This invention relates to rivet-making machinery, and more particularly to an automatic machine for heading and trimming rivet blanks.

5 One object of this invention is to provide a rivet-making machine having a rotary dial for carrying a plurality of rivet blanks, the lower end of said dial being immersed in a tank of cooling liquid in order to quench the rivets between the heading and trimming operations.

A further object is to provide a single rivet-making machine of the above nature which will automatically perform the operations formerly done in two or more separate machines.

40 A further object is to provide a machine of this nature which will be relatively simple and inexpensive to manufacture, easy to manipulate, very efficient and durable in use, and which will occupy only a relatively small floor space.

With these and other objects in view, there has been illustrated on the accompanying drawings, one form in which the invention may be conveniently embodied in practice.

Fig. 1 represents a top plan view of the machine.

Fig. 2 is a transverse sectional view of the same, taken along the line 2—2 of Fig. 1, looking in the direction of the arrows.

Fig. 3 is a front elevation of the machine with certain parts broken away.

Fig. 4 is a transverse sectional fragmentary view of the machine, taken along the line 4—4 of Fig. 3, looking in the direction of the arrows.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates the body member of the machine, said body member being preferably rectangular in shape and open at its center for housing the rivet-holding dial, punch-carrying gate, and quenching tank.

The body member 10 is supported by legs 11 which rest upon the floor of the room where the machine is to be operated.

In order to transmit power for operating the machine, provision is made of a pulley 12 which is adapted to receive a belt, not shown, said pulley 12 being mounted on a main shaft 13, which is adapted to rotate in suitable bearings in the body member 10.

The main shaft 13 is provided intermediate its length with an eccentric cam 14 upon which a reciprocating crank arm 15 is mounted, said crank arm 15 being pivoted at its other end upon a pin 16 carried by a sliding gate member 17.

The gate member 17 is mounted to reciprocate within a pair of horizontal guideeways 18 and 19, and carries at its free end a punch head 20, upon which are mounted a pair of spaced punches comprising a heading punch 21 and a trimming punch 22, respectively.

Rivet-carrying dial.

Mounted adjacent the punch head 20 and in alignment therewith is a rotary dial 23 preferably circular in shape and carrying four pairs of radially arranged tubular rivet-holding dies. Each pair of dies comprises an outer die 24 and an inner die 25, said pairs being spaced 90 degrees from each other.

The dial 23 is adapted to lie in flat contact with the inner face of the front of the body member 10, and is geared to rotate in a clockwise direction, as viewed in Fig. 3. The dial 23 is given an intermittent oneway motion by means of a “Geneva” stop motion comprising a central member 26 having four spaced radial slots 27. The member 26 is mounted on the dial shaft 28. A pin 29 carried on the outer end of an oval disc 30 is adapted to successively travel through the slots 27 in such a manner that the dial 23 will be given a quarter of a revolution for each complete rotation of said disc 29.

The disc 29 is mounted on a shaft 30, said shaft receiving power indirectly from the pulley 12 through spur gears 31, 32 and 33, shaft 34, bevel gears 35 and 36, and spur gears 37 and 38. The spur gears 31 and 32 are carried by shafts 30 and 33, respectively.

By means of this construction, it will be seen that the dial 23 will be intermittently given a quarter revolution, and between its successive movements, said dial will remain stationary sufficiently long to permit the punches to perform their respective operations.

Blank-cutting mechanism.

In order to deliver rivet blanks to the machine, a metal wire or rod 39 is continually fed through a passage 40 in the front of the
body member 10 by means of feed rolls 53 and 54 to be described later. The passage 40 is located in alinement with one of the four positions of the outer dies 24, said outer dies serving to support the rivet wire 39 while said wire 39 is being cut off by a shearing member 41. The shearing member 41 is mounted to slide in a transverse passageway 42, in the body member 10, and has a square cutting edge 43. The shearing member 41 is provided near its outer end with a pair of oppositely disposed pins 45 on its upper and lower faces, said pins 45 being disposed in a pair of aligned circular cam slots 46 located in a reciprocating head 47. The head 47 is connected by a pivot pin 48 to a pitman rod 49, the latter being pivoted at its outer end 50 to a pin 51 eccentrically mounted on a disc 52, the latter being rigidly carried on the end of the main shaft 13.

Wire-feeding mechanism.

The rolls 53 and 54 which feed the rivet wire into the machine have grooved peripheries shaped to fit the wire 39, and said feed rolls are mounted on a pair of parallel shafts 55 and 56, said shafts carrying intermeshing gears 57 and 58, respectively, in order to cause the wire 39 to be fed into the machine intermittently, in synchronism with the other working parts thereof, the shaft 56 is given a one-way motion, at suitable intervals, by a ratchet 59, the latter being actuated by a pawl member 60, said pawl member receiving an oscillating motion by a short pitman rod 61. The other end of the rod 61 is pivoted upon a pin 62 carried by a rotating disc 63 mounted on the shaft 64 which passes transversely through the body member 10. The shaft 64 on the end opposite from the disc 63 carries a bevel gear 65 which meshes with a bevel gear 66 mounted on the shaft 32, previously mentioned.

