

T. P. PAYNE & E. V. WURTS.  
 METAL WORKING MACHINE.  
 APPLICATION FILED JULY 11, 1917.

1,298,555.

Patented Mar. 25, 1919.

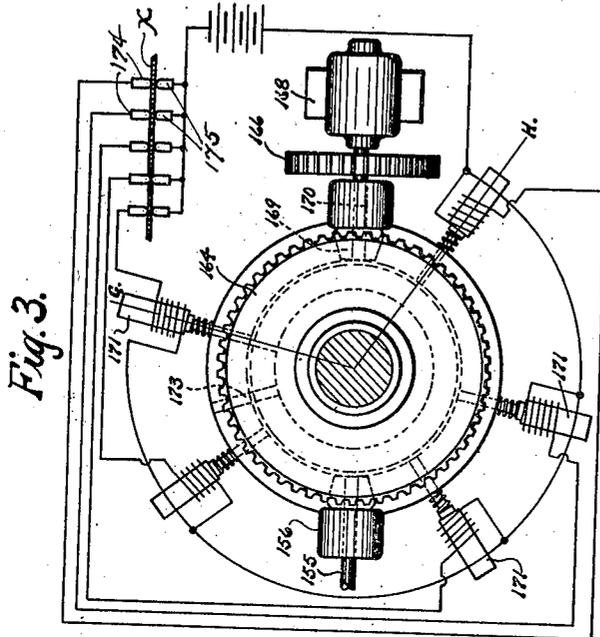


Fig. 3.

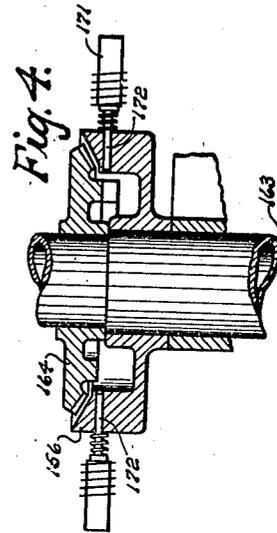


Fig. 4.

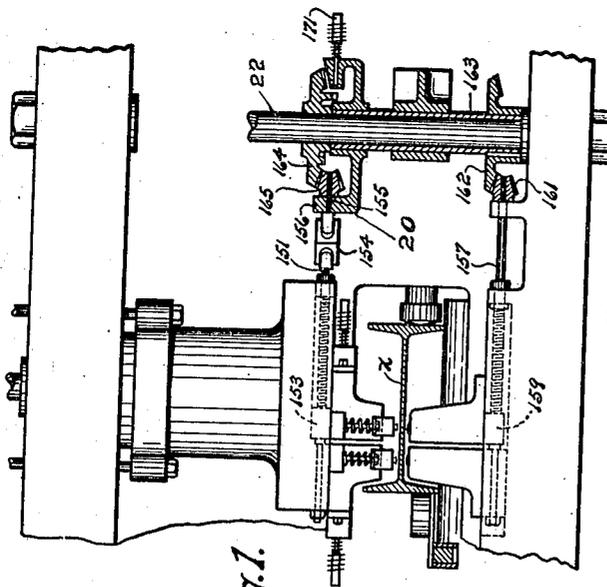


Fig. 1.

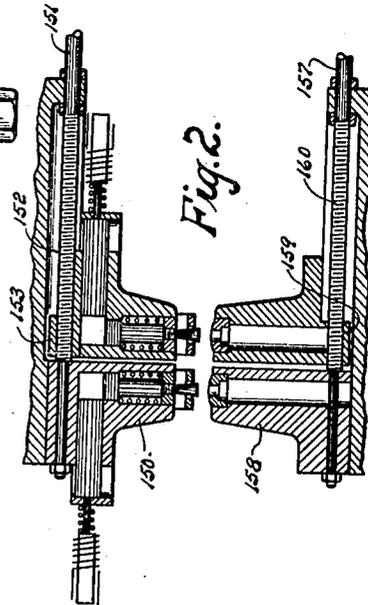


Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## METAL-WORKING MACHINE.

1,298,555.

Specification of Letters Patent. Patented Mar. 25, 1919.

Original application filed April 28, 1914, Serial No. 834,895. (Patent No. 1,241,254, dated September 25, 1917.) Divided and this application filed July 11, 1917. Serial No. 179,887.

To all whom it may concern:

Be it known that we, THEODORE P. PAYNE, a resident of New York, N. Y., and EDWARD V. WURTS, a resident of Newark, New Jersey, both citizens of the United States, have made new and useful Improvements in Metal-Working Machines, of which the following is a specification.

