(No Model.)

W. CANNELL.

FERRULE MACHINE.

No. 522,647. Patented July 10, 1894.

Fig. 1.

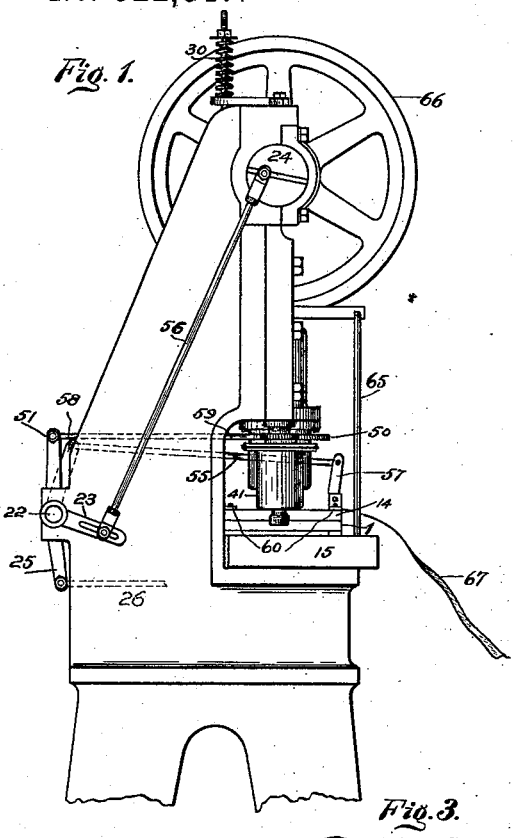


Fig. 2.

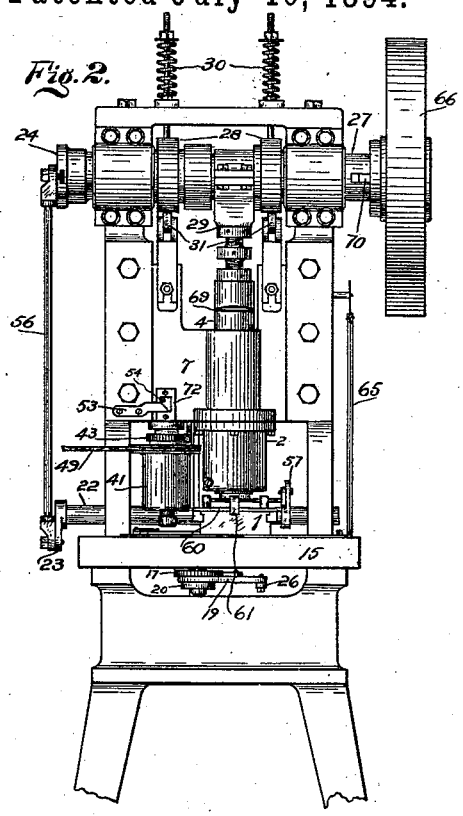


Fig. 3.

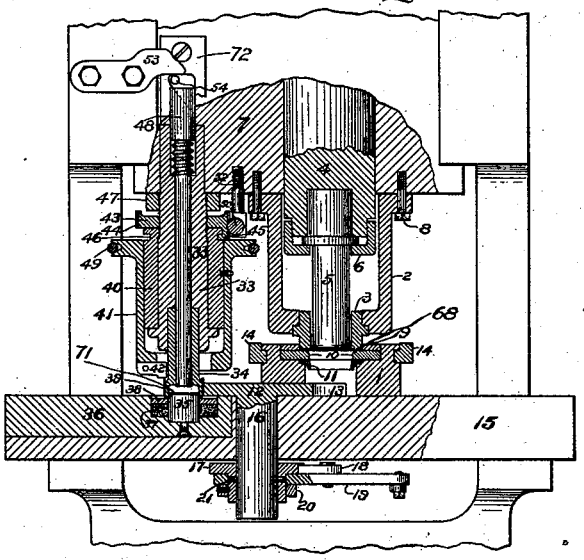
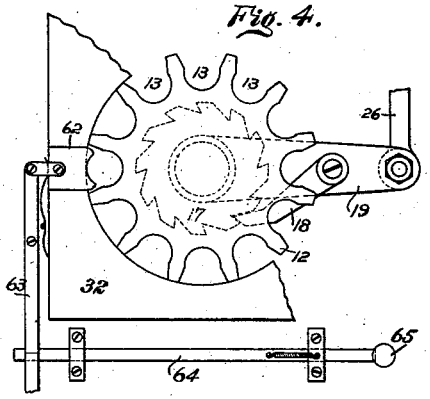


