June 24, 1969 W. A. SHIELDS 3,451,116

MACHINE FOR CRIMPING A FERRULE TO A HYPODERMIC NEEDLE

Filed Sept. 27, 1966 Sheet 1 of 2

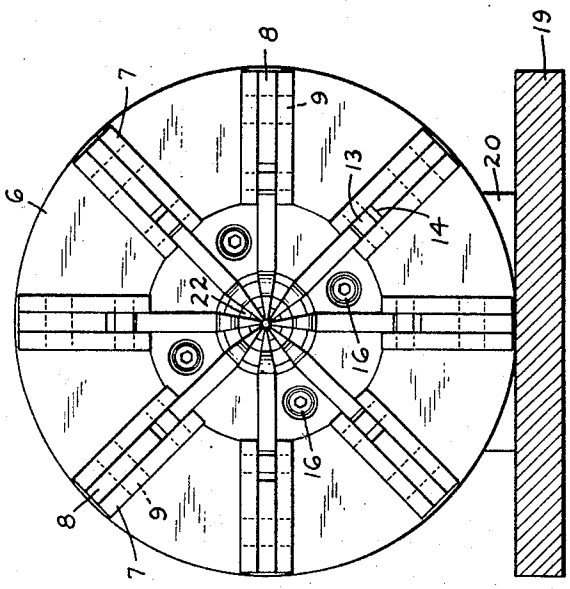

FIG. 2.

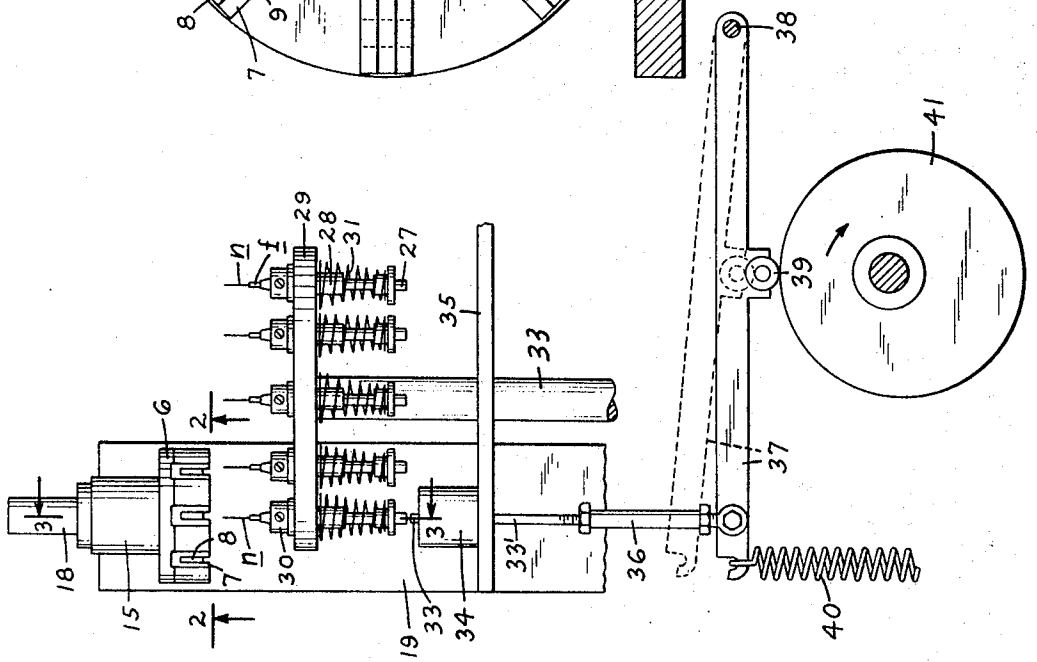

FIG. 1.

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FIG. 3.

