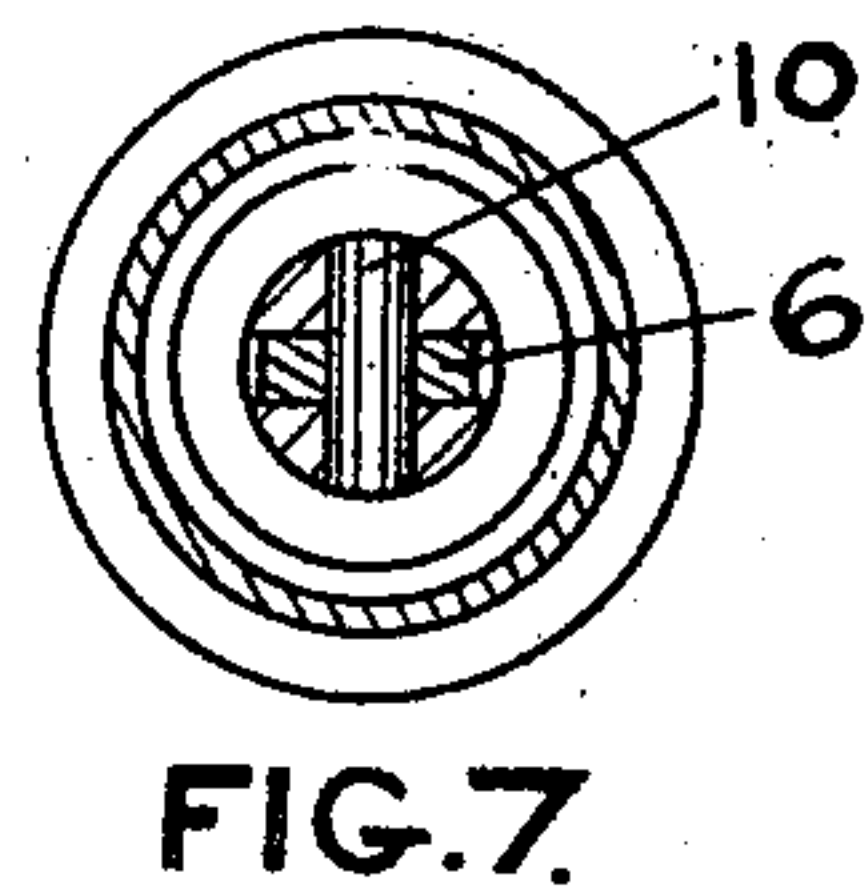
