



# UNITED STATES PATENT OFFICE.

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CHUCK.

1,295,994.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALPHONSE JOSEPH LAVOIE, a subject of the King of Great Britain, and resident of 154 Prud'homme avenue, in the city and district of Montreal, in the Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Chucks, of which the following is a specification.

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

The invention consists essentially in the novel arrangement and construction of parts whereby the gripping members are operated in a manner conformable with the best results regarding the engagement of the grip members simultaneously.

The objects of the invention are to facilitate the operations of the mechanic in lathe and like work, so that he will be enabled to handle his piece of work quickly and efficiently, to devise a chuck that may be used almost universally in turning and such machine work, and generally to provide a chuck cheap to manufacture and durable in its construction.

In the drawings Figure 1 is a longitudinal mid-sectional view, showing a piece of work engaged by the clamping jaws.

Fig. 2 is an end elevation of the chuck.

Fig. 3 is a cross sectional view showing the annular chamber for the reciprocation of the jaw members.

Fig. 4 is a cross sectional view through the return spring rods casing and jaws adjacent to the end.

Fig. 5 is an enlarged detail of the adjusting means for the return springs.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, the head 1 of the chuck is formed with the hollow shaft socket 2, said socket being threaded internally at 3 and having in the bed thereof a threaded opening 4 leading through the wall of said head.

The side wall 5 is in the form of an annular flange from the head 1 and at the extremity has the annular boss 6, into which the screw holes 7 extend.

The jaw casing 8 is formed at its inner end with the flaring rim 9, through which the screw bolts 10 hold the casing 8 to the boss 6.

The casing 8 extends outwardly and is recessed at 11 intermediate of the length thereof, said recesses having the slots 12 through the bed thereof, in which the screws 13 slide.

The jaw recesses 14 are formed in the inner wall of said casing 8 and the beds of said recesses are inclined from the axis of the casing and head, said inclines rising from the outer end to form wedge surfaces for the gripping jaws in their outward movement.

The compression spring chambers 15 are also formed in the casing 8, in groups alternating with the jaw recesses 14, said chambers terminating in the outer end in the rod holes 16, or as shown in Fig. 5, terminating in the threaded outer ends 17, in which the adjusting plugs 18 are inserted for adjusting the springs inclosed in said chambers.

A piston 19 is introduced into the interior of the head 1 previous to the attachment of the jaw casing and the packing ring 20 and packing 21 are secured to said piston at the outer edge to complete the air tight expansion chamber 22.

At the outer edge, the flange 23 extends outwardly forming the side wall of the piston, said wall or flange 23 reciprocating in the annular chamber 24. The central cylindrical wall 25 is concentric with the outer wall 23 and extends to the offset 26 from which in enlarged form 27 it extends to annular inturned flange 28, adapted to engage the jaws 29 in the recesses 30, said jaws being arranged in the jaw recesses 14 and preferably having the plates 31 mounted on the backs thereof for adjusting purposes, the plates 31 being held in place by the pins 32 entering corresponding pin holes in said jaws.

It will be seen by the above description that the jaws 29 to enter the recess 14 must be of tapering form, that is to say, they must have the backs inclined in relation to the straight gripping fronts so as to wedge between the work and the inclined surfaces of said recess 14; consequently, when pressure is brought to bear on the piston head, the cylindrical wall 25, being part of said piston head, and forming a socket, is thrust outwardly, and as said flange 28 engages the jaws 29, the said jaws are also thrust outwardly against the inclined inner walls 14, the tendency of said jaws being to form a wedge between the walls 14 and the piece of work in the chuck, here shown as the shell

33, in the socket 25 and extending outwardly between said jaws.

The rods 34 extend from the rod holes 16 into the spring chambers 15 and at their other ends within said spring chambers carry the heads 35. The spiral springs 36 encircle said rods 34 between the heads 35 and the end walls of the chambers 15.

The springs 36 exert a constant inward pressure on the heads 35 and these heads about the flange 28 between the jaw recesses 14, thereby forcing the piston continuously toward the head 1.

