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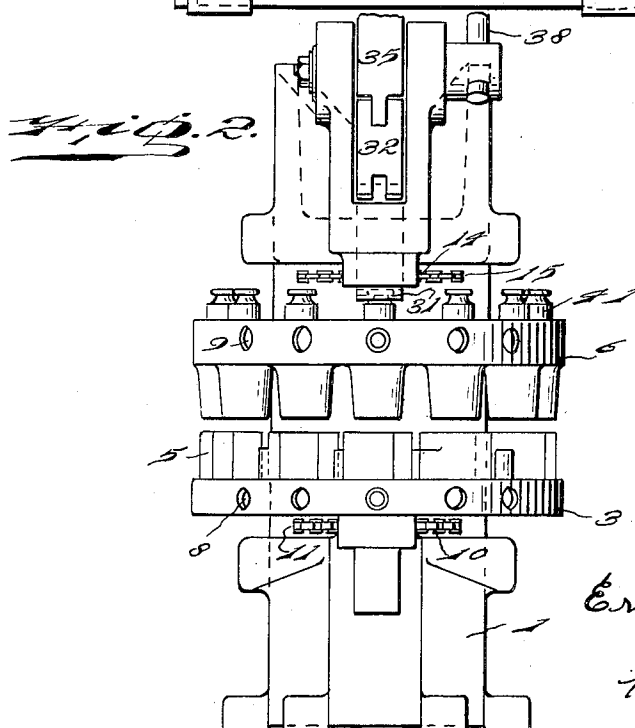
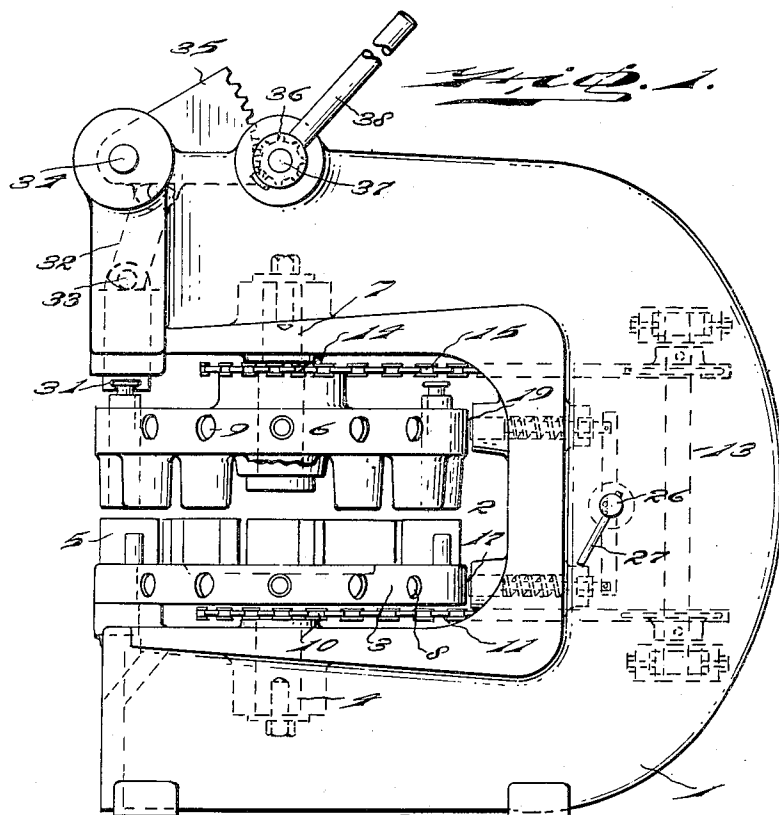
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TURRET PUNCH