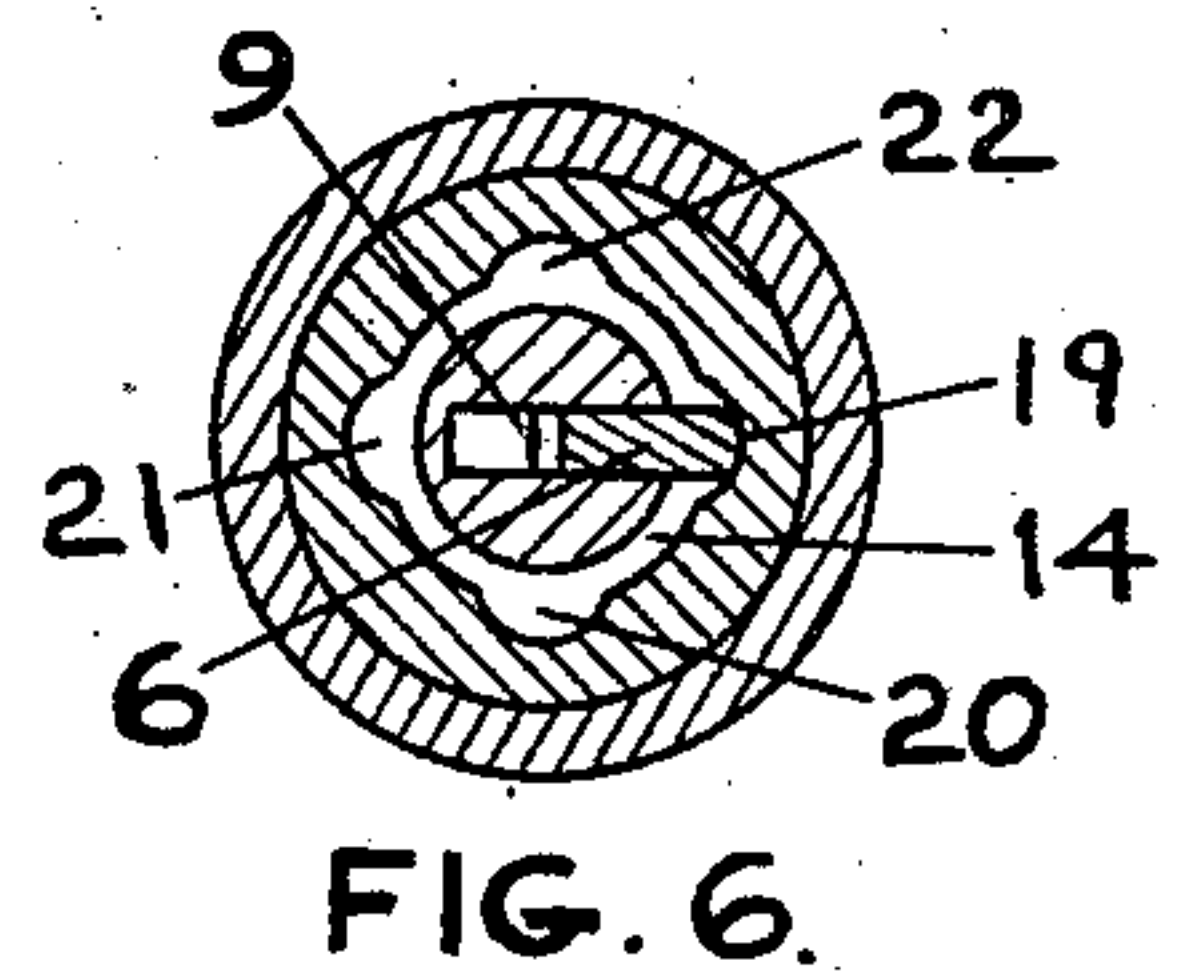
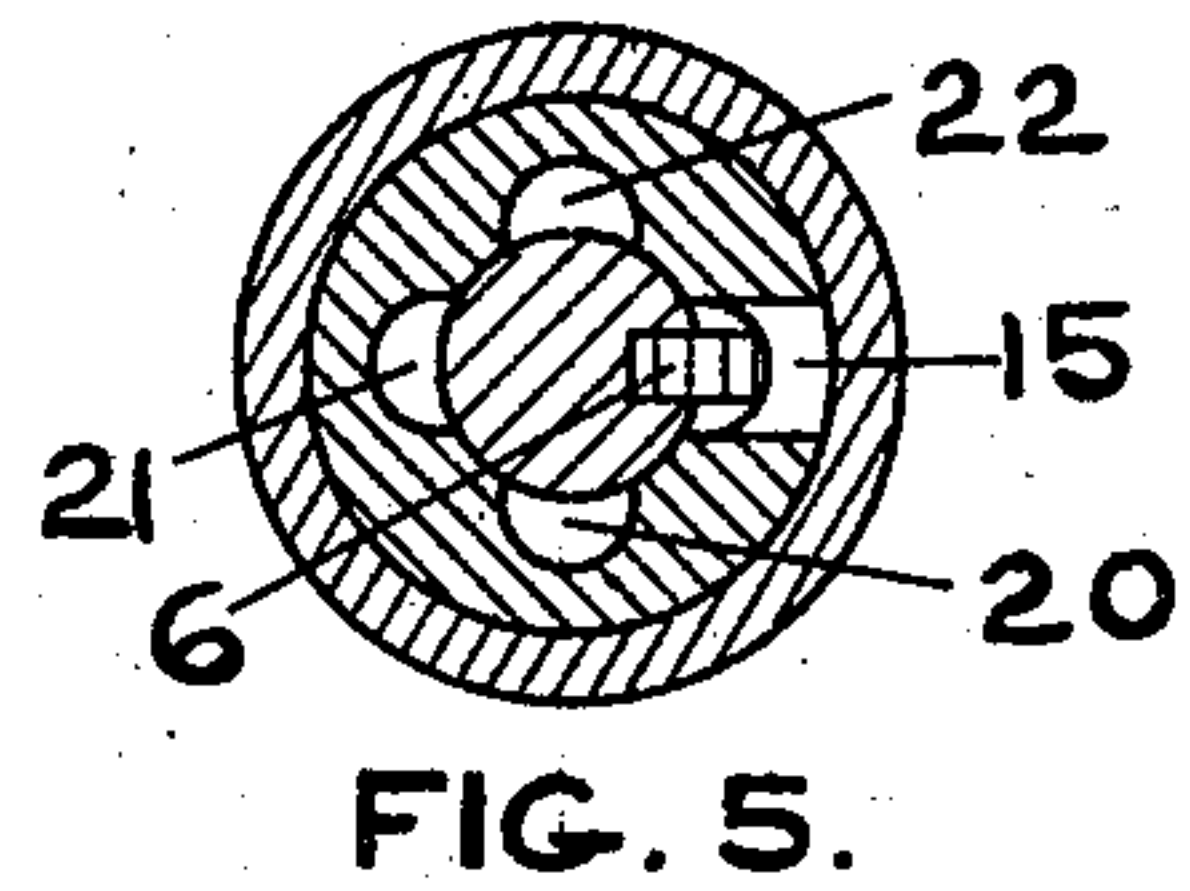