The threaded opening 4 is the inlet to the expansion chamber 22 and this inlet is connected to a compressed air pipe, which extends through the sleeve 2 and other parts of the machine, on which the chuck is mounted, to a compressed air supply. As soon as the air is turned on it flows into the chamber 22 and exerts a considerable force on the piston 19 which, as explained hereinbefore, moves the jaws against the inclined inner wall of the chuck casing and consequently against the work.

The release of the air pressure effects the release of the jaws, as the springs 36 return the piston to its original position, thereby loosening the jaws so that the work can be readily removed.

The screws 13 anchor the jaws 29 to the casing 8 through the slots 12, though they do not interfere with the longitudinal movement of said jaws.

It will be noticed that the jaw recesses 14 extend from the outer end of a concentric annular surface, said surface forming the inner wall of a cylindrical alining chamber and the enlarged portion 27 of the central extension from the piston engages said inner wall and thereby alines the gripping members with the socket formed by the central cylindrical wall 25 forming the inner part of the extension.

Various changes may be made in the construction and arrangement of the parts included in this device, without departing from the spirit of the invention, so long as they are within the scope of the claims for novelty following.

What I claim is:—

1. In a chuck, a housing in two parts bolted together and having a common axis, the inner part forming an expansion chamber and having a fluid opening in the head thereof, and the outer part having a plurality of longitudinal recesses with inclined beds, a piston operating in said expansion chamber and having an integral, cylindrical and inner central wall projecting outwardly therefrom and forming a socket for the work, said projection being enlarged at the outer end and forming an annular flange spring-held inwardly, and jaws in said recesses having correspondingly inclined backs

and transverse grooves at the inner end receiving said annular flange.

2. In a chuck, a housing in two parts, forming an expansion chamber, cylindrical chamber and a wedging casing, securely fastened together and having an inlet opening through the head of said expansion chamber, said wedging casing having jaw recesses with wedging beds, jaws in said recesses, a piston operating in said cylindrical chamber and suitably packed and having a concentric and inner cylindrical wall terminating in an enlarged inwardly flanged outer end and engaging said jaws, and compression springs introduced in the wall of said wedging casing between said jaws and exerting a constant pressure on the outer extremity of said concentric wall counter to the fluid pressure on said piston.

3. In a chuck, a housing in two parts, forming a fluid expansion chamber, a cylinder body and a wedging casing, the latter having longitudinal recesses with inclined beds and openings through said beds into slots from the outer side, jaws correspondingly formed and wedging on to the work from said recesses and having transverse grooves at their inner ends, a piston operating in said cylindrical head and having a central cylindrical outward projection of lesser diameter and terminating in an offset portion forming an annular flange engaging said transverse grooves, springs inserted in corresponding holes in the solid portions of the wall between said jaw recesses and engaging said piston and adjusting screw pins engaging said jaws through said openings.

4. In a chuck, a housing in two parts forming an expansion chamber at the head end and a jaw containing member at the outer portion, said jaw containing member having an annular wall forming a chamber of lesser diameter than said expansion chamber and concentric therewith, a piston having an outer side wall engaging the wall of said expansion chamber and an integral central extension, offset and beyond said offset forming an annular wall engaging the aforesaid annular wall and alining the chuck, jaws in said jaw containing member engaged by the extremity of said central extension and springs in constant engagement with said integral extensions and returning said piston to its original position following each forward movement.

5. In a chuck, a housing in two parts having a common axis, said parts forming an expansion chamber and an alining chamber respectively, jaws contained in the outer part and adapted to wedge to the work, and a piston spring-held toward the head and having an integral central concentric extension therefrom forming a rigid central socket substantially flush with said jaws

and offset to form an alining surface engaging the wall of said alining chamber and at the extremity of said alining surface formed to engage said jaws.

5 6. In a chuck, a housing in two parts having a common axis, the inner part forming a head and an expansion chamber and the outer part forming a jaw container and alining surfaces, jaws in said jaw container,  
10 a piston having a central outward extension engaging said alining surfaces and inwardly

turned at the extremity forming a flange engaging said jaws, and springs in said container arranged in corresponding chambers alternating with said jaw recesses said 15 springs operating on a headed rod engaging said flange and being adjustable in regard to the pressure exerted on the piston.

Signed at the city of Montreal, Canada, this 4th day of June, 1918.

ALPHONSE JOSEPH LAVOIE.