(No Model.)

W. SCHWANHAUSSER.

CHUCK.

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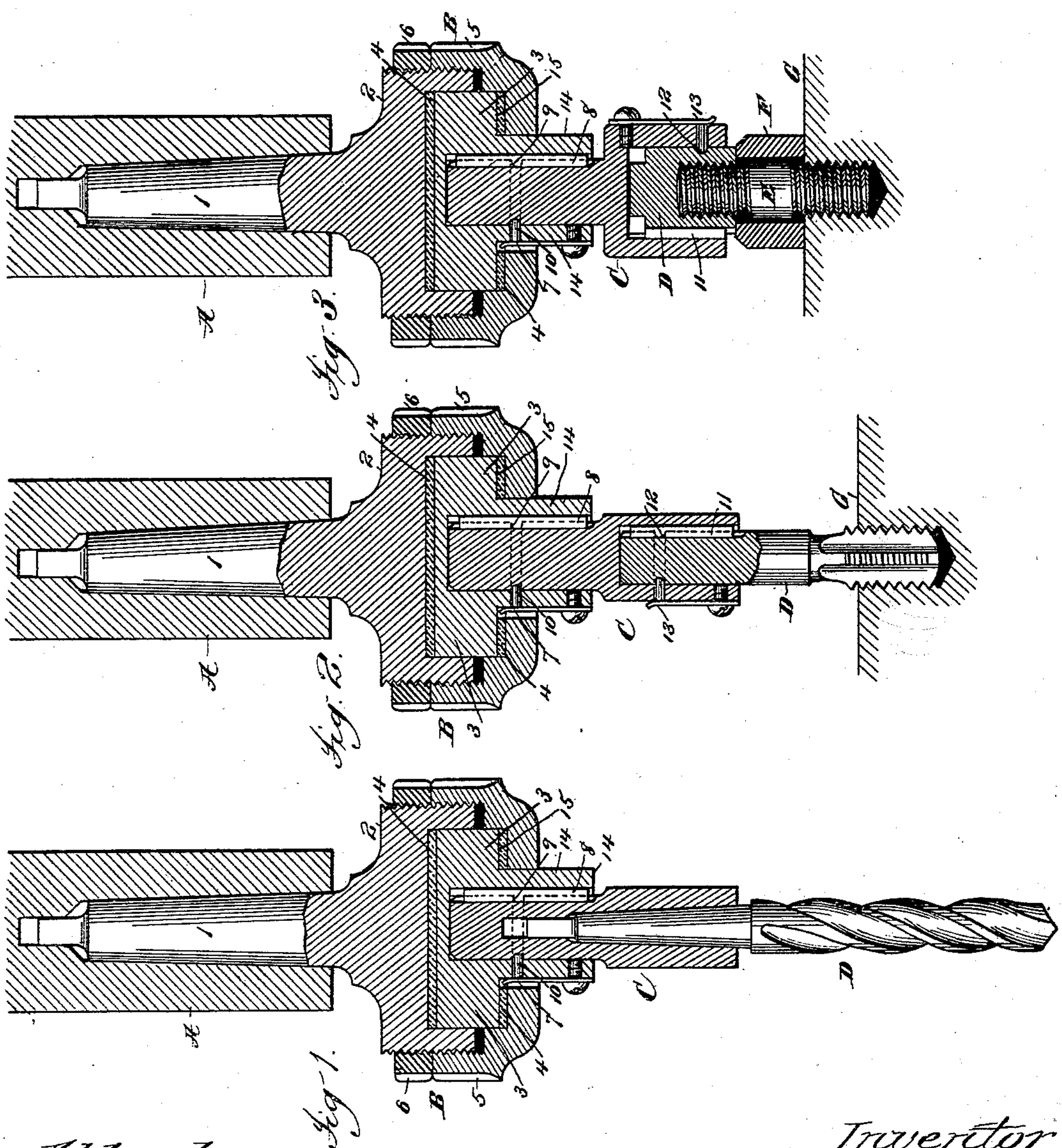

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CHUCK.