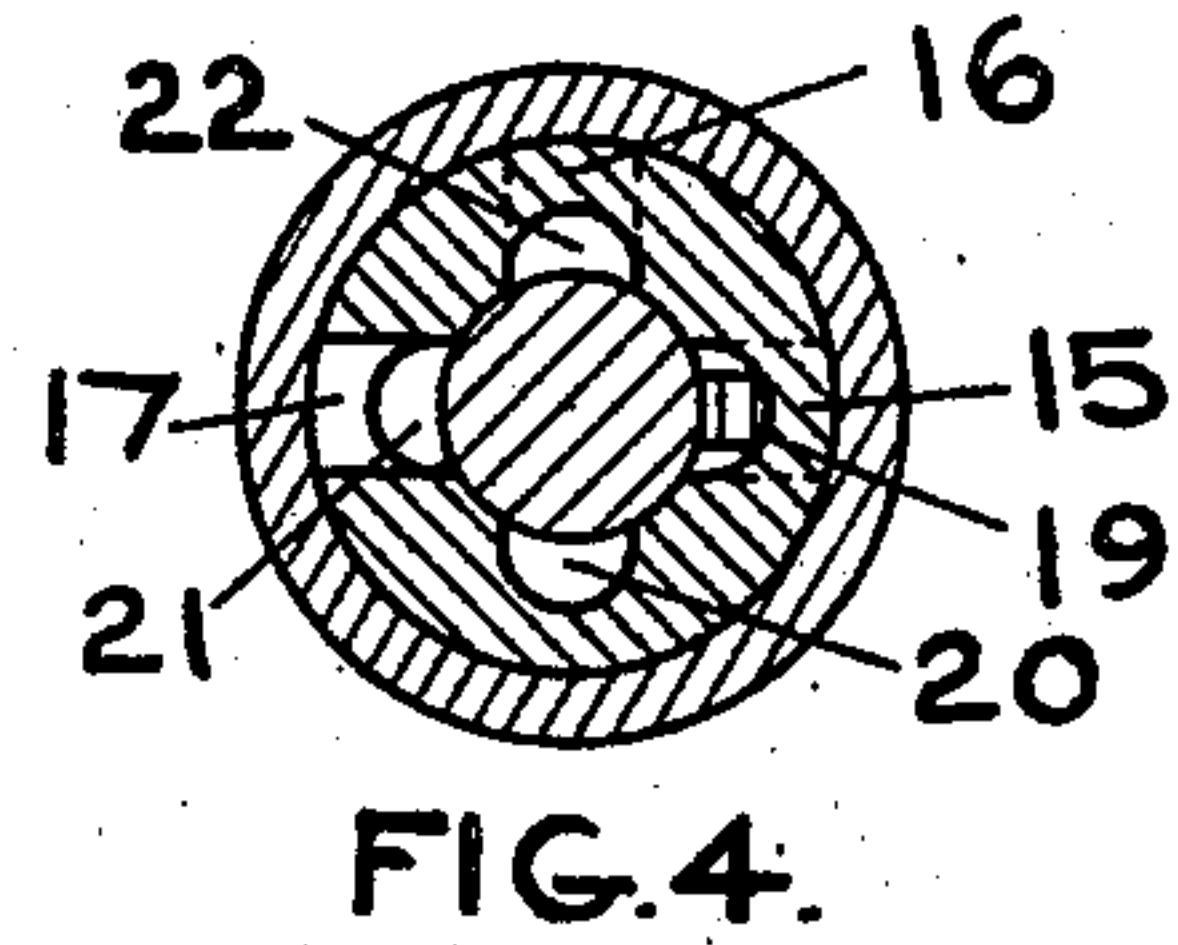
