Sept. 30, 1924. 1,510,261

E. G. DANIELS

PUNCH HEAD

Filed Nov. 7, 1923

Fig. 1.

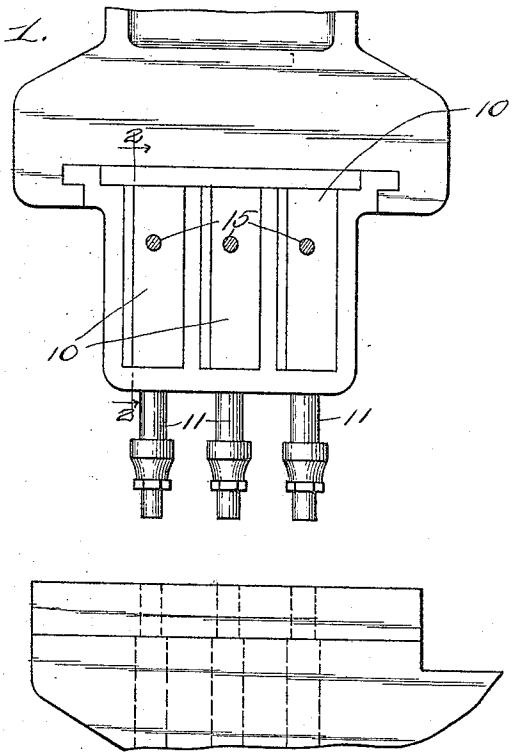


Fig. 2.

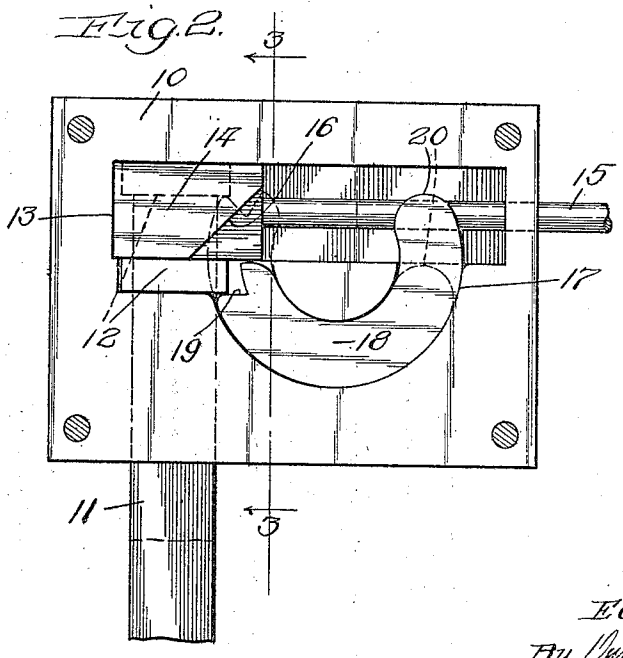
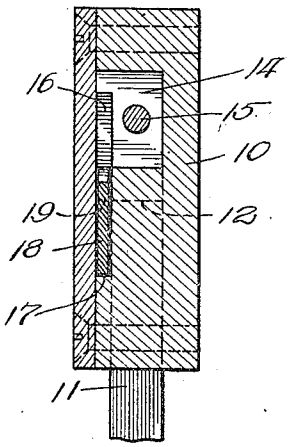


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PUNCH HEAD.

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To all whom it may concern:

Be it known that I, EDWIN G. DANIELS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Punch Heads, of which the following is a specification.

This invention relates to improvements in punch-heads and more especially to a gag for punch-heads having floating punches. By floating punch, is meant a continuously reciprocating punch-head in which the punch is loosely mounted with lost motion so that the punch may rest upon the work or close to it while the head itself continues to reciprocate upwardly and downwardly. When it is desired to have the punch operate on the work, a gag is thrown in to take up the lost motion between the punch and the punch-head so that the tool will be moved by the head to perform the punching operation. Floating punches of this kind are frequently used where the locations of the holes to be made are indicated by slight depressions in the work. The gag is withdrawn so that the punch rests lightly on the work while the head itself continues to reciprocate. The work is moved around until the point of the punch drops into one of the depressions indicating the location of a hole. The gag is then thrown in so that upon the next downward stroke of the head, the punch is forced through the work to punch the hole. Floating punches of this kind are also frequently used where the locations of the holes to be punched are marked in templates attached to the work.

