

Sept. 11, 1945.

L. A. SWEET

2,384,707

AUTOMATIC CENTER PUNCH

Filed Sept. 29, 1942

Fig. 1.

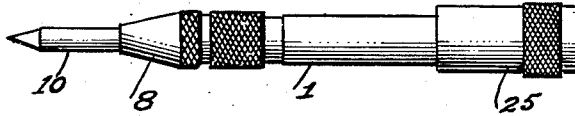


Fig. 2.

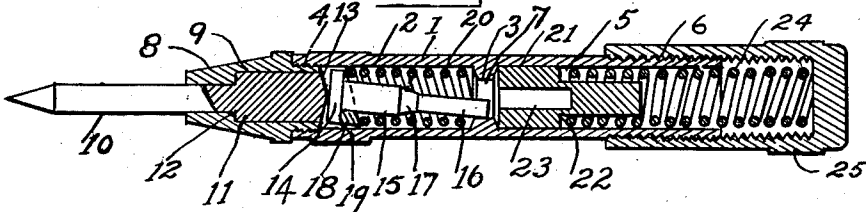


Fig. 3.

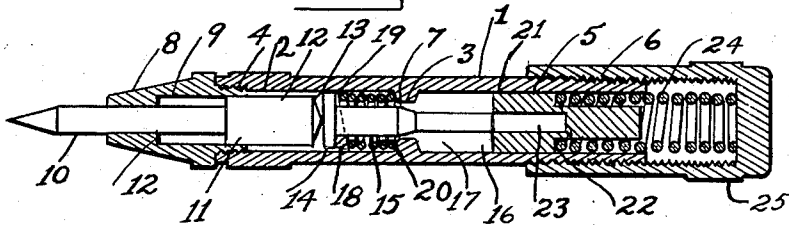
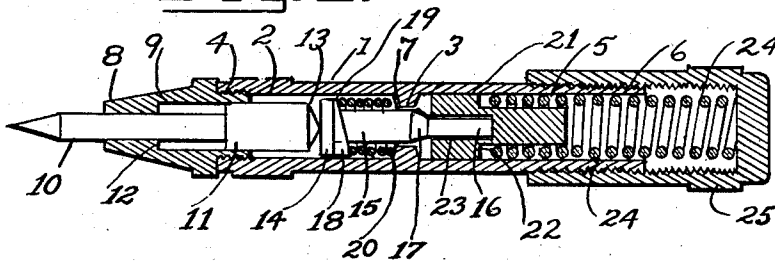


Fig. 4.



INVENTOR.

BY *Laurence Sweet*

UNITED STATES PATENT OFFICE

2,384,707

AUTOMATIC CENTER PUNCH

Laurence A. Sweet, Huntington Park, Calif.

Application September 29, 1942, Serial No. 460,165

2 Claims. (Cl. 81-1)

My invention relates to improvements in automatic center punches and the like. An object of this invention is to make a center punch which can be made to strike a blow upon the punch by merely pressing down on the outside casing of the mechanism. This enables the operator to place center punch marks with greater accuracy and rapidity, and with much less effort than by any other method.

A further object of my invention is to provide means to vary the force of the blow upon the head of the center punch so as to make punch marks of varying depth and diameter, thus providing for the starting of drills of different sizes.

A still further object of my invention is to make the punch and striking mechanism that the parts are very simple and sturdy, and will give long and satisfactory service.

Further objects and advantages of my invention will appear as the specification proceeds.

The preferred form of my invention is illustrated in the accompanying drawing in which:

Fig. 1 is a side view of the complete tool.

Fig. 2 is an enlarged longitudinal section of the tool showing the parts in released position.

Fig. 3 is an enlarged longitudinal section of the tool showing the parts raised and the springs compressed about to the point at which the hammer is tipped to strike the blow on the punch.

Fig. 4 is an enlarged cross-section of the tool showing the position of the parts just after the hammer has struck the blow on the punch.

In practicing this invention, I provide a construction by means of which a punch or punch plunger 10 is automatically actuated, that is to say, if the point of the punch plunger is held against a surface and pressure is exerted on the case or body 1 of the holder, the punch will move relatively outwardly, or toward the rear of the body. This relative movement forces back a hammer 21 with which is associated a spring 24, the movement being imparted from the butt end of the punch to the hammer through the agency of a tumbler 14. When the tumbler has moved rearwardly sufficiently to store up considerable energy in the spring, the tumbler is tripped, that is to say, it is moved automatically into position, which will release the hammer 21 and permit the hammer to be moved suddenly forward by its spring 24. In this forward movement of the hammer, a part of the hammer impinges upon the rear end of the tumbler so that the tumbler acts to impart the blow from the hammer to the butt end 13 of the punch. The face of the butt end of the punch and the adjacent end face of the

tumbler, have a correlated form which will enable these faces to cooperate to hold the tumbler normally in a position that will enable it to engage the forward face of the hammer and impart the withdrawing movement of the hammer to the hammer. The tumbler is preferably of spindle form, and the construction or form of the said correlated faces is such that they will normally hold the tumbler in the position in which the relative backward movement of the punch will push back the hammer and energize its spring. The construction includes means to be described hereinafter, operating at a certain point in the backward movement of the punch and tumbler, to trip the tumbler, that is to say, to shift it laterally into a position in which it will no longer be capable of pushing back the hammer. Then the blow is struck and imparted through the tumbler to the punch.