Blank transfer mechanism.

In order to transfer the blanks 44 from the outer dies 24 into alinement with the inner dies 25, provision is made of a “fiddle bow” or lever 67 which is pivoted on a pin 81 carried E. The upper end of the fiddle bow 68 is provided with an aperture through which a rod 70 is adapted to slide, said rod 70 being pivoted at 71 to said bracket 69. A spiral tension spring 72 surrounds said rod 70 and serves to press the fiddle bow 68 continuously about its pivot against the blank 44.

In the operation of the blank transfer mechanism, when the shearing member 41 is forced inwardly after cutting off the rivet blank from the wire 39, said blank will be carried to the left, as viewed in Figs. 1 and 3, or to the right, as viewed in Fig. 2, until it comes into alinement with the inner die 25. When the gate member 17 next moves forward, the punch 21 will force the blank 44 into said inner die 25 and head it. During the heading operation, it will be understood that the end of the rivet blank 44, not being headed, will rest upon the flat face of the body member 10 with which the dial 23 is in contact.

Quenching apparatus.

In order to cool the rivet blanks 44 which are necessarily heated by the heading operation, provision is made of a narrow tank 73 covering the lower end of the dial 23 and containing a suitable quantity of cooling liquid 74, preferably a quenching oil. The tank 73 has a flange 75 welded or otherwise secured to the body member 10, as clearly shown in Figs. 1, 2, and 4.

Trimming mechanism.

In order to remove the fin of surplus metal which remains on the rivets after the heading operation, the rivet will be carried by the next indexing movement of the dial 23 up out of the tank 73 into alinement with the punch 22, which trims off said surplus metal on the next forward movement of the gate member 17.

Rivet-ejecting mechanism.

After a rivet has been trimmed, the next indexing movement of the dial 23 will carry it to the uppermost position of the dial and into alinement with an ejection or knocking-out pin 76. The knocking-out pin is carried upon the forward end of a Z-shaped member 77 slidable in a bracket 78 secured upon the top of the body member 10, as by bolts 79. The outer end of the Z-shaped member 77 is provided with a pin 78 slidable in a slot 79 in a cam lever 80, said cam lever being pivoted on a pin 81 carried by a bracket 82, the latter being secured to the body member 10, as by a bolt 83.

The lower end of the cam lever 80 is provided with an offset ear 83 carrying a roller 84 adapted to continuously contact with an egg-shaped cam 85 rigidly mounted on the shaft 64. In order to keep the roller 84 pressed firmly against the cam 85 at all times, provision is made of a spiral spring 86, said spring being connected to pins 87 and 88 mounted on the cam lever 80 and the bottom of the body member 10, respectively.

In the operation of the ejection mechanism, the knock-out pin 76 will eject a rivet from the top of the dial each time that the latter is at rest, causing said rivets to drop into a suitable container or chute, not shown, whereby they may be removed from the machine.
It will be understood that any suitable means may be provided for lubricating the successive operations of cutting-off, heading, and trimming. Preferably the lubricant employed will be the quenching oil 74 located in the tank 73, said lubricant being returned to said tank after it has performed its lubricating functions.

While in this particular embodiment of the invention, a belt-driven pulley 12 is shown for furnishing the power to the machine, it is to be understood that an electrically driven motor may be substituted therefor within the spirit and scope of the invention.

One advantage of the present rivet-making machine is that it will automatically perform the successive operations of heading, quenching, and trimming, thereby reducing to the minimum the expense of equipment, labor, and floor space.

It will also be understood that a pair of gate members may be used instead of the single gate member 17 herein illustrated, in which case one gate member will carry the heading punch, and the other gate member the trimming punch, and that said gate members will be driven by separate eccentrics mounted on the main shaft.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In a rivet-making machine, a body member, a rotary dial mounted on said body member, said dial having a rivet-holding die, means for intermittently indexing said dial, means for heading said rivets, means for quenching said rivets after the heading operation, and means for trimming excess metal from said rivets after the quenching operation.

2. In a rivet-making machine, a body member, a rotary dial mounted on said body member, said dial having a rivet-holding die, means for intermittently indexing said dial, reciprocating means for heading said rivets, means for quenching said rivets after the heading operation, and means for trimming excess metal from said rivets after the quenching operation.

3. In a rivet-making machine, a body member, a rotary dial mounted on said body member, said dial having a rivet-holding die, means for intermittently indexing said dial, a reciprocating punch-holding gate member for heading said rivets, means for quenching said rivets after the heading operation, and means for trimming excess metal from said rivets after the quenching operation.

