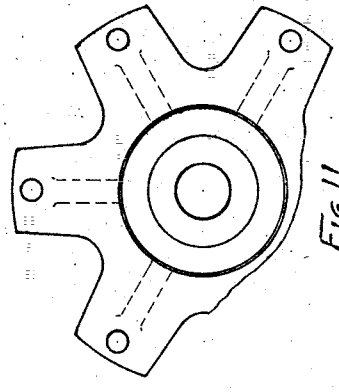


FIG. 11

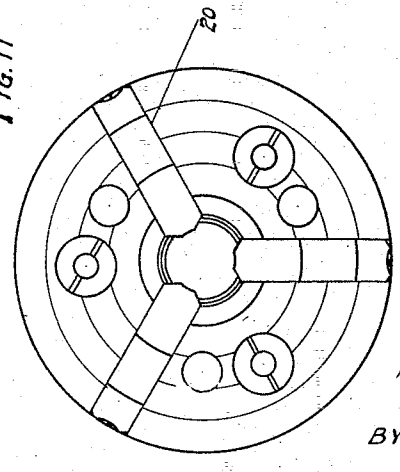


FIG. 2

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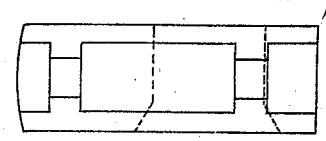


FIG. 7

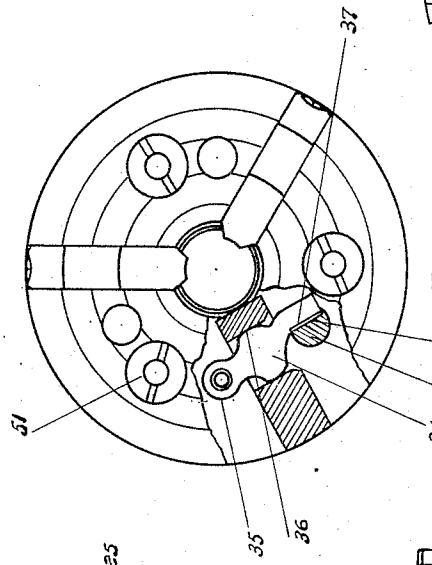


FIG. 4

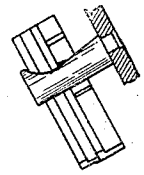


FIG. 5

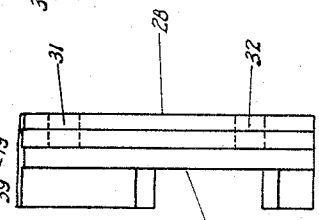


FIG. 6

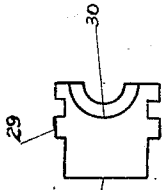


FIG. 8

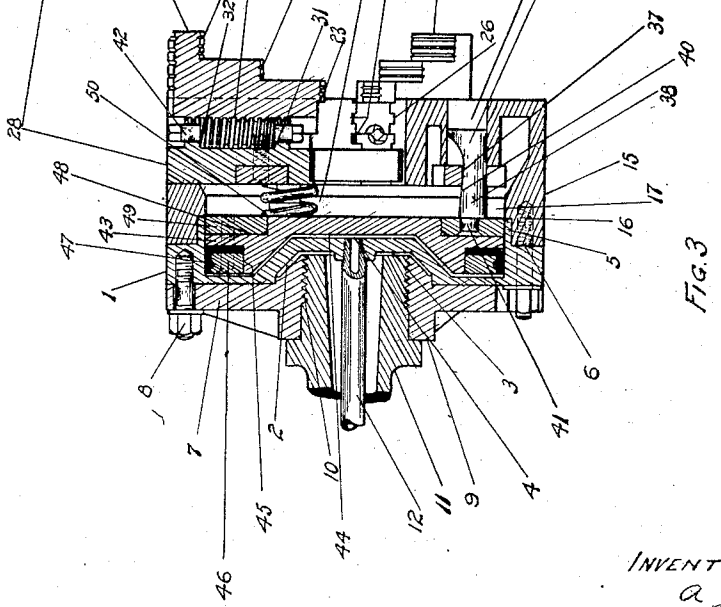


FIG. 3

INVENTOR

A. J. Lavoie

BY E. J. Futterknecht

ATTY.

UNITED STATES PATENT OFFICE.

ALPHONSE JOSEPH LAVOIE, OF MONTREAL, QUEBEC, CANADA.

CHUCK.

1,341,015. Specification of Letters Patent. Patented May 25, 1920.

Application filed March 26, 1919. Serial No. 285,361.

To all whom it may concern:

Be it known that I, ALPHONSE JOSEPH LAVOIE, a subject of the King of Great Britain, and residing at 294 Wilson avenue, in the city and district of Montreal, in the Province of Quebec, in the Dominion of Canada, have invented a new and useful Chuck, of which the following is a specification.