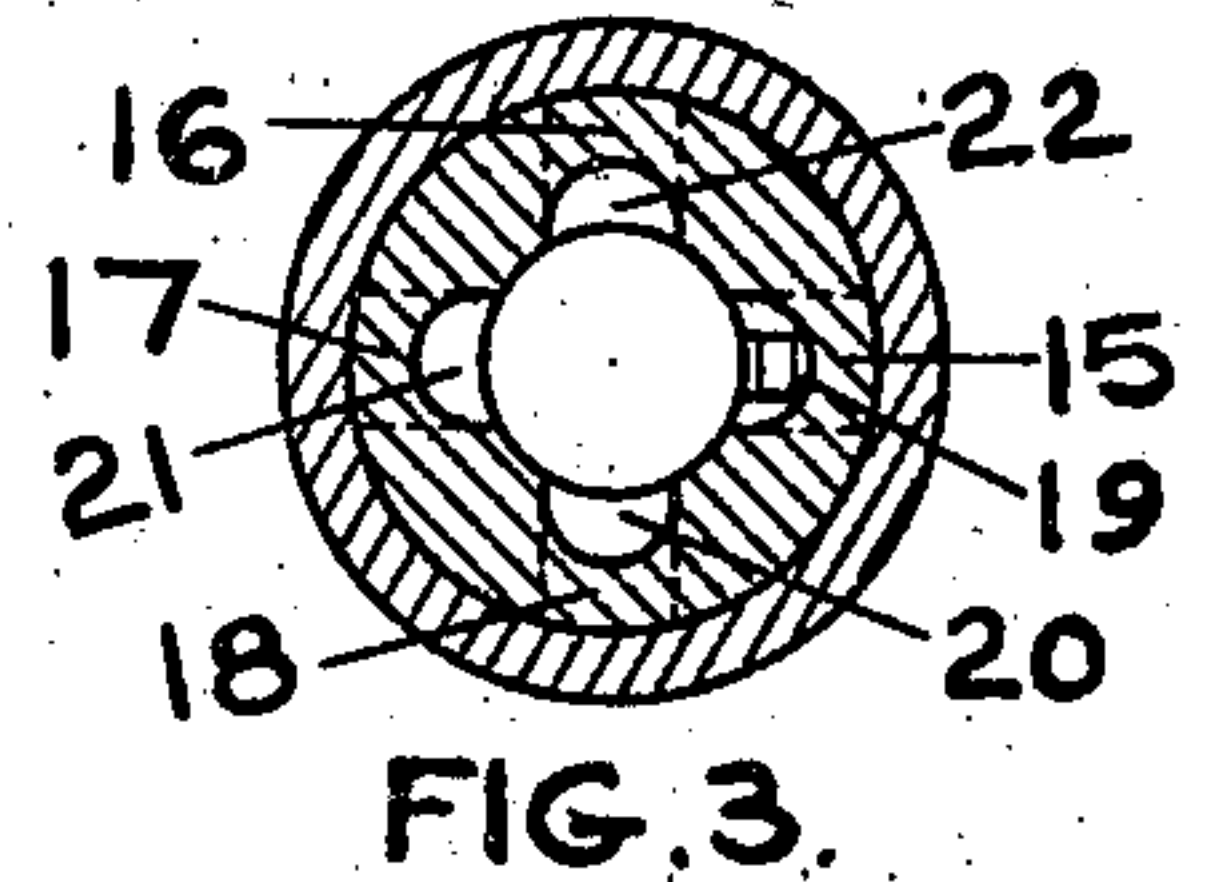