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To all whom it may concern:

Be it known that I, WILLIAM SCHWANHAUSSER, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Chucks, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to chucks, and has especial reference to drill-chucks and others of the class used in machines for boring, tapping, stud-setting, and similar purposes. In machines of this character the chuck holding the drill, tap, and stud-setting device is rigidly fastened to the driving-spindle, and in consequence, when employed for tapping, it becomes necessary, as the tap approaches the bottom of the hole, to so regulate the stopping of the machine as to prevent the tap from striking the bottom and receiving the full power transmitted through the spindle, which would result in the breaking of the tap, or, if the tap is of sufficient strength to resist the power, would injure the driving mechanism of the machine or the material on which the work is being done. When employed for stud-setting, in which operation it becomes absolutely necessary to provide a positive stop in order to gage the proper projection of the stud, the same nicety of regulation as to the stopping of the machine must be observed, thus requiring in either operation a large amount of skill in the use of such machines when employed for these purposes. Notwithstanding the greatest care, it is found in practice that many tools are broken or the machine or material injured through the impossibility of judging accurately the point at which it is necessary to stop the machine.

One object of my invention is to obviate this difficulty by providing a simple, cheap, and durable chuck, which shall be of sufficient rigidity to transmit or sustain the force required for the performance of the work, but shall yield under an excess of strain, permitting the tool to be driven at full speed until the completion of the work, thus reducing greatly the amount of skill required, and preventing absolutely the breaking of tools or the injuring of either the machine or material. In machines of this character, moreover, it is usual to employ a feeding device constructed to be thrown out of operation when desired, the purpose of this being to enable the machine to be used with either a drill, in the use of which a feeding mechanism is required, or with a tap or other tool which feeds itself. In the latter case the feed of the tool may and frequently will differ from that of the feeding mechanism, the same machine being used with taps the threads of which are of different pitches. In such case, if the feeding mechanism be not thrown out of operation in changing from drilling to tapping or other similar work, either the tool, material operated upon, or the machine will be broken.

Another object of my invention is to provide a chuck or other holder having tool-holding means so constructed as to yield under a force tending to move the tool and holder in different directions and allow the tool to be drawn out, thus avoiding all danger of breakage in case the operator neglects to throw out the feeding mechanism in using a tap or other tool having a feed varying from that of the feeding mechanism.

While it is evident that a chuck so constructed is of universal application in machines of this character it may be best illustrated by its use in a combined drilling, tapping, and stud-setting machine, for which it is especially intended, and will be shown as thus applied.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view, partly in section, showing my improved chuck attached to a drill-spindle and carrying a drill. Figs. 2 and 3 are similar views showing the chuck in use with a tap and in stud-setting.

A is a drill spindle or driver, to which the chuck B is attached by its shank 1. The chuck B consists of the body 2, screw-threaded upon the outside and recessed to receive the socket-piece 3, to which the tool or tool-holder is to be attached. The socket-piece 3 is formed with a neck 14, reduced in size, thus providing shoulders 15 upon the base of the socket-piece. Surrounding the threaded body 2 and the socket-piece 3 is the screw-cap 5, through which is passed the neck of the

socket-piece, the cap thus bearing upon the shoulders 15. The body 2 and socket-piece 3 and the shoulders 15 and cap 5 may be in direct contact; but I prefer to insert between their bearing-surfaces friction-pieces 4, formed, preferably, of vulcanized fiber, thus permitting the chuck to be made of ordinary material, and enabling it to be used a long time by renewal of the friction pieces or disks as they wear. The cap 5 serves to adjust the friction between the parts, the friction being increased as the cap is screwed farther up upon the body, pressing the body and socket-piece together. A locking-nut 6 is provided for securing the parts in position when adjusted.

