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G. G. GREULICH
AUTOMATIC ROTARY PUNCH
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2,083,370

Fig. 1.

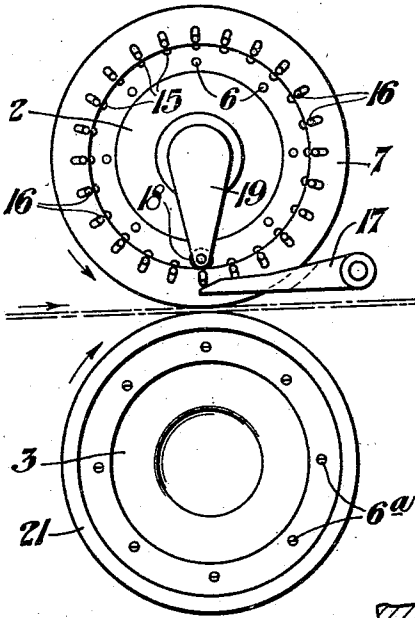


Fig. 2.

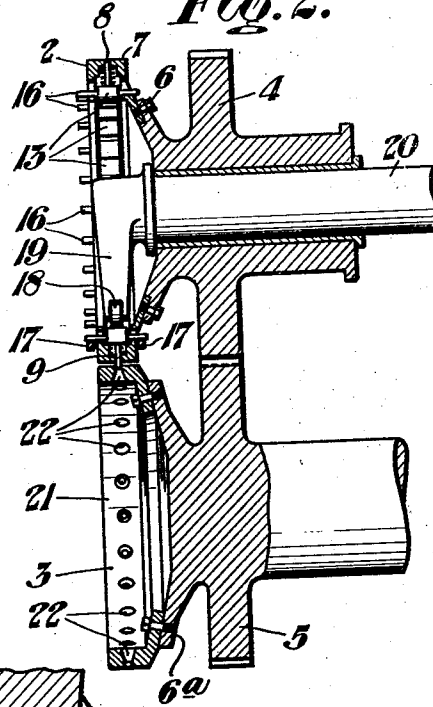
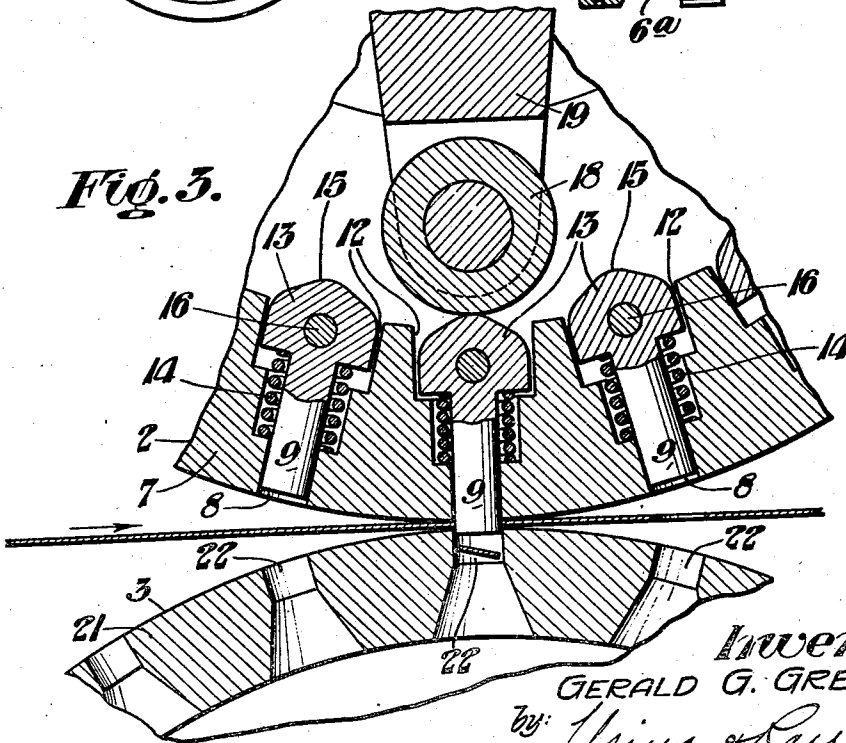


Fig. 3.



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AUTOMATIC ROTARY PUNCH

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5 Claims. (Cl. 164—99)

This invention relates to an automatic rotary punch adapted to punch holes in metal which will be clean-cut and accurately spaced and at the same time permit the metal stock to remain flat.

An object of this invention resides in synchronizing the rotation of male and female die members and providing one of the die members with one or more plungers arranged about the periphery thereof to be depressed into a recess in the other die member to pierce the metal passing between the die members.

Other objects and advantages will become apparent as the description proceeds, in which:

Figure 1 is a front elevation showing the cooperative relation of the die members, Figure 2 is a transverse section, partly in elevation, of the die members and driving mechanism, and

Figure 3 is an enlarged detailed section of the die members and plunger operating means.