Filed Feb. 11, 1932

2 Sheets-Sheet 1



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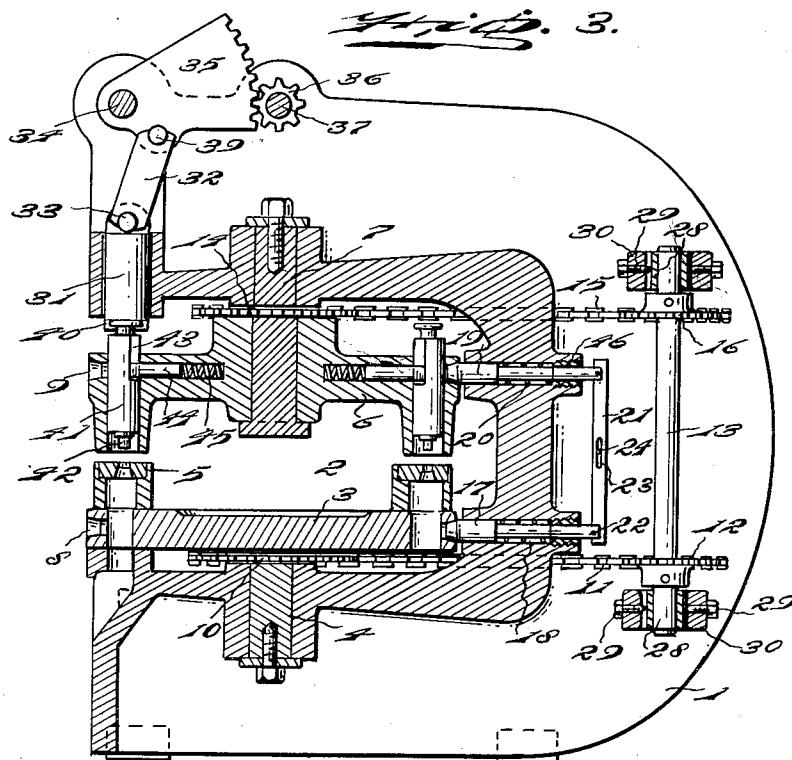


*Fig. 4.*

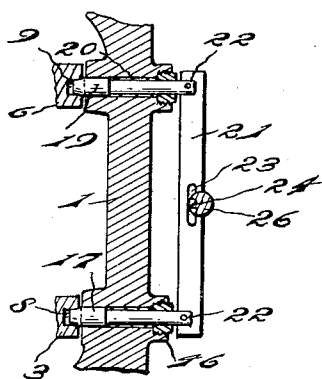
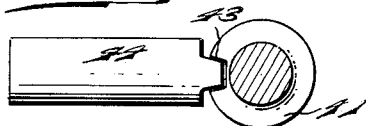


*Fig. 5.*



*Fig. 6.*



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## UNITED STATES PATENT OFFICE

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## TURRET PUNCH

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3 Claims. (Cl. 164—91)

The object of this invention is to devise a novel construction and arrangement of a turret punch which is readily portable and which can be manually operated.

5 A further object of this invention is to devise a novel turret punch wherein a deep throat is provided, said throat not being limited by either the radius or diameter of turret but can be made as large as required for the same diameter of turret so that large sheets can be punched a distance 10 from the marginal edge of the sheet and wherein novel means are employed for multiplying the pressure applied to the punch so that in case of thick sheets the additional pressure desired will 15 be imparted at the beginning of the operative stroke of a punch.

A further object of the invention is to devise a novel turret punch wherein the punch head and the die head are revolubly mounted in a novel 20 manner and wherein novel means are provided for locking the heads in the position to which they have been adjusted.

Novel means are also provided for securing the punch holders in position with automatic means 25 for taking up wear or back lash in punch holders.

With the above and other objects in view, as will hereinafter more clearly appear, my invention comprehends a novel construction and arrangement of a turret punch.

30 It further comprehends a novel turret punch having a novel construction and arrangement of a frame providing a deep throat, a novel construction and arrangement of rotatable punch and die heads, novel means for locking said heads 35 in aligned position and for centering the heads if they are not exactly aligned with the locking mechanism.

It further comprehends novel mechanism controlled by the operator for applying pressure to 40 the punch so that an improved mechanical advantage will be obtained when punching thick material as compared with other methods of obtaining pressure which are not efficient on thick material. This mechanical advantage is practically equal when punching any thickness of material. 45

It further comprehends novel means for locking a punch carrier in position in the head with automatic wear adjustment.

50 Other novel features of construction and advantage will hereinafter more clearly appear in the detailed description and the appended claims.