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM CANNELL, OF LYNN, MASSACHUSETTS.

FERRULE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 522,647, dated July 10, 1894.

Application filed December 9, 1893. Serial No. 493,230. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CANNELL, of Lynn, Essex county, Massachusetts, have invented certain new and useful Improvements in Ferrule-Machines, which improvements are described in the following specification and are illustrated by the accompanying drawings.

My invention is a combined drawing-press and trimmer for the manufacture of ferrules, and other like articles. In the construction of the same it is my object to combine in a superior manner, and in a single machine, all the mechanism which is necessary for performing the several operations involved in converting a strip of sheet metal into finished ferrules. To accomplish this object, I use a double-action drawing-press, which is provided with primary dies and punches, in the usual manner, and which is also provided with a secondary die and punch, in combination with a trimmer, and with mechanism for transferring the partly finished ferrules between the primary and the secondary dies.

The best manner in which I have contemplated applying the principle of my invention, is shown in said drawings, in which—

Figure 1 is a side elevation of a ferrule machine, which is constructed upon that principle. Fig. 2 is a front elevation of the same. Fig. 3 is an enlarged view of a portion of the same, partly in front elevation, and partly in vertical section; and Fig. 4 is a plan of the transferring mechanism in detail.

The machine which is exhibited in the drawings includes the essential parts of a common double-action cutting and drawing press, namely: the main shaft, which is denoted in Fig. 2 by the numeral 27, the pulley 66 and cams 28 upon that shaft, the blanking slide 7 and its antifriction rollers 31, the spiral springs 30, which hold up slide 7 so that rollers 31 are at all times in contact with cams 28, the bonnet 2, which is secured to slide 7 by screws 8, as shown in Fig. 3, the blanking punch 3, which is carried by bonnet 2, and is hereinafter termed the primary cutting punch, the drawing slide 4, reciprocating in slide 7, and holding the drawing punch 5 by means of cap 6, a crank on the main shaft 27, carrying a pitman 29, which is connected with drawing slide 4 by a toggle joint 69, the blanking die 9, the drawing die 10, and the spring stripper 11, which is placed in an aperture through bolster-plate 1 on bed-plate 15; all which are easily intelligible from the drawings and from the usual construction and mode of operation of double-action presses. In the same slide 7 a tubular holder 33, of the reciprocating die 34, is seated in a vertical position, adjustable by means of nut 47. On holder 33 is a rotable brass shell 40, having a neck, which is formed by the circumferential groove 46. A nut 43, on the same holder 33, is provided with a bridle 45, taking into groove 46, and with peripheral teeth 44, engaging a rack 50, which is held up to such engagement by a bridle 52. A combined shell and pulley 41, keyed to shell 40, and armed at its lower extremity with a steel cutter 42, is driven at high speed by a belt 49. Within the holder and die, 33 and 34, is a spring-seated knockout 48, whose head is in apposition with lever 54. The inner end of this lever is fastened loosely in a hole in slide 7, and the outer end of the same projects through a guiding plate 72, on the face of that slide, for the purpose of being alternately engaged and disengaged by latch 53. An adjustable plate 36, which is seated in bed-plate 15, as shown in Fig. 3, holds a secondary cutting punch 35, stationary under die 34, in a hole, which contains a stripper, consisting of the annular rubber spring 37 and the annular steel cover 38.