The invention relates to chucks as described in the present specification and illustrated in the accompanying drawings that form part of the same.

The invention consists essentially of the novel construction and arrangement of parts, whereby the jaws may be adjusted to the proper size according to the work to be done and operated in their gripping movements by fluid driven members.

The objects of the invention are to facilitate the operations of turning metal and other materials in lathes by effecting a quick engagement and an instant release from a carefully adjusted central position; to insure reliability in a work holding member; to economize in labor by reducing the time required to set and release the work; to afford greater radius in the one device than is customary in work holding members and thereby save the time and trouble incident to replacing one size of machine for another; and generally to provide a holder for various purposes, comparatively cheap to manufacture and both durable and serviceable in use.

In the drawings, Figure 1 is a side elevation of the machine, showing one jaw in its socket.

Fig. 2 is an end elevation of the machine.

Fig. 3 is a longitudinal mid-sectional view.

Fig. 4 is an end elevation, showing a section broken away to disclose a sectional view of a jaw base and an operating member.

Fig. 5 is a detail of a wedging member and coöperating parts.

Fig. 6 is a vertical side elevation of a jaw base.

Fig. 7 is a top view of a jaw base.

Fig. 8 is an end view of a jaw base.

Fig. 9 is a detail showing a side elevation of a jaw.

Fig. 10 is a detail showing a plan of the gripping faces and their supporting pillar.

Fig. 11 is an end view showing one half the face plate and end wall appearing at intervals therebehind.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, the numeral 1 indicates the end wall of the jaw holder and the said end wall is centrally recessed at 2, said recess having a circular flat bed 3 and an air inlet 4 in the center thereof.

The wall 1 is formed with the annular inward flange 5 and the annular recess 6 at the end of said flange.

The face plate 7 is secured by the screws 8 to the wall 1 and extends into and partly across the recess 2, having a central boss 9 and a threaded central socket 10 reaching to the bed 3 of said recess and receiving the hollow lathe spindle 11, through which the air pipe 12 reaches the air inlet 4.

The other end of the air pipe 12 is journaled in the casing 13 connected to the air supply by the pipe 14.

The body 15 of the holder is rigidly secured to the end wall 1 by the screws 16 and fits into the recess 6 to bring its inner wall flush with the inner wall of the flange 5 and thereby form a cylindrical piston chamber 17.

The remainder of the body 15 is formed with the cylindrical spring chambers 18, the circular guide orifices 19 for the wedging blocks and the radial jaw recesses 20 terminating at the end of the cylindrical chamber 17, said jaw recesses 20 having the grooves 21 in the edges thereof.

The jaws 22 are each formed with three gripping faces 23, 24 and 25 in stepped arrangement and at the sides have the tongues 26 fitting in grooves 21 of the body 15. The inner end 27 of each jaw 22 is semi-circularly grooved and threaded for the purpose of drawing said jaws inwardly and outwardly to and fro in their grooved bearings in said body.

The bases 28 for said jaws 22 are formed with tongues 29 to fit into the remaining grooves 21 and are slidable in said grooves in relation to the body 15, each of said bases having a semi-circular plain recess 30 corresponding to and opposing a recess 27 in a jaw, and the transverse ribs 31 and 32 limiting the length of the recess and forming abutments. The other side of each of said

bases is recessed intermediate of the depth thereof at 33. The dogs 34 are pivotally secured at their ends 35 in prepared grooves in the body 15 opposite each of the cam slots 33 and the cam sections 36 of said dogs are introduced into said slots, the actual cam engaging faces being substantially of arc-shape and so set in relation to one another as to move the bases 28 inwardly or outwardly as the case may be.

The other ends of the dogs 34 beyond the cam sections 36 are the wedge surfaces 37 engaged by the wedges 38, the latter having the circular ends 39 operating in the guide orifices 19 and the flattened inner sides 40 inclined from the head 41 of the wedge and engaging the wedge surfaces 37 of the dogs 34.

The screws 42 are introduced in the opposing semi-circular recess 27 and 30 of the said jaws and their bases respectively between the abutments 31 and 32 and the thread of said screws engages the thread in the recess 27, consequently on turning either end of said screws, the jaws will be moved while their bases remain stationary.

The piston 43 is formed with a central recess 44 corresponding to the central recess 2 in the end wall 1 and adjoining the latter the annular recess 45 containing the packing ring 46 and packing 47 rigidly secured to said piston.

On the other side of said piston, the outer annular recess 48 is made and contains the ring 49 rigidly secured and rigidly holding the heads 41 of the wedges 38.

It will be thus seen that the piston 43 becomes the operating member for the wedges 38 and incidentally the means of actuating the cams forming part of the pivoted dogs 34.