The invention relates to metal punching machines, and more particularly to means for spacing a plurality of punches and their die blocks relatively to each other, and to means for so relatively spacing the respective punches and die blocks by a controlling device operating thereon automatically.

This application is a division of application Ser. No. 834,895, filed by us April 28, 1914, now Patent No. 1,241,254, issued Sept. 25, 1917.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and forming a part hereof, illustrate one embodiment of the invention and together with the description serve to explain the principles thereof.

Of the drawings:

Figure 1 is a fragmentary elevation of a machine constructed in accordance with the principles of the invention;

Fig. 2 is a fragmentary, central section, on an enlarged scale, of the punch and die mechanism shown in Fig. 1;

Fig. 3 is a fragmentary plan, on an enlarged scale, with parts in section, of the controlling device of the spacing mechanism; and

Fig. 4 is a section, taken on line G—H of Fig. 3.

Referring to the accompanying drawings, illustrating by way of example one embodiment of the invention, means are provided for automatically effecting and controlling the relative positioning or spacing apart of the punches, and therewith the corresponding dies, and more particularly for effecting and controlling such relative positioning from the distance record sheet. As embodied, one punch and die, or one set of the punches and dies are fixed in position, as shown at the left in Fig. 2. Rotatably

mounted in the stationary punch block 150 is a shaft 151. Shaft 151 passes through an aperture in the movable punch block 153 and is screwthreaded at 152 to engage an internal thread formed in the aperture in punch block 153. Shaft 151 connects by a universal joint 154 with a short shaft 155, said shaft 155 being journaled in a bracket 156 supported on cross frame 20.

In Fig. 1 is shown the shape  $\alpha$  which is traveled longitudinally by rolls 1 and is stopped and positioned by the head 2, rack 3 and coöperating parts, and the punch block 153 and its die block 159 are automatically moved transversely across the work  $\alpha$  under control of the distance record device to effect relative movement between the punches to space the holes the desired predetermined distance apart across the work.

A similar arrangement is provided for the die blocks, a shaft 157 being rotatably mounted in a fixed die block 158. Shaft 157 passes through a movable die block 159, the shaft having a screw thread 160 engaging an internal thread in the aperture of the die block 159. Means are provided for rotating shafts 155 and 157 to and fro to correspondingly move the punch and die blocks 153 and 159, and as embodied shaft 157 has a beveled pinion 161, meshing with a bevel gear 162. Gear 162 is fixed on a sleeve 163 embracing rod 22. Fixed also to sleeve 163 is a bevel gear 164 meshing with a bevel pinion 165 fixed on shaft 155. Thus shafts 155 and 157 rotate in unison, while provision has been made by joint 154 for the reciprocation of the punches. Joint 154 also has a telescoping action due to changes in the level of shafts 151 and 155. Sleeve 163 is rotated to and fro by suitable means, such as a bevel pinion 169 meshing with gear 164 and fixed to a shaft 170, to which shaft is also fixed a slip or friction gear 166, driven by a pinion driven by a motor 168.

The movement and position of the punches and dies are controlled by suitable devices, and in accordance with one feature of the invention, this is effected from the distance record sheet or by manually settable devices. As embodied, solenoid operated means are provided for this purpose. On bracket 156 are supported a series of solenoids 171, which have suitable circuit connections to the dis-