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# UNITED STATES PATENT OFFICE.

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## STRIKING-TOOL.

947,391.

Specification of Letters Patent.

Patented Jan. 25, 1910.

Application filed April 2, 1909. Serial No. 487,552.

*To all whom it may concern:*

Be it known that I, WILLIAM C. MICHAEL, a citizen of the United States, residing at Claremont, in the county of Sullivan and State of New Hampshire, have invented an Improvement in Striking-Tools of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to striking tools, being more particularly concerned with the provision of improved means for adjusting the stroke of striking tools, such, for example, as center punches, dental pluggers, or other tools of this description.

My invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings: Figure 1 is a central, sectional elevation showing a tool embodying one form of my invention with the parts just ready to deliver a blow; Fig. 2 is a similar section showing the parts in normal position; Fig. 3 is a plan view, in section, taken on the line 3—3, Fig. 2; and Figs. 4, 5, 6 and 7 are similar sections in plan taken on the lines 4—4; 5—5; 6—6; 7—7, respectively, in Fig. 2.

Referring to the drawings and to the tool therein disclosed, which I have selected for illustrating the principles of my invention, the same comprises a holder 1, herein consisting of a hollow cylindrical shell or tubular casing, having the tubular tip or nose piece 2 through which projects the punch rod 3, the latter carrying at its end any suitable form of tool, herein, by way of example, a simple center punch.

The punch rod has a sliding fit through the tip 2 and is normally projected to the position in Fig. 2 by means of the coiled spring 8 located within a chamber in the tip and abutting, one end against a collar or enlargement on the punch rod, and the other against the guide member 5. The latter forms a second guide or bearing through which the punch rod slides and, like the nose piece, is threaded into the head end of the tubular casing 1, being provided with the holes 13 to

facilitate screwing it into or unscrewing it from the casing.

The tool is operated by applying the end of the punch rod to the work and depressing the holder against the spring 8, devices being provided within the casing whereby a hammer blow is delivered to the end of the punch rod, which hammer blow is herein made adjustable both as to the force and the length of stroke of the hammer member.

To deliver the hammer blow the holder has within it the hammer member 4, which is adapted reciprocatively to slide within the casing, there being interposed between the rear of the hammer member and the closed end of the casing the hammer spring 7. The latter has one end fixed in the casing at 23, and the other end in the hammer member at 28 and is preferably of sufficient stiffness not only to strike the desired blow but also to prevent rotation of the hammer member.

The hammer member has an axial bore 30 into which the upper part of the punch rod may enter. When the holder is depressed the hammer member moves with it until it is caught and held against further depression at a predetermined distance from the punch rod by suitable holding means, whereupon further depression of the holder results in compression of the hammer spring. Subsequent depression of the holder finally causes the holding means to release the hammer, permitting the compressed hammer spring to drive it downward and cause the seat 27 of the bore 30 to deliver the hammer blow against the upper end of the punch rod.

While any suitable holding and releasing devices may be employed, herein I have shown a locking or holding pawl 6, pivotally mounted upon the pin 10, within the narrow slot or opening in the punch rod the bottom and top of the slot being designated by 24 and 25 respectively. This pawl is adapted to catch but subsequently to release the hammer member on depression of the holder, as described.

As herein shown, the upper or holding end of the pawl 26 is normally pressed outward by the spring 9 and slides in one of several longitudinal grooves being shown by way of example, in the groove 19, which is of substantially semi-circular cross-section (as



shown in Fig. 3), and cut in the walls of the hammer bore 30. Herein, for purposes of adjustment to be more fully described, there are provided four such grooves 19, 20, 21 and 22, spaced at equal distances about the said bore, but a greater or lesser number may be employed, if desired, and the shape and arrangement of such grooves may be otherwise widely varied, and formations other than a groove formation may be employed.