The main element of the above-mentioned transferring mechanism is the turret 12, which is shown in Figs. 3 and 4. This turret, which is provided with a predetermined number of receptacles, or peripheral pockets, 13, is conveniently located on the top of plates 15 and 36, and is surrounded by plate 32. The same is provided with a shaft 16, which is journaled in a vertical position in bed-plate 15, and is rotated intermittently by means of ratchet and pawl, 17 and 18, so that pockets 13 pause in succession under punch 5, and also under die 34. Ratchet-wheel 17 has a sleeve, which is fastened to shaft 16 by pin 21; and pawl 18 is carried by lever 19, which turns upon the sleeve of the ratchet-wheel 17, being held thereon by collar 20.

A rockshaft 22, which is driven by a crank disk 24 on the main shaft 27 by means of a pitman 56 and arm 23, has three arms 25, 51

and 58, which are shown in Fig. 1. Arm 25 is connected by a pitman 26 with the lever 19, for the purpose of intermittently rotating the turret 12; arm 51 is connected by a pitman 59 with the rack 50, for the purpose of turning the nut 43 alternately up and down upon the die-holder 33; and arm 58 is connected by a pitman 55 with a bar 57, for the purpose of operating the feed mechanism, which remains to be described. The feed mechanism is a carriage, reciprocating upon bolster-plate 1, and consisting of two guiding slides 14, a flat plate 60, by which slides 14 are joined together, and a swinging bar 61, which is capable of automatically gripping in position upon plate 60 the ribbon or strip of brass, 67, from which ferrules are to be formed.

It remains to mention the tripping mechanism, by means of which the machine is stopped in case of accidental failure of the primary punches to perform their functions. In plate 32 is set a sliding plate 62, which is adapted to slightly enter the mouth of any one of the several pockets 13 which may be presented empty, as shown in Fig. 4. This sliding plate is connected by lever 63 and rods 64 and 65, with a tripping lever, not shown in the drawings, acting upon a key 70, by which pulley 66 engages the main shaft 27. This tripping mechanism, which is not fully shown in the drawings, is not peculiar in any other respect than that of being capable of being brought into action by the absence of a ferrule from that particular pocket 13 which is for the time being directly under die 34.

Such being the construction of my improved ferrule machine, its mode of operation remains to be described.

The strip of brass or other metal, 67, of suitable width and of indefinite length, being the stock, which is to be worked up into ferrules, is first inserted by hand between parts 60 and 61 of the described intermittently reciprocating feed carrier, so that a portion of the strip 67 is brought into position under the primary punches 3 and 5. Then, as pulley 66 begins to turn, slide 7, descending through the position in which the same is shown in Fig. 2, and into the position in which the same is shown in Fig. 3, presses the blanking punch 3 into die 9, and thereby cuts from the strip, or ribbon, 67, a disk or circular blank, 68. Meanwhile, and until the machine is fully under way, the described tripping mechanism is held inoperative by the hand of the operator. After the described formation of blank 68, the same is held in the bottom of die 9, between punch 3 and die 10, while cams 28 are on the dwell. Then, as pulley 66 continues turning, the main crank, operating through pitman 29, forces the drawing punch 5 down into die 10; and blank 66 is thereby drawn in the usual manner into the form of a cylindrical ferrule, closed at the bottom, and is carried down through the annular spring stripper 11 into a pocket 13 of turret 12. Then slide 7 ascends, while the described ferrule with closed bottom, being prevented by stripper 11 from accompanying punch 5 in its upward movement, is left with its mouth open upward in that pocket. Next, turret 12, being impelled by rock-arm 25, through pitman 26, lever 19 and ratchet and pawl, 17 and 18, is rotated one step, namely, through an angle representing the distance between two adjacent pockets 13; so that such partly made ferrule is carried away from the path of punch 5, and the next pocket 13 is brought to rest empty under that punch. As the machine continues working, all the described steps are repeated as many times as are necessary to bring the first-mentioned pocket and ferrule into position under die 34. Then at the next following descent of slide 7, die 34, entering the last-mentioned ferrule from above, forces the latter down onto punch 35, as shown in Fig. 3, so that a flat circular plate, the disk 71, is cut from the bottom of that ferrule. Next, the rack 50, being propelled by rock-arm 51, turns the nut 43 down upon the die-holder 33, and thereby depresses shell 41, so that the revolving cutter 42, being pressed down into the upper edge of the ferrule, trims off all irregularities, and leaves the ferrule finished. After cams 28 have turned so far as to allow slide 7, drawn by springs 30, to begin to rise, the knock-out 48, being actuated by the guided lever 54 and the stationary latch 53, pushes disk 71 out of die 34, leaving that disk loose in the ferrule. By means of the spring strippers 37 and 38, the ferrule is disengaged from punch 35, and is restored to the same position which it previously occupied in pocket 13. The completed ferrule is afterward discharged from the turret 12, and from the machine, through a hole, which is not shown in the drawings, leading from a point under the path of pockets 13, through the bed-plate 15.