- tance record sheet or to the manually settable devices. The solenoid cores operate pins 172 working in apertures in the walls of the supporting ring or bracket 156. Extending downwardly from the bevel gear is a lug 173 which is engaged by any set pin 172, thus stopping the gear 164, the sleeve 163 and gear 162, and thus positioning the punches and dies at the desired point. In Fig. 3 the solenoids 171 are shown in circuit with contacts 174 and 175, which cooperate with a distance record sheet X, to control the solenoids as described to govern the spacing of the punches and dies.
- 15 What we claim as our invention is:
1. A punching machine including in combination a plurality of punches, a head carrying said punches, means for increasing and decreasing the distance between the punches, and automatic means for controlling said spacing.
  2. A punching machine including in combination a plurality of punches, a head carrying said punches, means for increasing and decreasing the distance between the punches, and settable means for controlling said spacing.
  3. A punching machine including in combination a plurality of punches, a head carrying said punches, means for increasing and decreasing the distance between the punches, and automatic means for controlling said spacing including a distance record device.
  - 35 4. A punching machine including in combination a plurality of punches, a head carrying said punches, means for increasing and decreasing the distance between the punches, and electrically operated means for controlling said spacing.
  - 40 5. A punching machine including in combination a punch carrier having a plurality of punches, a die carrier having a plurality of dies, and preliminarily settable means for varying the distance between the respective punches and dies.
  - 45 6. A punching machine including in combination a punch carrier having a plurality of punches, a die carrier having a plurality of dies, and means including a preliminarily prepared distance record device for varying the distance between the respective punches and dies.
  - 50 7. A punching machine including in combination a reciprocable head, a plurality of punches carried thereby, a screw rod rotatable to increase and decrease the distance between said punches and means previously settable for controlling the rotation of said screw rod.
  - 60 8. A punching machine including in combination a reciprocable head, a plurality of punches carried thereby, a screw rod rotatable to increase and decrease the distance between said punches and means previously settable for controlling the rotation of said screw rod, said means including a distance record device.
  9. A punching machine including in combination a reciprocable head, a plurality of punches carried thereby, a screw rod rotatable to increase and decrease the distance between said punches and automatic electrically operated means previously settable for controlling the rotation of said screw rod.
  - 70 10. A punching machine including in combination a reciprocable head, provided with a guideway, a plurality of punches one at least thereof being slidable along the guideway, a screw rod in threaded engagement with the slidable punch and means including a slip drive and settable stops for controlling the screw rod to effect a predetermined relative spacing of the punches.
  - 80 11. A punching machine including in combination a reciprocable head, a plurality of punches carried thereby, a screw rod rotatable to increase and decrease the distance between said punches and means previously settable for controlling the rotation of said screw rod, dies for the punches and means for causing a die to travel with its punch.
  - 85 12. A punching machine including in combination a reciprocable head provided with a guideway, a plurality of punches one at least thereof being slidable along the guideway, a screw rod in threaded engagement with the slidable punch and means including settable stops for controlling the screw rod to effect a predetermined relative spacing of the punches, dies for the punches and means for causing a die to travel with its punch.
  - 90 13. A punching machine including in combination a reciprocable head provided with a guideway, a plurality of punches one at least thereof being slidable along the guideway, a screw rod in threaded engagement with the slidable punch and means including a distance record device for automatically rotating the screw rod to effect a predetermined relative spacing of the punches, dies for the punches and means for causing a die to travel with its punch.
  - 95 14. A punching machine including in combination a reciprocable head, a plurality of punches carried thereby, means for moving said punches with respect to each other, said means including a screw rod having threaded engagement with at least one of said punches, dies for the punches, a screw rod having threaded engagement with at least one of said dies, and means for moving the screw rods together to preserve the relation between the punch and its die and settable stops controlling the screw rods.
  - 100 15. A punching machine including in combination a reciprocable head, a plurality of punches carried thereby, means for moving
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said punches with respect to each other, said means including a screw rod having threaded engagement with at least one of said punches, dies for the punches, a screw rod having threaded engagement with at least one of said dies, and means for moving the screw rods together to preserve the relation between the punch and its die, and a distance record device controlling the rotation of the screw rods.

16. A punching machine including in combination means for feeding the work longitudinally through the machine, a reciprocable punching head, a plurality of punches carried by the head and relatively movable thereon transversely to the path of travel of the work, cooperating dies, and automatic means including solenoid operated stops for moving and positioning at least one of the punches and dies to space the holes transversely in the work.

17. A punching machine including in combination means for feeding the work longitudinally through the machine, a reciprocable punching head, a plurality of punches carried by the head and relatively movable thereon transversely to the path of travel of the work, cooperating dies, and automatic means for moving and positioning at least one of the punches and dies to space the holes transversely in the work, said means including a distance record device.

18. A punching machine including in combination means for feeding the work longitudinally through the machine, a reciprocable punching head, a plurality of punches carried by the head and relatively movable thereon transversely to the path of travel of the work, cooperating dies, and automatic means for moving and positioning at least one of the punches and dies to space the holes transversely in the work, said means including a screw rod in threaded engagement with one of the punches and settable means controlling the screw rod.

19. A punching machine including in combination means for feeding the work longitudinally through the machine, a reciprocable punching head, a plurality of punches carried by the head and relatively movable thereon transversely to the path of travel of the work, cooperating dies, and automatic means for moving and positioning at least one of the punches and dies to space the holes transversely in the work, said means including a screw rod in threaded engagement with one of the punches, and a distance record device controlling the rotation of the screw rod.

In testimony whereof, we have signed our names to this specification.

THEODORE P. PAYNE.  
EDWARD V. WURTS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."