When the holder is depressed from the position shown in Fig. 2 toward that shown in Fig. 1, the hammer member 4 descends with the holder with the projecting end 26 of the pawl resting in the groove 19. At a suitably selected point in the groove there is provided a depression or opening 15 presenting a shoulder into which depression the pawl-end 26 is forced by the spring 9 as soon as it comes into registration therewith, moving the pawl to the position shown in Fig. 1. The hammer member is then held fast against further depression of the holder, which merely causes the compression of the two springs 7 and 8.

The lower end of the pawl is provided with a releasing projection 29 which normally lies within the slot formed in the punch rod, but which, on the holding movement of the pawl described, is swung out to project beyond the surface limits of the punch rod. As the depression of the holder continues such releasing projection is engaged by the lower end of the guide member 5 which swings the pawl inward, withdraws the holding end 26 from the depression 15 and thereby releases the hammer member, which is instantly thrown down by the hammer spring to deliver its blow. When downward pressure is relieved on the casing or holder the spring 8 expands and lifts the same again to the position shown in Fig. 2.

It will be seen that the position of the depression shoulder 15 governs both the length of the hammer stroke and the compression of the spring. If the shoulder is located farther to the rear than is the shoulder 15 the holding of the hammer, which occurs when the holder is depressed, is delayed so much the longer, and the length of the blow *i. e.* the distance between the top of the punch rod and the bottom 27 of the bore 30, when the hammer is thus caught, is correspondingly shortened and the extent of compression of the hammer spring correspondingly reduced, so that the stroke is lighter and shorter.

Means are herein provided whereby the particular point in the depression, at which the hammer is arrested and compression of the spring begins, may be varied,—and herein this is accomplished by adjustable parts requiring no additional exterior or visible members. To this end the four grooves 19,

20, 21 and 22 are provided, the said grooves having their respective depressions or shoulders 15, 18, 17 and 16 located at different positions lengthwise the hammer bore. To permit the pawl to be operatively related to any one of the several grooves at will, the lower portion of the bore 30 is counterbored or enlarged at 14 (see Fig. 6) so that the grooves have their transverse depth diminished by the counterbore and are relatively shallow. While, therefore, the pawl, when resting in the lower, shallow portion of any one of the grooves, is suitably and sufficiently guided to be maintained therein against accidental displacement, it is not positively held therein as in the deeper portion of the groove, but, by turning the projecting portion of the punch rod in the holder, when in the position shown in Fig. 2, the holding end of the pawl can be readily snapped from one groove to another at will. Preferably, though not necessarily, the holding pockets for the several grooves taken in rotation are located at distances which increase by equal steps from the forward end of the tool so that, by turning the punch rod when in its normal position, the operator can gradually increase the length of the hammer stroke from a minimum to a maximum, or vice versa, by equal steps.

Since the length of the working stroke of the hammer and the amount of compression of the hammer spring increases or decreases simultaneously and by equal amounts, a greater range in the intensity of the blow is obtained than has been possible with other tools of this class where the only adjustment provided has been in changing the compression of the hammer spring.

It is to be understood that the stroke-changing mechanism may be secured by locking the pawl or other holding member elsewhere than upon the punch rod as, for example, upon the hammer, as well as by providing other means for varying the stroke than separate grooves or the like, it being understood that I have herein illustrated but one specific embodiment of my invention, the details and form and relative arrangement of parts being susceptible of extensive changes without departing from the spirit of the invention.

Having thus described my invention, what I claim is:

1. In a striking tool, the combination with a punch member, of a hammer member, a casing or holder, a spring between the casing and the hammer member, said casing being depressible about the punch member against said spring, holding means to arrest the depression of the hammer member, releasing means to release the hammer member at a given point in the depression of the casing, and means for varying the point in the de-



pression of the casing at which the depression of the hammer member is arrested.