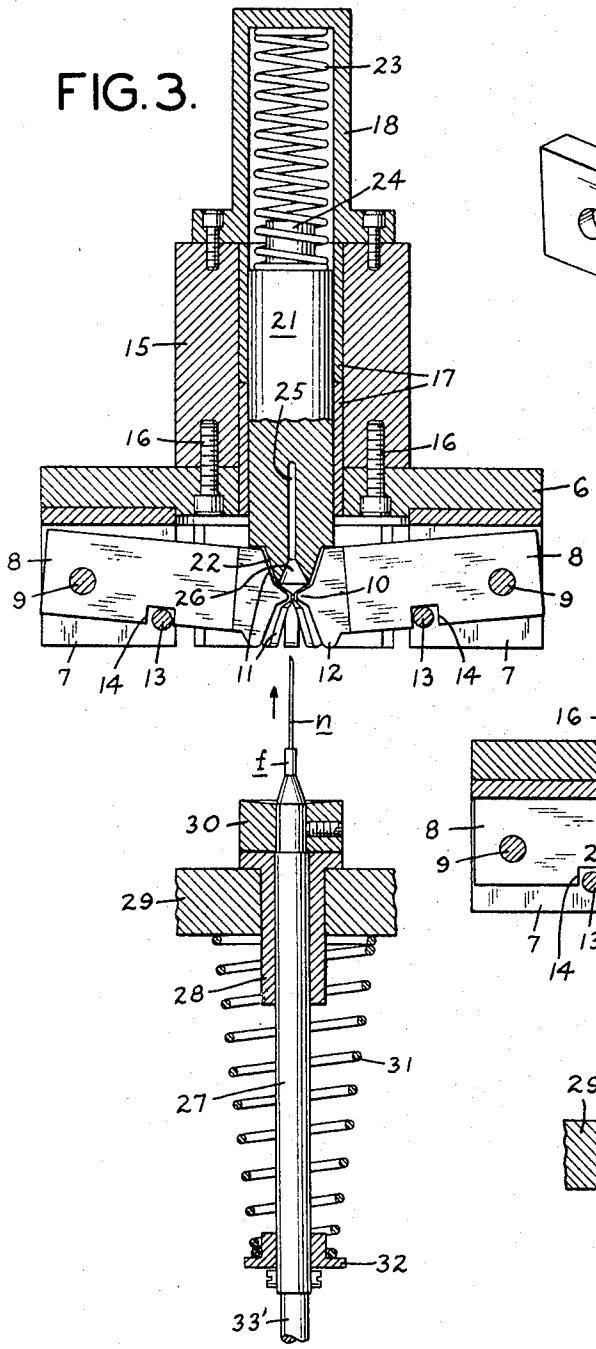


FIG. 5.

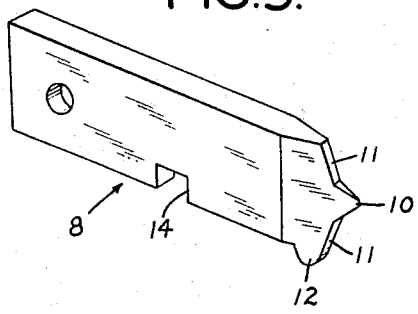
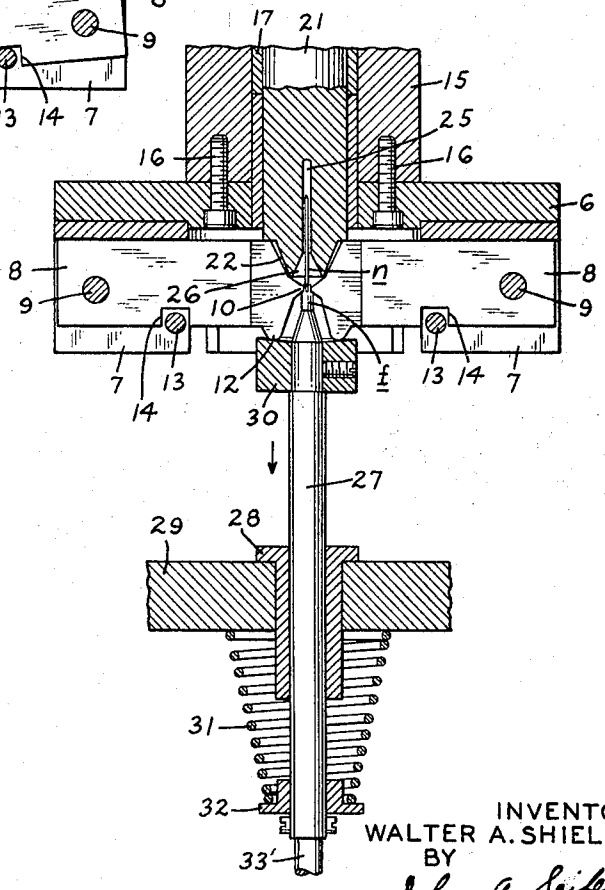


FIG. 4.



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MACHINE FOR CRIMPING A FERRULE TO A HYPODERMIC NEEDLE

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ABSTRACT OF THE DISCLOSURE

A machine for crimping a ferrule to a hypodermic needle and particularly to a head carrying radially disposed crimping jaws yieldingly spaced from each other and from the vertical center of the head, and a mandrel adapted to be positioned in vertical alignment with and spaced below the space between the jaws, said mandrel carrying a ferrule having a hypodermic needle loosely engaged therein, movement of the hypodermic needle into the space between the jaws moving the jaws toward each other and into crimping position.

After the ferrule is crimped to the hypodermic needle, it is provided with a protective shield and assembled in a cap member for use in a syringe.

It is an object of the invention to provide jaws which will evenly crimp a ferrule to a hypodermic needle under great pressure by a toggle action.