In the drawing, 2 and 3 represent male and female die members, each carried by and rotating with intermeshing gear wheels 4 and 5 which may be driven in synchronism by any desired type of driving means, not shown.

The male die member 2, which is secured to the gear wheel 4 in any conventional manner, as shown at 6 in the drawing, comprises a steel ring 7, provided on the outer peripheral body portion thereof with a plurality of spaced openings 8 through which spring actuated plungers, or cutting members 9, pass to punch the metal from the sheet stock. The inner peripheral portion of the ring 7 is provided with enlarged recesses 12 for receiving the enlarged head 13 of the plungers 9 and the spring 14 which encircles the body portion of said plungers.

The enlarged heads 13, of the plungers 9, are provided with a curved portion 15 forming a cam surface and an opening through which pins 16 project to engage a retracting cam lever 17 to effect rapid retraction of the plungers 9 should they become wedged or stuck in the openings 8 and fail to be returned to their retracted position by the springs 14. The cam surface 15 of the plungers 9 projects beyond the inner periphery of the ring 7 and is engaged upon the said surface by a roller or member 18 which is mounted on the free end of a lateral extension 19 of a non-rotatable shaft 20. This shaft 20 extends through the bore of the gear wheel 4 which is driven to rotate the steel ring 7.

The female die member 3, which is secured to the gear wheel 5 in any conventional manner

similar to the construction shown at 6, comprises a steel ring 21 provided on its periphery with suitable openings 22 coinciding with the openings 8 of the male die member, at the point of contact with the material to be punched, to permit the plungers 9 to pierce the metal and project slightly into the recess in ring 21 whereby the punched metal will drop out through the bottom of the opening 22.

The metal to be stamped or punched out is fed, in the direction of the arrow shown in the drawing, to pass between the two die members, each of which is rotating in synchronism, and as the die ring 2 rotates, it successively brings the cam surface 15 of plungers 9 into contact with the roller 18 to produce a cam action on the face 15 of the plungers 9 and depress said plungers into contact with the work, which pierces or stamps out the metal from the material permitting the cut out portion to fall through the opening 22 and the punched material remain flat and pass on to suitable means for collecting the punched sheet. In order to facilitate production, it is proposed to have the die members 2 and 3 contact the material being punched with sufficient pressure so as to feed or draw the material continuously through the machine. Any suitable means may be provided for maintaining pressure of the die rings upon the material being punched.

While the springs 14 under the enlarged heads 13 of the plungers 9 would ordinarily retract said plungers as soon as they are free from contact with the roller member 18, they might tend to stick; however, to insure that the plungers will not stick, a retracting cam finger 17 engages having a cam shaped upper surface which the under side of the pin 16 projecting from the head 13 of the plungers 9, thus making certain rapid retraction of said punches.

It, therefore, becomes apparent that the present invention provides a machine which will punch holes rapidly and clean without excessive wear on any one punch due to the multiplicity of punches around the periphery of the die member 2 and permit the material to fall through openings in the female die member while the material, which has been punched, will pass on through the die members in a substantially flat condition.

While I have shown and described one specific embodiment of the invention, it will be understood that I do not wish to be limited exactly thereto, since various modifications may be made

without departing from the scope of the invention as defined by the following claims.

I claim:

1. An automatic rotary punch comprising male
5 and female die members, means adapted to rotate said die members in unison, said die members secured to said rotating means, spring actuated plungers disposed about the periphery of one of said die members, openings in the other
10 die member, a stationary shaft having a laterally extending arm thereon adapted to successively depress said plungers into said openings as the die members are rotated to punch a portion of
15 material from the stock, the axis of said stationary shaft coinciding with said driving means.
2. An automatic rotary punch comprising die
members, means adapted to rotate said die members in unison, said die members secured to said
rotating means, plungers disposed about the periphery of one of said die members, openings in
20 the other die member, a stationary shaft having a laterally extending arm thereon adapted to successively depress said plungers into said openings as the die members are rotated to punch a

portion of material from the stock, the axis of said stationary shaft coinciding with said driving means for said die members, and means for automatically retracting said plungers.

3. In a rotary die member for punching material from stock, a plurality of plungers mounted around the periphery of said die member, a cam, projections on said plungers adapted to engage said cam to automatically retract said plungers after the punching operation.

4. In a rotary die member for punching material from stock, a die ring having a plurality of plungers disposed about the periphery thereof, said plungers having pins mounted thereon adapted to cooperate with a cam finger to automatically retract said plungers in said die ring.

5. In a rotary die member for punching material, a plurality of punch members provided with projecting pins and disposed about the periphery of said die member, means for successively contacting said punch members with the material and cam means adapted to engage
20 said pins to retract said punching members.

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