For the purpose of illustrating the invention I have shown in the accompanying drawings a 55 typical embodiment of it, which, in practice, will

give satisfactory and reliable results. It is, however, to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized, and my invention is not limited to the exact arrangement 60 and organization of these instrumentalities as herein set forth.

Figure 1 is a side elevation of a turret punch embodying my invention.

Figure 2 is a front elevation thereof, partly 65 broken away.

Figure 3 is a sectional elevation taken through the center of the punch.

Figure 4 is a detailed view of the control for the locking plungers which lock the punch holders 70 and die bolster in adjusted position.

Figure 5 is a top plan view of a locking plunger.

Figure 6 is a detailed view of a punch carrier and its locking plunger. 75

Similar numerals of reference indicate corresponding parts.

Referring to the drawings:—

1 designates the frame of a turret punch embodying my invention. The frame is in the form 80 of a yoke having a deep throat 2 in order to enable it to receive sheets which can be punched a considerable distance from the edges of the sheets. 3 designates the die bolster which is rotatably mounted on a stud 4 secured to the 85 frame. The die bolster has secured to it in any desired manner, the dies 5. 6 designates the punch holder which is rotatable on a stud 7 secured to the frame 1. The die bolster 3 is provided with the circumferentially spaced recesses 8 opening through its periphery, opposite 90 walls of such recesses converging outwardly. In a similar manner the punch holder 6 is provided with the circumferentially spaced recesses 9 which open through its periphery and opposite 95 walls of such recesses diverge outwardly.

The punch holder and the die bolster are operatively connected so that they can be simultaneously adjusted by a partial rotation and for this purpose the die bolster is provided with a 100 sprocket wheel 10 around which passes a chain 11, which also passes around a sprocket wheel 12 fixed to a shaft 13 suitably journaled in the frame of the machine.

The punch holder, in a similar manner, has 105 fixed to it a sprocket wheel 14 around which passes a chain 15 which also passes around a sprocket wheel 16 fixed to the shaft 13. It will thus be seen that when a partial rotation is im- 110

parted to the punch holder the die bolster will be moved in unison therewith.

17 designates a locking plunger for the die bolster, slidably mounted in the frame 1 and at its forward end it has opposite sides converging forwardly so that it will accurately align the die bolster when it is moved forwardly into a recess 8 of such die bolster.

A spring 18 is inserted between the rear end of the locking plunger and the frame thus tending to move the plunger forwardly. This spring is of such length that it limits the rearward movement of the locking plunger.

In a similar manner a locking plunger 19 of the same construction as that of the locking plunger 17 is movably mounted in the frame and adapted to enter a locking recess 9 of the punch holder in registry therewith, and a spring 20 is provided to effect the forward locking movement of the plunger. The rear ends of the plungers 17 and 19 are connected by a cross bar 21, the plungers being slotted to receive the bar, and the bar being secured in position by means of the pins 22. The bar is provided with a slot 23 into which extends a stud 24 eccentrically carried by a shaft 26, journaled in the machine frame and provided with an actuating handle 27. This handle 27 is arranged to lock the plungers either into registry with the turret or to lock the plungers out of the turret.

In order to compensate for wear I provide a take-up mechanism for the chains 11 and 15 it being seen that their journal boxes 28 are mounted between the opposed adjusting screws 29 in threaded engagement with the journal brackets 30.

The upper part of the yoke of the frame near the open end of the throat is provided with a reciprocable ram 31 which is pivotally connected with a toggle arm 32 by means of a rod 33. The upper arm of the yoke of the frame has fulcrumed on it at 34, a segment lever 35 which is in mesh with a gear 36 fixed to a shaft 37 which latter is provided with an actuating arm 38, arranged to make approximately one-half of a revolution. The toggle arm 32 is pivotally connected at 39 to the arm 35 intermediate its fulcrum point and the gear 36 so that it has normally an inclined position. It is to be noted that the fulcrum point of the lever 35 is in a different vertical plane from that of the median line of the ram 31. The ram at its forward end is slotted as at 40 to receive the upper ends of the punch carriers 41. These punch carriers 41 at their forward end are adapted to receive the punches 42 connected therewith in any desired or conventional manner. As illustrated the punch carriers are recessed to receive the punches.