In my improved punch-head, I have provided a gag which can be thrown in or out to lock or unlock the punch so that the floating punch may be operated in the usual manner. I have also provided means whereby the gag may be withdrawn slightly farther than is necessary to unlock the punch. This extra withdrawal operates means to raise the punch and hold it up out of the way. This arrangement is unusually desirable in punch-heads carrying a plurality of punches, since frequently one or more of the punches is not being used at all and then it is an advantage to have these punches held up out of the way rather than have them resting on or close to the work. With the ordinary gag, heretofore known, the punch was either hanging down and floating on the work or else operating with the punch-head to perform punching operations. My improved punch-head gives a third position, that is, with the punch reciprocating with the head but drawn up into the head so that it does not perform the punching operation and is also held up off of the work and out of the way. I have accomplished this purpose in a very simple manner. Other advantages and features of my improved punch-head will appear more fully as I proceed with my specification.

In that form of device embodying the features of my invention shown in the accompanying drawings, Figure 1 is a view in front elevation of a punch-head embodying the features of my invention, Fig. 2 is a view taken as indicated by the line 2 of Fig. 1, and Fig. 3 is a view taken as indicated by the line 3 of Fig. 2.

As shown in the drawings, 10 indicates a continuously reciprocating punch-head carrying a plurality of punches here shown as three in number and indicated by 11, 11. It is obvious that, without detracting from the spirit of the invention, the same could be embodied in a punch-head having only one punch, or more. Since the details of construction and operation of the different punches is the same, I will describe but one.

It will be seen that the punch 11 has on its upper end an enlarged part 12. Above the head 12 is a space 13 in the punch-head 10. The punch 11 is adapted for vertical movement in the punch-head a distance equal to the height of this space 13. The head 12 limits its downward movement and also its upward movement In Fig. 2 the punch is shown in solid lines in its lower position and in broken lines in its upper position. When the space 13 is empty, it is obvious that the punch will hang down in the position shown by the solid lines in Fig. 2 except as it may be supported by the work. I will assume that the punch-head is continuously reciprocating a distance not greater than the height of the space 13. When thus operating, with the space 13 empty, the punch 11 may float or rest on the work while the head continues to reciprocate, without any punching operations being performed. The space or recess 13 is extended to the right (as viewed in Fig. 2) to form a slide in which is mounted a sub-

stantially rectangular block 14 having attached to it an operating rod 15, affording a projecting end which may be used as a handle for sliding the block 14 in its way. The lower right hand corner of the block 14 has a part cut away to form the slanting shoulder or face 16.

Formed below the slide in which the block 14 moves is a flat, circular groove 17. Lying within the groove is a flat, arc-shaped member 18 substantially 180 degrees in length. The end of the member 18 lying next to the head of the punch 11 is provided with a V-shaped notch 19 as shown. The other end of the member 18 is rounded as indicated by 20.

In the operation of the device, the projecting edge of the head 12 on the punch 11 engages the notch 19 in the end of the curved member 18. When the gag 14 is withdrawn from above the head 12 so that it just clears the head but the slanting surface 16 does not engage the rounded end 20 of the curved member 18, the punch 11 will normally, of its own weight, fall down to the position indicated by the solid lines in Fig. 2 and slide the curved member 18 to the position shown by the solid lines in Fig. 2. When the parts are in this position, it is obvious that the punch 11 is free to move up and down in the punch-head. When it is desired to gag the punch or make it operate, the block or gag 14 is pushed into the space immediately above the head 12 with the result that the punch can no longer slide upwardly in the head as the head descends. When in this position, obviously the punch will perform a punching operation as the head descends. These two positions, namely with the punch ungagged and gagged, permit the operation of the punch the same as any floating punch. If, however, it is desired to ungag the punch and at the same time raise it up in the head, the block 14 is pulled to the right (as viewed in Fig. 2) until the slanting surface 16 engages the rounded end 20 of the curved member 18. Such engagement forces the end of the curved member 18 downwardly which causes it to slide in its circular groove so that the other end is raised. This raising of the notched end of the curved member 18 lifts up the punch and holds it in the position shown by the broken lines in Fig. 2. The lifting is caused by the engagement of the projecting edge of the head 12 with the notch 19.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as possible in view of the prior art.

What I claim as new, and desire to secure by Letters Patent, is:

1. A punch-head carrying a punch adapted for vertical movement therein, a gag block adapted to be moved to locking position to lock the punch in its lower position against vertical movement in the punch-head and adapted to be moved to unlocking position to permit vertical movement in the punch-head, and means whereby movement of said gag block to a position beyond its unlocking position operates to raise the punch to its uppermost position in the punch-head and there support the same.