It is another object of the invention to maintain the jaws and mandrel under spring tension during the crimping of the ferrule to the hypodermic needle.

Other objects and advantages of the invention will be set forth in the detailed description of the invention.

In the drawings accompanying and forming a part of this application:

FIGURE 1 is an elevational view of the embodiment of the invention;

FIGURE 2 is a bottom plan view, on an enlarged scale, of the head looking from the line 2—2 of FIGURE 1 in the direction of the arrows:

FIGURE 3 is a longitudinal sectional view, on an enlarged scale, of the head and mandrel, taken on the line 3—3 of FIGURE 1, looking in the direction of the arrows and showing the jaws spaced from each other and the mandrel spaced below said jaws;

FIGURE 4 is a view similar to FIGURE 3 with part of the head broken-away and showing the mandrel actuating the jaws into crimping position; and

FIGURE 5 is a perspective view of a jaw.

The embodiment of the invention comprises a head including an annular plate 6 having a radial series of spaced pairs of ears 7 secured and projected from the bottom of said plate and each pair of ears is formed from a U-member secured at the connecting portion to the bottom of the plate as by welding. Each pair of ears is adapted to swingingly support a jaw 8 by a pin 9 fixed at its ends in the ears and loosely engaged in the outer or perimetrical end of said jaw, as shown in FIGURES 3 and 4. The opposite or inner end of each jaw is provided with a nose 10 tapering from converging edges 11 and the lower converging edge is arranged with a projection 12 for a purpose to be hereinafter described. Due to the location of the pins 9 in the jaws 8, the noses 10 will swing in a downward direction from the head plate 6 and said downward swinging movement is limited by abutments in the form of a pin 13 fixed in and extended transversely of each pair of ears 7 to engage a notch 14 in the lower edge of each jaw 8 between the pin 9 and the nose 10. In the present illustration of the invention there are eight radially disposed jaws.

The head plate 6 is provided with a tubular member 15 secured by screws 16 to the top of said plate concentrically of the opening in the plate, and said opening and tubular member 15 being lined with bearing material 17. The upper end of the tubular member 15 is closed by an elongated cap member 18 secured to the tubular member and having an interior bore corresponding to the inner bore of the bearing liners 17. The head plate 6 is mounted in a fixed position by a standard 19 having a lateral extension 20 secured to the head plate 6, as shown in FIGURE 2.

The jaws 8 are yieldingly urged against the pins 13 by a plunger 21 slidable in the bearing liners 17 and having at its lower end a tapered head 22 corresponding to the angle of the upper converging edges 11 of the jaws 8 to forcibly engage said edges 11 by a spring 23 compressed between the closed end of the cap member 18 and the upper end of the plunger 21 which is provided with a spring guiding knob 24, as shown in FIGURE 3. The tapered head 22 is arranged with an inwardly extending bore 25 having a flaring entrance 26, as shown in FIGURES 3 and 4, for a purpose to be hereinafter described. The pins 13 are positioned in the ears 7 so that the plunger 21 will space the jaw noses 10 a predetermined distance from each other and form a circular space, as shown in FIGURE 3.

A ferrule *f* and a hypodermic needle *n* are moved into said circular space formed by the jaw noses 10 by a mandrel in the form of a rod 27 slidably mounted in a bearing 28 of an annular series of equidistantly spaced bearings in a rotatable table 29. The upper end of the mandrel 27 is reduced to support the ferrule *f* having the hypodermic needle *n* loosely engaged therein. Below the reduced end of the mandrel 27, there is secured an abutment in the form of a ring 30 which normally abuts the top of the bearing 28 under the influence of a spring 31 compressed on the mandrel 27 between the bottom of the table 29 and a collar 32 secured on the lower end of the mandrel 27.

In operation, the loosely assembled ferrules and hypodermic needles are positioned on the reduced end portions of the mandrels 27, and the table 29 is intermittently rotated by a suitable mechanism, not shown, operatively connected to a shaft 33 of the table 29. The intermittent rotation of the table 29 successively positions a mandrel 27 with its loosely assembled ferrule and hypodermic needle in vertical alignment and spaced below the circular space formed by the jaw noses 10. A rod 33' is slidably mounted in a bearing 34 on a platform 35 below the table 29 with the upper end of the rod 33' normally positioned slightly below the path of travel of the lower ends of the mandrels 27, as shown in FIGURE 1. The lower end of the rod 33' is arranged with an adjustable coupling member 36 pivotally connected to a lever 37 adjacent one end of said lever and the opposite end of said lever is pivotally mounted, as shown at 38 in FIGURE 1. A roller 39 is rotatably mounted on a portion of the lever 37 intermediate the ends of said lever and is yieldingly urged by a spring 40 to ride on a cam disc 41 continuously rotated by suitable mechanism, not shown. The spring 40 is connected at one end to the end of the lever 37 adjacent to the pivotal connection of the coupling member 36. The opposite end of the spring 40 is anchored to suitable anchorage, not shown. The low portion of the cam disc 41 under the influence of the spring 40 will position the upper end of the rod 33' slightly below the line of travel of the lower ends of the mandrels 27, as shown in FIGURE 3. The high portion of the cam disc 41 will contact the roller 39 during the rest periods of the table 29 and raise the aligned mandrel against the force of the associated