The operation of this part of my device is as follows: The tool or tool-holder having been inserted into the socket-piece 3 and attached thereto by means which, so far as the operation of this part of my invention is concerned, may be of any ordinary form, the friction of the parts is adjusted in accordance with the work to be performed by the screw-cap 5, which is then locked in position by the locking-nut 6. The machine then being set in operation the tool is driven by force transmitted through the parts in frictional contact until the work is completed. In the operation of drilling, as the tool is driven through the material the cutting-edges of the drill will catch upon the side of the opening formed, thus tending to break the edges of the drill or to injure the material. In the case of a tap the completion of the work produces an increased strain through the tap reaching the limit of its motion in material G, and in the case of the stud-setting device shown in Fig. 3, in which the block F limits the motion of the stud-holder D and stud E, a positive stop is also reached. In each of the three cases the strain put upon the tool or holder is in excess of the rigidity of the chuck, and the body 2 and cap 5 will turn upon the socket-piece 3, which carries the tool or tool-holder, thus preventing any injury of the tool or material through the increased strain. This movement of the body and cap independent of the tool will indicate the completion of the work, when the machine will be reversed. It is evident that the close attention necessary in the use of a chuck of ordinary form is not required, as the machine is driven at full speed until the parts of the chuck slip, and this slipping is sufficient to call the attention of the operator without constant watching of this part of the machine.

It will be understood that the feeding mechanism may be applied to either the tool-driver or to the part carrying the material, the operation of the chuck being the same whether the tool moves toward the work, or vice versa, and whether the tool be rotated or the material rotated in contact with it. The chuck, moreover, may be used to carry the material instead of the tool.

Referring now to the second part of my invention, the socket-piece 3 is provided with a spring-catch 10, formed, preferably, of a pin having a rounded or beveled end, as shown, and the tool-holder with a recess 9, in which the spring-catch 10 is adapted to enter, the recess also being formed, preferably, with rounded or beveled sides. The tool-holder and socket-piece may be connected by a spline 8, preventing rotary movement of the parts upon each other, or if the parts be angular in cross-section the spline will be unnecessary. The tool-holder is inserted and secured in the socket by simply sliding it into place, the catch 10 yielding to allow this, but springing into the recess 9 as the base of the tool-holder reaches and rests upon the base of socket-piece. The spring is made of sufficient rigidity, so that the catch holds the parts together in the ordinary operation of the machine, there being, as is evident, no pressure tending to force the catch out, except the weight of the tool and tool-holder.

The operation of this part of my device is as follows: If the feeding mechanism used in connection with the drill shown in Fig. 1 be not thrown out of operation in using the tap or setting the stud, as in Figs. 2 and 3, and the feed of the tap or stud and that of the feeding mechanism be different, the pull tending to separate the parts B and C will be sufficient by the pressure on the rounded or beveled sides to force the spring-catch 10 out of the groove or recess in the chuck, thus permitting the latter to slide out of the chuck and preventing any injury to the parts. It is evident that either the catch or recess may be formed with square sides, if desired; but the construction shown is preferable. If the catch be formed with square sides, the inner end of the tool or tool-holder should be beveled opposite the catch, as shown on the inner end of tool-holder C.

In Fig. 2 the tap D and in Fig. 3 the stud-holder D are shown as connected to their respective holders by means similar to that used in the chuck, consisting of the spline 11, recess 12, and spring-catch 13. This second attachment may be of any ordinary form, so far as the special function of the holder in connection with the feeding mechanism is concerned; but this holding means is preferred, independent of its special use, on account of the ease with which the tool may be attached to and detached from its holder. In the common form of holder shown in Fig. 1, in which the drill D is driven into holder C, much force is necessary to remove the drill, this being done generally by driving a wedge inside the end thus forcing the drill or other tool out, an operation that necessitates the stopping of the machine and results in injury to the tool and holder. With my means of attachment the tool may readily be withdrawn from the socket by first raising the spring-catch or by a stronger pull without thus raising it. It will thus be seen that my means for holding a tool is of universal ap-

plication, and may be used not only in a chuck but in tool-holders of any other form.