2. A punch-head carrying a punch adapted for vertical movement therein, a gag block adapted to be moved to locking position above the punch to lock the punch in its lower position against vertical movement in the punch-head and adapted to be moved to unlocking position to permit vertical movement in the punch-head, and means whereby movement of said gag block to a position beyond its unlocking position operates to raise the punch to its uppermost position in the punch-head and there support the same.

3. A punch-head carrying a punch adapted for vertical movement therein, a gag block adapted to be moved to a position above the punch to lock the same in its lower position and adapted to be moved to unlocking position at one side to permit vertical movement of the punch in the punch-head, and means operated by movement of the gag block beyond its unlocking position to lift the punch to its uppermost position and there support the same.

4. A punch-head carrying a punch adapted for vertical movement therein, a gag block slidably mounted in a horizontal slide and adapted to be moved to a position above the punch to lock the punch in its lower position against vertical movement in the punch-head and adapted to be moved to one side to unlocking position to permit vertical movement of the punch in the punch-head, and means operated by movement of the gag block beyond its unlocking position to raise the punch in the punch-head to its uppermost position and there support the same.

5. A punch-head carrying a punch adapted for vertical movement therein, a gag block adapted to be moved to locking position to lock the punch in its lower position against vertical movement in the punch-head and adapted to be moved to unlocking position to permit vertical movement in the punch-head, and means whereby movement of said gag block to a position beyond its unlocking position operates to raise the punch to its

uppermost position in the punch-head and there support the same, said means including a curved member slidably mounted in an arcuate guide having one end adapted to be engaged by the gag block upon movement of the same beyond its unlocking position and the other end adapted to engage a part on the punch.

6. A punch-head carrying a punch adapted for vertical movement therein, a gag block adapted to be moved to locking position to lock the punch in its lower position against vertical movement in the punch-head and adapted to be moved to unlocking position to permit vertical movement in the punch-head, a slanting surface on the gag block, and means whereby movement of said gag block to a position beyond its unlocking position operates to raise the punch to its uppermost position in the punch-head and there support the same, said means including a curved member slidably mounted in the arcuate guide having one end adapted to be engaged by the slanting surface on the gag block upon movement of the gag block beyond its unlocking position and the other end adapted to engage a part of the punch.

7. A punch-head carrying a punch adapted for vertical movement therein, a horizontal slide in the punch-head, a gag block slidably mounted in the horizontal slide and adapted to be moved to a position above the punch to lock the same against vertical movement in the punch-head and adapted to be moved to one side to unlocking position to permit vertical movement of the punch in the punch-head, a slanting surface on the gag block, an arcuate guide formed below the slide carrying the gag block with its rear end opening into said slide, a curved member slidably mounted in the arcuate guide having its forward end in engagement with a part on the punch and of such length that when the punch is in its lowermost position the rear end of said curved member extends upwardly into the slide carrying the gag block and is adapted to be engaged by the slanting surface on the gag block upon withdrawal of said gag block beyond its unlocking position to slide said curved member in the arcuate guide to cause its forward end to raise the punch.

8. A punch-head carrying a punch adapted for vertical movement therein, a horizontal slide in the punch-head, a gag block slidably mounted in the horizontal slide and adapted to be moved to a position above the punch to lock the same against vertical movement in the punch-head and adapted to be moved to one side to unlocking position to permit vertical movement of the punch in the punch-head, a slanting surface on the gag block, an arcuate guide formed below the slide carrying the gag block with its rear end opening into said slide, a curved member slidably mounted in the arcuate guide having its forward end notched, a part on the punch in engagement with said notch, said curved member being of such length that when the punch is in its lowermost position the rear end of said curved member extends upwardly into the slide carrying the gag block and is adapted to be engaged by the slanting surface on the gag block upon withdrawal of said gag block beyond its unlocking position to slide said curved member in the arcuate guide to cause its forward end to raise the punch.

9. A punch-head carrying a punch adapted for vertical movement therein, a projecting head on top of the punch, a horizontal slide formed above the punch, a gag block slidably mounted in the horizontal slide, a slanting surface on the gag block, an arcuate guide arranged below the horizontal slide having its forward end adjacent the head on the top of the punch when in its lower position and its rear end opening into the slide carrying the gag block, and a curved member slidably mounted in the arcuate guide, said curved member having a notch on its forward end in engagement with the head on the punch and said curved member being of sufficient length so that when the punch is in its lower position the rear end of said curved member extends upwardly into the slide carrying the gag block in the path of the slanting surface on said gag block.

In witness whereof, I have hereunto set my hand and seal this 2nd day of November, 1923.

EDWIN G. DANIELS. [L. S.]