The helical springs 50 are introduced into the spring chambers 18 and at one end engage the piston 43 and at the other are mounted on pin guides having the adjusting heads 51 screw-threaded into said chambers 18, thereby providing a means of regulating the pressure of said springs to insure the return of the piston to the end wall at the termination of each operation.

In the operation of this invention the jaws are first adjusted by means of the screws 42, which are turned inwardly or outwardly as the case may be.

The manipulation of the said screws 42 causes the jaws to move, while the jaw bases remain stationary, for it will be seen that in each set the thread at both ends will come in contact with an abutment 31 or 32, and on one side be in engagement with the jaw, therefore on that side the jaw progresses or retrogresses on the screw, which widens or narrows the distance between gripping faces.

The jaws are set by adjustment to correctly fit the piece of work and it will be noticed that a considerable variation in sizes is provided for, as in the first place there are the three sets of gripping faces in steps and in the next place these have a radial movement for some distance in and out.

As soon as the jaws are properly adjusted the work is inserted and then the air is turned on, which causes a forward movement of the piston 43 and coincidently of the wedges 38. The latter engage the wedge surfaces of the dogs 34 and the cam sections of said dogs engage the bases of the jaws and move both bases and their jaws inwardly, consequently the work is firmly gripped so long as the air is on, but the moment the air is shut off the jaws are instantly released and then the work may be removed or reset.

This chuck is of the universal type and will operate instantly both in engaging and disengaging the work. The travel of the engaging parts is of the slightest owing to the fine adjustment previously done, therefore the wear and tear on the machine is at the minimum with a corresponding precision in the operation.

Various changes may be made in the details of construction without departing from the spirit of the invention, so long as they remain within the scope of the claims for novelty following this description.

What I claim is:—

1. A chuck comprising an air cylinder having its head held by a face plate screw-threaded on to a hollow lathe spindle, a chuck body completing the cylinder, an air feed pipe extending through the lathe spindle and connected with the inlet through said head, a piston spring-held against said head, jaws formed with a gripping member adjustable in relation to a base member and slidably mounted in said chuck body, said base members having transverse slots intermediate of their length, and wedging members engaging said bases in said slots and operatively connected with said piston.

2. In a chuck, a body suitably supported and having jaw recesses and grooves in the walls of said recesses, jaw bases having tongues entering said grooves and recesses in their front faces, jaws having threaded recesses in their inner faces opposing said base recesses and tongues engaging in said grooves, and screws engaging said threaded recesses and turning freely in the base recesses and stopped from longitudinal movement on said base, a piston operating in said body, levers pivoted within said body and swinging across said jaw bases, and wedges operatively engaging said levers beyond the jaw bases and actuated by said piston.

3. In a chuck, a body suitably supported and having jaw recesses and grooves in said recesses, jaw bases having tongues entering

said grooves, each base having a transverse lever slot and a recess in its front face and transverse ribs across said recess forming abutments, a screw arranged between said abutments and turning freely in said base recess, jaws having tongues entering said grooves and suitable gripping faces, each jaw having a threaded inner face engaged by said screws and levers extending through said slots and therebeyond and pivoted at one end and operatively engaged at the other end.

4. In a chuck, a body having a centrally recessed end wall secured thereto and an inlet to an expansion chamber, a hollow lathe spindle supporting said body in said central recess, an air pipe through said spindle, jaws slidably mounted in said body, levers extending across said jaws intermediate of their length and swinging from pivots at one end, a piston operating in said expansion chamber, and wedge pins engaging said levers beyond the jaws and operatively connected with said piston.

5. In a chuck, a chuck body and end wall forming a cylindrical chamber having an air inlet, and jaw recesses, jaws adjustably arranged in said recesses, cam members operatively connected with said jaws, wedge pins engaging said cam members, and a piston operating in said cylindrical chamber and driving said wedge pins.

6. In a chuck, a chuck body and end wall forming a cylindrical chamber having an air inlet, and jaw recesses, guide and spring passages, jaws secured in said recesses, cam members engaging said jaws, wedge pins engaging said cam members and operating in guide passages, a piston operating in said cylindrical chamber, and driving said pins and springs in said passages returning said piston.

7. In a chuck, a chuck body and end wall forming a cylindrical chamber having an air inlet, spring and guide passages and jaw recesses, jaws adjustably arranged in said recesses and having in the rear portions thereof a cam slot, cam members pivoted in the said body and introduced into the prepared slots in said rear portions, wedge pins in said guide passages and engaging said cam members, a piston in said cylindrical chamber and secured to the heads of said wedge pins, and springs adjustably secured in said spring passages and engaging said piston.

Signed at the city of Montreal, Quebec, Canada, this 14th day of March, 1919.

ALPHONSE JOSEPH LAVOIE.