4. In a rivet-making machine, a body member, a rotary rivet-holding dial mounted on said body member, means for intermittently indexing said dial, means for feeding rivet wire to said machine, means for cutting rivet blanks from said wire, a reciprocating punch-carrying gate member for successively heading and trimming said rivet, and means for quenching said rivet between the heading and trimming operations.

5. In a machine for heading and trimming rivets, a body member, a dial rotatably mounted in said body member, means for intermittently rotating said dial to carry a rivet successively into heading and trimming positions, a reciprocating member for heading and trimming said rivets, means for quenching said rivets between the heading and trimming operations, said dial having a plurality of inner dies for holding the rivets while being headed, quenched, and trimmed, said dial having a plurality of outer dies extending through said dial, means for delivering a strand of rivet wire through said outer dies, and means co-acting with said outer dies for shearing off rivet blanks from said rivet wire.

6. In a machine for heading and trimming rivets, a body member, a dial rotatably mounted in said body member, means for intermittently rotating said dial to carry a rivet successively into heading and trimming positions, a reciprocating member for heading and trimming said rivets, means for quenching said rivet between the heading and trimming operations, said dial having a plurality of inner dies for holding the rivets while being headed, quenched, and trimmed, said dial having a plurality of outer dies extending through said dial, means for delivering a strand of rivet wire through said outer dies, and a cam-operated reciprocating slide co-acting with said outer dies for shearing off rivet blanks from said rivet wire.

7. In a machine for heading and trimming rivets, a body member, a dial rotatably mounted in said body member, means for intermittently rotating said dial to carry a rivet successively into heading and trimming positions, a reciprocating member for heading and trimming said rivets, means for quenching said rivet between the heading and trimming operations, said dial having a plurality of inner dies for holding the rivets while being headed, quenched, and trimmed, said dial having a plurality of outer dies extending through said dial, means for delivering a strand of rivet wire through said outer dies, and means co-acting with said outer dies for shearing off rivet blanks from said rivet wire.
rivet wire, and means for transferring said rivet blanks into a position in alinement with said inner dies.

8. In a machine for heading and trimming rivets, a body member, a dial rotatably mounted in said body member, means for intermittently rotating said dial to carry a rivet successively into heading and trimming positions, a reciprocating member for heading and trimming said rivets, means for quenching said rivet between the heading and trimming operations, said dial having a plurality of inner dies for holding the rivets while being headed, quenched, and trimmed, said dial having a plurality of outer dies extending through said dial, means for delivering a strand of rivet wire through said outer dies, means co-acting with said outer dies for shearing off rivet blanks from said rivet wire, and a spring-pressed lever for clamping said rivets against said shearing-off means for transferring said rivet blanks into a position in alinement with said inner dies.

9. In a machine for heading rivets, a body member having a flat vertical surface, a circular rivet-carrying rotary dial contacting with said flat surface, a tank of quenching liquid covering the lower part of said dial, means for heading said rivets before being quenched, means for rotating said dial to immerse said rivets in said quenching liquid after the heading operation, and means for trimming said rivets after being quenched.

10. In a machine for heading rivets, a body member having a flat vertical surface, a circular rivet-carrying rotary dial contacting with said flat surface, a tank of quenching liquid covering the lower part of said dial, means for heading said rivets before being quenched, means for rotating said dial to immerse said rivets in said quenching liquid after the heading operation, and means for trimming said rivets after being quenched, said heading and trimming means being carried by a unitary reciprocating gate member.

11. In a machine for heading rivets, a body member having a flat vertical surface, a circular rivet-carrying rotary dial contacting with said flat surface, a tank of quenching liquid covering the lower part of said dial, means for heading said rivets before being quenched, means for rotating said dial to immerse said rivets in said quenching liquid after the heading operation, and means for trimming said rivets after being quenched, said heading and trimming means being carried by a unitary reciprocating gate member, said tank being secured to said body member.

12. In a machine for heading rivets, a body member having a flat vertical surface, a circular rivet-carrying rotary dial contacting with said flat surface, a tank of quenching liquid covering the lower part of said dial, means for heading said rivets before being quenched, means for rotating said dial to immerse said rivets in said quenching liquid after the heading operation, and means for trimming said rivets after being quenched, said heading and trimming means being carried by a unitary reciprocating gate member, said flat surface forming one side of said tank.

13. In a rivet-making machine, a body member, a rotary rivet-holding dial mounted on said body member, means for intermittently indexing said dial, means for feeding rivet wire to said machine, means for cutting rivet blanks from said wire, a reciprocating punch-carrying gate member for successively heading and trimming said rivets, and means for quenching said rivets between the heading and trimming operations.

In testimony whereof, we have affixed our signatures to this specification.

MARTIN DWYER.
RICHARD J. BOYLE.