What I claim is—

1. In a chuck, the combination of a body for attachment to the driver, a socket-piece for receiving the tool or tool-holder, an adjustable clamp pressing the parts together, whereby the friction of the parts may be adjusted in accordance with the work to be done, and means for holding the clamp in position when adjusted, substantially as described.

2. In a chuck, the combination of a body for attachment to the driver, a socket-piece for receiving the tool or tool-holder, one of said members being screw-threaded on the outside, a screw-clamp surrounding the screw-threaded member and engaging the other member, whereby the friction may be adjusted in accordance with the work to be done, and a locking-nut on said screw-threaded member for holding the parts in position when adjusted, substantially as described.

3. In a chuck, the combination of a body for attachment to the driver, a socket-piece for receiving the tool or tool-holder, one of said members being screw-threaded on the outside, a friction-piece between the body and socket-piece, a screw-clamp surrounding the screw-threaded member and engaging the other member, whereby the friction may be adjusted in accordance with the work to be done, and a locking-nut on said screw-threaded member for holding the parts in position when adjusted, substantially as described.

4. A chuck consisting of the recessed screw-threaded body 2, socket-piece 3, inserted into said recess and provided with a reduced neck and shoulders, adjustable screw-threaded clamping-ring 5, surrounding the body and neck and pressing against the shoulders, pressure-pieces 4 between the parts, and a locking-nut 6 on the body for holding the parts in position, substantially as described.

5. A chuck consisting of a plurality of parts having surfaces held in frictional contact, the pressure being so adjusted that the chuck is rigid under the strain required for work, but yields under an excess of strain, and having a socket to receive a tool or tool-holder, and a yielding catch adapted to enter a recess in the side of the tool or tool-holder, the catch being constructed to yield and release the tool or tool-holder under a force tending to pull the same from the socket, substantially as described.

6. In a chuck, the combination of a body for attachment to the driver, a socket-piece for receiving the tool or tool-holder, an adjustable clamp for pressing the parts together, whereby the friction of the parts may be adjusted in accordance with the work to be done, and a yielding catch adapted to enter a recess in the side of the tool or tool-holder, the catch and tool or tool-holder engaging by rounded or beveled surfaces, whereby the catch will yield and release the tool or tool-holder under a force tending to pull the same from the socket-piece, substantially as described.

7. In a chuck, the combination of the recessed body 2, socket-piece 3, inserted into said recess and provided with a reduced neck and shoulders, adjustable clamping-ring 5, surrounding the body and neck and pressing against the shoulders, and pressure-pieces 4 between the parts, substantially as described.

8. A chuck having a socket to receive a tool or tool-holder and provided with a yielding catch adapted to enter a recess in the side of the tool or tool-holder, the catch being constructed to yield and release the tool or tool-holder under a force tending to pull the same from the socket, substantially as described.

9. A chuck having a socket to receive a tool or tool-holder and provided with a yielding catch adapted to enter a recess in the side of the tool or tool-holder, the catch and tool or tool-holder engaging by rounded or beveled surfaces, whereby the catch will yield and release the tool or tool-holder under a force tending to pull the same from the socket, substantially as described.

10. The combination of a tool-holder provided with a spring-catch, and a tool adapted to slide into said holder and provided with a recess in its side to receive the spring-catch, the catch and holder engaging by surfaces, one or more of which is beveled or rounded, substantially as described.

11. As a means for retaining a tool in its holder, the spring-pressed pin 10, carried by the holder and having a rounded or beveled end adapted to enter a recess in the side of the tool, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM SCHWANHAUSSER.

Witnesses:

JAS. W. PARKER,

F. G. PITCHER.