In order to accomplish these effects, the adjacent faces of the butt end of the punch and the forward end of the tumbler, are formed the one with a projecting point, the other with a flat face to engage this point. This projecting point, in the present instance, is obtained by forming a conical face or cone end 13 on the butt end of the punch, which rests against a flat face formed at the forward end or head of the tumbler 14. However, it should be understood that it is merely necessary to form these faces so that if pressure is exerted from the butt end of the punch to the tumbler, there is nothing inherent in the form or contact of these faces that would tend to keep the tumbler in a position that would permit the hammer to be moved forward by its spring. In other words, these contacting faces are formed so that they will tend to hold the tumbler in a position to impart movement from the punch to the hammer and push it back when the punch is pressed forcibly against the surface. The tumbler is preferably of spindle form with a head at its end adjacent to the cone 13. The body 15 of this tumbler is preferably of smaller diameter than the head 14, and the rear end of the tumbler is preferably formed into a stem 16 of substantially uniform diameter. Between the stem and the body 15 of the tumbler, I prefer to form an inclined or tapered neck 17 which operates as a cam when this neck engages the edge of the shoulder or constriction 3 which forms the reduced opening 7. When this occurs the tumbler will be tripped, that is to say, it will be moved into a position in which its longitudinal axis is brought substantially into alignment with the axis of the hammer. This will bring the stem

into alignment with the bore 23 of the hammer, and release the hammer to strike its blow upon the tumbler. Although I do not consider it essential to the performance of this operation to employ a spring to maintain the tumbler in its active position, that is to say, a position in which it can exert thrust upon the hammer to withdraw the hammer, I do prefer to employ a small coil spring 20 disposed around the tumbler, and I prefer to employ an "angle washer" 18 having an inclined face against which this spring seats. By reason of this inclined face the spring exerts its force to hold the tumbler in its active position (see Fig. 2). This small spring 20 prevents any possibility of the end of the stem 16 from accidentally getting into alignment with the bore 23 of the hammer when the punch 10 is being shoved against the face that is to be punch-marked. The forward face of this washer 18 is disposed in a plane substantially at right angles to the axis of the hole through the washer, and this face seats against the shoulder 19 on the rear side of the enlarged head of the tumbler 14. The rear end of the spring 20 thrusts against annular shoulder 3 within the body 1 of the tool.

The punch holder guide 8 has a small bore fitting to the diameter of the punch plunger 10, and a counterbore 9 to receive its butt end 11 so that the punch plunger 10 is retained in the punch holder 8 by the shoulder 12. The punch holder 8 is screwed into the sleeve 1 at the internally threaded portion 4.

In the bore 5 of the body 1 is placed the hammer 21 which in normal position rests against the shoulder 3 of the body 1. The hammer 21 is shouldered at 22 and a blind bore is formed centrally therein, said bore 23 being of slightly larger diameter than the stem 16 of the tumbler 14 and being adapted to receive and guide the same. In the present instance, I prefer to employ a coil spring, preferably a compression spring which is compressed by the backward movement of the hammer. In the present instance, against the shoulder 22 of the hammer 21 rests compression spring 24, the opposite end of this spring 24 being retained by a cap 25 which is preferably adjustably threaded onto the sleeve or body 1 at the externally threaded portion 6 of the sleeve 1.

To operate the tool the punch point should be placed against the surface that is to be punch marked, with the sleeve or body 1 and cap 25 grasped firmly in one hand. A quick inward or downward pressure exerted on the tool then forces the punch plunger 10 and tumbler 14 relatively upwards against the spring 20. This presses the tip of stem 16 of the tumbler 14 against the bottom of the hammer 21, and the inclined direction of pressure of the spring 20 on the angle washer 18 normally holds the tip of

stem 16 off center and against the forward end of the hammer 21. This moves the hammer 21 relatively back and against the pressure of the spring 24 until the point is reached where the taper 17 on the tumbler 14 strikes the camming shoulder or constriction 3. As the diameter of the neck 15 is a sliding fit in the opening 7 of the shoulder 3, this will align the stem 16 of the tumbler 14 centrally with the hole 23 of the hammer 21 and release the hammer 21 so that the spring 24 forces the hammer 21 quickly downward or forward over the stem 16 so that the bottom of the bore 23 strikes a sharp blow upon the upper end of stem 16 of the tumbler 14, said blow being transmitted to the punch 10 through the tumbler 14 and driving the point of the punch 10 into the material being marked. The force of the blow struck by hammer 21 may be regulated by adjusting the cap 25 of the body 1 by means of the threads 6 so as to increase or decrease the compression force for spring 24. Release of the downward pressure on body 1 allows all parts to return to the normal position as shown in Fig. 2 in readiness for the next blow.

Many other embodiments of the invention may be resorted to without departing from the spirit of the invention.

What I claim is:

1. An automatic centerpunch comprising: a tubular housing having a constriction intermediate its ends forming a camming element; a punch plunger slidable in said housing at one side of said constriction and protruding from said housing; a tumbler including a head adapted to bear against said plunger, a stem extending into and through said constriction and a tapered cam portion on said stem adapted as said stem is urged through said constriction to engage said camming element and move the extremity of the said stem remote from said head from a position offset with respect to the axis of said housing to a substantially centered position; a hammer slidable in said housing on the opposite side of said constriction from said plunger; and a spring urging said hammer toward said restriction, tumbler and plunger; said hammer having an end adapted to be engaged by said stem when in its offset position and a socket in said end adapted to receive said stem when said stem is in its aligned position, whereby on receiving said stem the hammer is driven by said spring into impact engagement therewith.

2. A construction as set forth in claim 1 wherein a shoulder inclined relative to the axis of said stem is provided between said stem and its head and a spring is interposed between said shoulder and said constriction and urges said stem into its inclined position.

LAURENCE A. SWEET.