Whenever, during the operation of the machine, a turret 13 is presented to slide 62 empty, and accidentally unoccupied by any ferrule, that slide automatically enters the mouth of that pocket; and by this movement the before-mentioned tripping mechanism is brought into action, and pulley 66 is let loose upon shaft 27 by the withdrawal of key 70. So the machine stops, awaiting the attention of the operator.

Such being the construction and operation of my improved ferrule-machine, I claim as my invention—

1. In a machine for the manufacture of ferrules, or other like articles, a primary cutting punch and die, a drawing punch and die, a secondary cutting punch and die, a trimmer, and mechanism for operating such punches, dies and trimmer, in combination with transferring mechanism between the primary and secondary cutting punches, substantially as and for the purpose specified.

2. A primary cutting punch and die, mechanism for feeding stock to such punch and die, a drawing punch and die, a secondary

cutting punch and die, a trimmer, and mechanism for operating such punches, dies and trimmer, in combination with transferring mechanism, for feeding to such secondary cutting punch the stock which has previously been subjected to the operation of the primary cutting punch and of the drawing punch, substantially as and for the purpose specified.

3. A primary cutting punch and die, a drawing punch and die, a secondary cutting punch and die, and mechanism for operating said punches and dies, in combination with a rotary trimmer, and transferring mechanism for feeding the partly finished work to said secondary punch, substantially as and for the purpose specified.

4. A primary cutting punch and die, a drawing punch and die, a secondary cutting punch and die, mechanism for operating said punches and dies, a reciprocating feed carrier for supplying stock to the primary cutting punch, and intermittently moving mechanism for transferring the partly manufactured stock to said secondary cutting punch, in combination with a rotary trimmer, substantially as and for the purpose specified.

5. A die and punch, whose reciprocating member is made fast in a reciprocating holder, mechanism for imparting reciprocating motion to such holder, and rotary mechanism, which is mounted upon such reciprocating holder and carries a rotary cutter, in combination with mechanism for imparting to such rotary mechanism and cutter a reciprocating movement, relative to such reciprocating holder, substantially as and for the purpose specified.

6. A reciprocating die and a stationary punch therefor, a cylindrical holder for said reciprocating die, mechanism for driving said die-holder and die, a rotary grooved sleeve upon said die-holder, a nut upon said die-holder, provided with peripheral teeth and with a bridle, which takes into the groove of said rotary sleeve, and a reciprocating rack, which engages said nut by means of said teeth, in combination with a combined sleeve and pulley, which is keyed to said grooved sleeve, and a revolving cutter, which is carried by such pulley sleeve, substantially as and for the purpose specified.

7. A die and punch, whose reciprocating member is provided with a cylindrical holder, mechanism for imparting reciprocating motion to such holder, and rotary mechanism, carrying a cutter, and mounted upon such cylindrical holder, in combination with mechanism for moving such rotary cutter-carrying mechanism longitudinally upon such reciprocating holder, substantially as and for the purpose specified.

In testimony whereof I hereunto set my name in the presence of two witnesses.

WILLIAM CANNELL.

Witnesses:
THOS. CANNELL,
FRED P. SNOW.