2. In a striking tool, the combination with a hammer member, of a punch member, a depressible holder, a spring between the holder and the hammer, a holding member, said tool having a plurality of holding portions arranged circumferentially at different points lengthwise the same for engaging said holding member to arrest the depression of the hammer, and releasing means for subsequently releasing the same, said holding member being adapted, through the turning of the punch member relatively to the holder, to be operatively related to any one of said holding portions at will.

3. In a striking tool, the combination with a hammer member, of a punch member, a casing or holder, a spring between the casing and the hammer member, said casing being depressible about the punch member against said spring, means for arresting the depression of the hammer member against the compression of the spring, comprising a movable locking member on the one hand and a group of lock-receiving portions, one upon the punch member and the others upon the hammer member, said locking member being adapted to be presented at will for engagement with any of said lock-receiving portions, and means for releasing the locking member on subsequent depression of the casing.

4. In a striking tool, the combination with a hammer member, of a punch member, a holder, a spring between the hammer member and the holder, said tool having a pivoted holding member and a set of grooves arranged, one upon the punch member and the other upon the hammer member, said grooves being arranged circumferentially about the tool and provided each with a holding shoulder, the holding shoulder for the several grooves being located at different points lengthwise the tool, said grooves having a point of diminished depth whereat the holding member may be turned to engage with any one at will, and means providing for the withdrawal of the holding member from the holding shoulder on subsequent depression of the holder.

5. In a striking tool, the combination with a holder, a hammer member, a punch member, impelling means for causing the hammer member to strike the punch member a blow on the depression of the holding member, and means governed by the rotation of the holder relatively to the punch member for varying both the length of the blow and the impulse imparted by the impelling means.

6. In a striking tool, the combination with a holder, a hammer member, a punch member, impelling means for causing the ham-

mer member to strike the punch member a blow on depression of the holding member, and means governed by the rotation of the holder relatively to the punch member for varying at will the force of the impelling means.

7. In a striking tool the combination with a casing 1, the punch member 2, the hammer member 4, within the casing for imparting a blow to the punch member, an impelling spring 7 for the hammer member, and a controlling pawl 6 for the hammer member, there being provided the grooves 19, 20, 21 and 22 within which the pawl member is adapted to work, and also holding recesses 15, 18, 17 and 16 for engagement with the controlling pawl.

8. In a striking tool, the combination with a punch member, a hammer member, a depressible holder, a spring, an adjustable stroke-changing mechanism comprising a pivoted catch carried by one member, and a plurality of longitudinal grooves formed in another member, said grooves having differentially spaced shoulders for engagement with the catch.

9. An automatic striking tool having a tubular casing closed at one end, a spring-actuated striking rod slidably mounted in said casing, a spring-actuated pawl pivotally secured to said striking rod, and a spring-actuated hammer member slidably mounted in said casing, said hammer member having a plurality of longitudinal grooves presenting a plurality of differentially spaced shoulders and said rod being rotatable to engage said pawl with any groove at will.

10. In a striking tool, the combination with a punch member, a hammer member, a holder, means for causing the hammer member to strike the punch member on depression of the holder, and means governed by the rotation of the holder relatively to the punch member to vary the stroke.

11. In a striking tool, the combination with a punch member, of a hammer member, a holder, a releasing device for releasing the hammer member to strike the punch member on depression of the holder, and means governed by the rotation of the holder relatively to the punch member for varying the point in depression when said releasing device becomes effective.

12. In a striking tool the combination with a holder barrel, of a hammer member, impelling means and adjustable means entering the tool end of the barrel for adjusting the stroke of the hammer.

13. In a striking tool the combination with a holder barrel, of a hammer member, impelling means, and means adjustable through the tool end of the barrel for adjusting the force of the impelling means.



14. In a striking tool the combination  
with a holder barrel, of a hammer member,  
impelling means and means adjustable  
through the end of the barrel for varying  
5 both the length of the blow and the impulse  
imparted by the impelling means.

In testimony whereof, I have signed my

name to this specification, in the presence of  
two subscribing witnesses.

WILLIAM C. MICHAEL.

Witnesses:

CHESTER F. BRUCE,  
H. W. P. PUTNAM.