spring **31** and forcibly engage the abutment ring **30** with the jaw projections **12** to impart a toggle action to the jaws **8** causing the jaw noses **10** to advance forwardly with great pressure and squeezed or crimp the ferrule *f* to the hypodermic needle *n* which have been positioned in the circular space formed by the jaw noses **10** just prior to the contact of the ring abutment **30** with the jaw projections **12**, as shown in FIGURE 4. The bore **25** in the tapered head **22** of the plunger **21** will permit upward movement of the mandrel **27** without damaging the hypodermic needle *n*, as shown in FIGURE 4.

After the ferrule is crimped to the hypodermic needle, a protective shield is positioned over the fully assembled ferrule and hypodermic needle at a succeeding station of the mandrel **27** by a succeeding intermittent rotation of the table **29**.

It is to be understood that the mandrels **27** could be fixedly mounted on the table **29** and the head plate **6** could be reciproacted toward and away from an aligned mandrel **27** and its ferrule *f* and hypodermic needle *n* without departing from the scope of the present invention.

Having thus described my invention, I claim:

1. A machine for crimping a ferrule to a hypodermic needle comprising a head, jaws radially disposed in the head and pivotally mounted at their perimetrical ends with the opposite ends swinging in a downward direction from each other, abutments in the head to limit the downwardly swinging movement of the opposite ends of the jaws and space said opposite ends a predetermined distance apart, and a mandrel adapted to be positioned in vertical alignment and spaced below the space between the opposite ends of the jaws, said mandrel adapted to support a ferrule having a hypodermic needle loosely engaged therein said mandrel adapted to impart movement of the hypodermic needle into the space between the opposite ends of the jaws thereby moving the jaws from the abutments in the head and causing said opposite ends of the jaws to crimp the ferrule to the hypodermic needle.

2. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **1**, wherein the head is fixedly mounted.

3. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **1**, wherein each jaw is provided with a notch in the lower edge thereof and intermediate the ends of each jaw, and each abutment in the head comprises a pin extended transversely of and in the notch of the jaw.

4. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **1**, wherein the opposite end of each jaw is provided with a nose tapering from converging edges of said jaw.

5. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **1**, a plunger slidably mounted in the head and yieldingly urged into engagement with said opposite ends of the jaws to normally maintain the jaws in engagement with the abutments in the head.

6. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **4**, a plunger having a tapered head corresponding to the angle of the upper converging edges of the jaws and slidably mounted in the head and yieldingly urged to engage said tapered head with the upper converging edges of the jaws and normally maintain the jaws in engagement with the abutments in the head and space the noses of the jaws from each other.

7. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **6**, wherein the tapered head of the plunger is provided with a vertical bore to receive the hypodermic needle during the crimping of the ferrule to the hypoderimc needle.

8. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **1**, wherein the mandrel is slidably mounted and yieldingly urged from the head to position the hypodermic needle and ferrule in spaced relation to the opposite ends of the jaws, and means to intermittently actuate the mandrel toward the head.

9. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **8**, an abutment mounted on the mandrel below the ferrule and hypodermic needle to limit the movement of the mandrel from the head, to engage the opposite ends of the jaws, to move the jaws from the abuments in the head and to cause the crimping of the ferrule to the hypodermic needle by the opposite ends of the jaws.

10. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **9**, wherein the lower converging edge of each jaw is provided with a projection to be engaged by the abutment on the mandrel.

11. The machine for crimping a ferrule to a hypodermic needle as claimed in claim **1**, a table rotatably mounted on a vertical axis extending in a plane parallel to the vertical axis of the head and slidably carrying a plurality of said mandrels to successively position the mandrels in vertical alignment and spaced below the space between the opposite ends of the jaws.

12. The machine to crimp a ferrule to a hypodermic needle as claimed in claim **8**, wherein the means to intermittently actuate the mandrel comprises a rod slidably mounted in vertical alignment and spaced below the space between the opposite ends of the jaws, a continuously rotating cam disc, and a lever connected to the rod and having a roller riding on the cam disc.

References Cited

UNITED STATES PATENTS

2,836,218 5/1958 Perri.
2,986,192 5/1961 Macleod.

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U.S. Cl. X.R.

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