This invention relates to a device for producing impacts and has for one of its objects to provide a novel device for this purpose which is simple and inexpensive to manufacture but which is effective in producing the desirable impacts.

Devices of this sort are useful for various purposes where it is desired to produce a series of light impacts and as illustrative one use I would refer to that of opening or releasing a cylinder lock, the key of which has been lost or broken. In this opening a lock the tumbler pins are successively subjected to a series of light impacts which line them up one by one and the device herein illustrated is admirably adapted for this purpose although it is also useful for other purposes where it is desired to subject any article to a series of light impacts.

In order to give an understanding of the invention I have illustrated in the drawing a selected embodiment thereof which will now be described in detail and showing the novel features will be pointed out in the appended claims.

Fig. 1 is a view of a device embodying my invention with one side removed to illustrate the interior construction, said figure showing the parts in normal position;

Fig. 2 illustrates the manner in which the impact is developed;

Fig. 3 is a front view of Fig. 1 with a portion broken out;

Fig. 4 is an enlarged perspective view of the end of the cylinder-turning spring.

My improved implement comprises a spring-impelled striking or impact finger which is actuated on by a spring that tends to move it into normal position, a manually-operated trigger device and means for coupling the trigger device to the impact or striking finger when both parts are in normal position whereby movement of the trigger will move the striking finger against the action of its spring, together with means to automatically release the engagement of the trigger with the impact or striking finger during the movement of the trigger thereby allowing the spring to return the striking finger to its normal position with a quick striking movement.

The means which accomplish the release of the trigger from the striking finger is adjustable so that the point in the movement of the trigger at which the releasing occurs can be varied thereby varying the force of the impact or striking movement of the finger.

The movable parts above referred to are carried by a suitable frame 1 which for convenience is provided with a handle portion 2 adapted to be held in the hand. This frame 1 is hollow and is shown as provided with an interior chamber 3 in which the operative parts of the device are received.

The impact or striking finger is indicated at 4 and it projects through an opening 5 formed in the front end 6 of the frame 1. This finger is rigid with a spring element 7 herein shown as a leaf spring which preferably will be relatively stiff although the stiffness or strength of the spring may vary according to the use to which the device is to be put.

This spring 7 is shown as anchored at one end to a projection or lug 8 with which the frame is provided and said spring bears against another projection or fulcrum member 9 which is situated in the chamber 3. The spring may be connected to the projection 8 in any appropriate way. As herein shown the end of the spring is bent into the hook form 10 which is hooked around the projection 8.

The impact or striking finger 4 may be rigidly secured to the spring 7 in various ways without departing from the invention. This finger might be an integral part of the spring but is herein shown as rigidly mounted in a head member 11 which is rigidly secured to the end of the spring 7. When the parts are in normal position the head member 11 rests against the upper wall 12 of the chamber 3 and the spring 7 will be under some tension or will be somewhat flexed, the elasticity of the spring tending to force the head 11 and finger 4 upwardly thereby maintaining the head firmly against the wall 12.

The desired impact is secured by moving the finger 4 downwardly from the normal position shown in Fig. 1 thereby increasing the flexure of the spring and placing it under increased tension and then releasing the finger to allow the spring 7 to return said finger to its normal position shown in Fig. 1 with a quick impact-delivering or striking movement.

The moving of the finger downwardly to place the spring 7 under increased tension is herein accomplished by means of a trigger device 13 which is pivotally mounted on a pin 14 carried by the frame, said trigger projecting through an opening 15 formed in the side wall of the frame.

This trigger is actuated by a spring 16 which tends to move it into its vertical or normal position shown in Fig. 1. The trigger 13 is shown as having a forwardly-directed portion 17 to which a latch member 18 is pivotally connected as shown at 19. This latch member has the finger portion 20 which is adapted to en
gage the toe portion 21 with which the head 11 is provided as shown in Fig. 1 when the parts are in normal position.

The lash member 18 is shown as acted on by a spring 20 which tends to swing the finger 30 toward the right. The finger 20 has the beveled face 23 and the toe portion 21 has the beveled face 24 so that when the trigger is moved into its normal position shown in Fig. 1 the face

23 will wipe over the face 24 thereby allowing the finger 20 to swing into position above the toe 21 as illustrated in Fig. 1.

If, with the parts in this position, the trigger 15 is pulled back wardly, the latch member 18 will be moved downwardly and during this movement the finger 20 will engage the toe 21 thereby holding the head 11 and impact finger 4 downwardly against the action of the spring 7, the flexure and tension of said spring being increased by this movement. During the movement of the trigger and before the latter reaches the extreme of its backward movement the finger 20 is disengaged from the toe 21 thereby allowing the spring 7 to recoil and to move the impact or striking finger upwardly with a quick striking blow.

The disengagement of the latch from the toe 21 is caused by the engagement of an adjustable stop member 25 with the tail 26 of the latch. This adjustable stop member is in the form of a screw which is screwed through the arm 17 of the trigger.