The punch carriers 41 are provided with the grooves or slots 43 into which extend the plungers 44 slidably mounted in the punch holder 6 and springs 45 are provided which tend to move the plungers 44 forwardly into fractional engagement with the punch carriers 41 so that the latter are retained in assembled position with respect to the punch holder 6. The springs 18 and 20 have threaded sleeves at the rear so that the length of rearward movement of the springs and therefore also of the plungers can be adjusted and controlled to ensure that both plungers are fully and equally withdrawn from turrets. Without this means, one plunger could operate while the other plunger might fail to operate.

The punch carriers 41 are assembled in the

punch holder or head 6 and the dies 5 are assembled in the die bolster. The handle 27 is actuated to cause the disengagement of the locking plungers 17 and 19 with the die bolster 3 and the punch holder 6 respectively, and to lock them in this position, when desired, and by a partial rotation of either the punch holder 6 or the die bolster 3, both of such parts are brought into their approximate aligned position with the ram 31 so that a punch holder will be received in the ram. The handle 27 is then unlocked to allow the locking plungers to ride on the periphery of the turrets. A further alignment of the turrets allows the plungers to snap into the locking recess of the punch holder and die bolster to accurately align them in position, the handle 27 being then used to lock them. The sheet or other member to be punched is inserted into the throat 2 and the handle 38 is moved forwardly thereby causing the downward or operative stroke of the ram 31.

The cross bar 21 which connects the locking plungers 17 and 19 is floating so that it is necessary to actuate only a single handle 27 to operate and lock both plungers. When such handle 27 is partially turned, the locking plungers will be moved into unlocked position. If at such time only one plunger was in unlocked position, the other plunger will be positively move into its unlocked position.

For purpose of illustration I have shown chains employed for interconnecting the punch holder and die bolster but it will be apparent that other equivalent mechanical means, such as, for example, gears, can be employed to accomplish the same result.

The controlling mechanism for the ram is such that a toggle arrangement is provided which will impart a powerful thrust to the ram so that the turret punch can be employed for punching comparatively thick sheets.

In Figure 6 I have shown more in detail the manner in which a locking plunger cooperates with a punch carrier to retain it in position, it being seen that the punch carrier is provided with a groove or slot, opposite walls of which diverge outwardly, and the cooperating end of the locking plunger is correspondingly shaped to engage the walls of the recess and overhang the periphery of the punch carrier, thus providing automatic and accurate take up for wear.

While I have illustrated my present invention as designed to be manually operated it will be apparent that it may be power driven if desired, it being simply necessary to interconnect the shaft of the driving motor with the gear 36.

It will now be apparent that I have devised a new and useful turret punch which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which will give in practice satisfactory and reliable results, it is to be understood that this embodiment is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a turret punch, a frame having a deep throat, a die bolster rotatably mounted in said frame, a punch holder rotatably mounted in said frame, the depth of said deep throat being inde-

pendent of the radius of said die bolster and punch holder, a shaft rotatably mounted in said frame in rear of said throat with separate movable connections to both said punch holder and said die bolster whereby they can be simultaneously rotatably adjusted by rotating said shaft, means to align and lock said punch holder and die bolster, a ram reciprocable in said frame, a toggle arm connected with said ram to actuate it, and manually actuated means to actuate said toggle arm.

2. In a turret punch, a frame having a deep throat, a die bolster rotatably mounted in said frame, a punch holder rotatably mounted in said frame, a shaft mounted in said frame, a chain connecting said punch holder with said shaft, a chain connecting said die bolster with said shaft, manually actuated means to simultaneously lock said punch holder and die bolster in aligned position, a reciprocable ram, and means to actuate said ram.

3. In a turret punch, a frame having a deep throat, a die bolster rotatably mounted in said frame, a punch holder rotatably mounted in said frame, a shaft, sprocket wheels thereon, chains engaging said sprocket wheels and said punch holder and die bolster to simultaneously adjust them, said punch holder and die bolster having recesses with opposed inclined walls opening through their peripheries and circumferentially spaced, locking plungers having opposite sides inclined, and movably mounted in said frame to enter said recesses, resilient means to effect the forward movement of said plungers, manually actuated means to effect the rearward movement of said plungers and to lock them in both their forward and rearward positions, a reciprocable ram, and means to actuate said ram.

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