During the initial movement of the trigger from its normal position shown in Fig. 1 the finger 20 will engage the toe 21 and said finger will move downwardly with the toe, during which movement the latch 18 will have a turning movement about its pivot 19. As the latch does thus turn the tail 26 is brought into engagement with the adjustable stop 25 as shown in Fig. 2 and this will limit any further turning movement of the latch relative to the portion 17 of the trigger. During further movement of the trigger, therefore, the latch 18 will move bodily with the trigger and because the latch is mounted on the forward end of the extension 17 the latch will move in the arc of a circle struck from the center 14. This will carry the finger 20 toward the left and cause it to become disengaged from the toe 21 as shown in Fig. 2. In said figure the full line position illustrates the position of the finder 4 when the latch becomes disengaged from the toe 21 and when this occurs the spring 7 will immediately move the finder 4 back to the normal or dotted line position 2 of Fig. 2 with a quick striking blow.

By adjusting the screw stop 25 the point in the movement of the trigger at which the disengagement of the latch from the toe 21 will take place can be varied and by this means the force of the striking blow of the finger 4 may be varied or controlled. If the stop screw 25 is backed off from the position shown in Fig. 1 then the disengagement of the finder 20 with the toe 21 will occur at a later point in the movement of the trigger and consequently the finder 4 will have been brought to a lower position than that shown in Fig. 2 before the disengagement occurs. This results in a stronger blow because of the fact that the spring is flexed to a greater extent before the finder is released.

On the other hand, if the screw 25 is advanced from the position shown in Fig. 1 then the disengagement of the finder 20 with the toe 21 will occur at an earlier point in the move-
ment of the trigger 13 with the result that the blow which the finder delivers will be a less violent one since the spring 7 will have been flexed to a less extent before the finder is released.

The device, therefore, is a very simple one by which the finder 4 can be caused to strike a blow or produce an impact of predetermined force.

In using this implement for opening a cylinder lock the impact finder 4 is introduced into the keyhole slot sufficiently so that the end of the finder will engage the first tumbler pin and the device may then be actuated to give impacts to said tumbler pin and at the same time the cylinder is given a slight turning movement. The impact given to the tumbler pin will line up the latter and the slight turning movement or torque which is applied to the cylinder will hold the pin lined up. This operation is repeated for the successive tumbler pins until all are lined up when the cylinder will be free to turn.

The device herein shown is also provided with means for normally giving the cylinder of the lock a turning movement or torque during the operation of the impact finder 4. Such means is in the form of a spring element 27 which is shown as a coil spring anchored at one end to the frame 1, the end 28 of the spring being of a size to enter the upper portion of the keyhole slot and having flat sides 29 which prevent the end 28 from turning in the slot. The shape of the spring is such that normally the flat sides 29 stand at an inclination but when the device is to be used the spring is bent or flexed until the flat sides 29 stand vertically and then they are entered into the keyhole slot. The tension of the spring thus acts through the end 28 thereof to give the cylinder of the lock the necessary turning movement or torque to permit the device to function properly.

The shape of the spring not only gives the necessary turning pressure or torque to the barrel of the lock but also allows the spring to close up in the direction of the length of the finder 4 so that the spring permits the finder 4 to be advanced into the lock to pick up one tumbler way after the other, while continually applying the turning force to the cylinder of the lock. This spring may be carried by the frame in any suitable way. As herein shown it is secured to the end of a screw member 30 which is mounted on a projection 31 rising from the top of the frame. The spring can be adjusted to give a greater or less torque or turning force by turning the screw 30 in the projection 31.

The device embodying the invention is also useful for any purpose where it is desired to give repeated impacts or blows and by constructing the finder as a hammer it would be possible to use a device of this type for setting rivets under those circumstances where the head of the rivet is within a cylinder or tubular member. In using the device in this way the hammer finder would be inserted into the tubular member at the proper point and then the trigger actuated to cause the hammer to give the rivet the necessary rivet-setting blows.

I claim:

1. In an impact-producing element, the combination with a frame, of a spring carried thereby and anchored at one end, a striking finder rigid with the free end of said spring and extending beyond the frame, said frame provided with a stop surface to limit the spring-impelled movement of the finder, an L-shaped trigger pivot
intermediate its ends to the frame, a latch to couple one end of the trigger to the free end of said spring, thereby to cause flexure of said spring by movement of the trigger, and means carried by the trigger to uncouple said trigger from said spring at a predetermined point in the movement of the trigger, whereby the released spring will return the finger to normal position with a quick striking blow.

2. In a device of the class described, the combination with a frame, of a spring carried thereby and anchored at one end thereto, a striking finger rigidly secured to the free end of the spring and projecting beyond the frame, said finger being adapted to enter the keyhole slot of a lock, a trigger carried by the frame, means to couple said trigger to the finger when both the trigger and finger are in normal position, whereby movement of the trigger will retract the finger from normal position and flex the spring, means to disengage the trigger from said finger during the movement of the latter, the flexed spring returning the released finger to normal position with a striking blow and a cylinder-turning spring carried by the frame and adapted to apply a turning force to the cylinder of the lock as the striking finger is actuated.

3. An impact-producing implement comprising a frame, a leaf spring member carried thereby and anchored at one end, a striking finger rigid with the spring at the other end thereof and extending beyond the frame, a spring-pressed trigger member pivoted to the frame, a latch pivoted to the trigger and adapted in normal position of the trigger and finger to be coupled to said spring, and a stop screw carried by the trigger and engaging the latch to cause it to be disengaged from the spring as the trigger is moved.

LOUIS S. HANFLIG.