Nov. 22, 1927. 1,650,525

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DEVICE FOR MAKING PINS WITH HEADPLATES

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Fig.1.

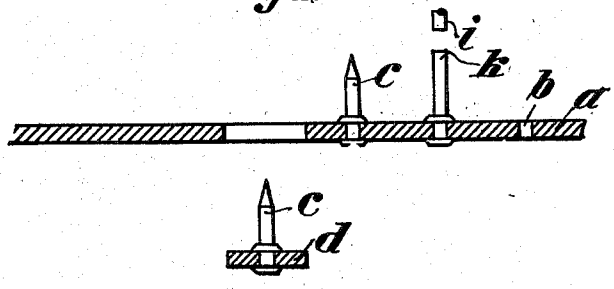


Fig.2.

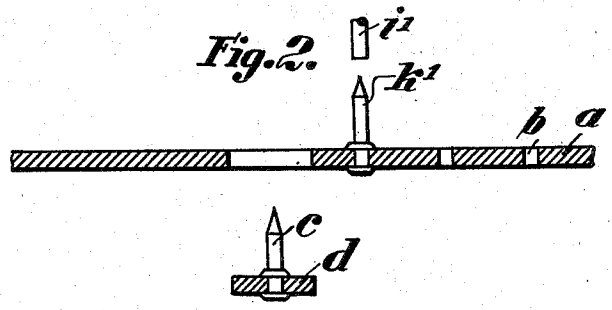


Fig.3.

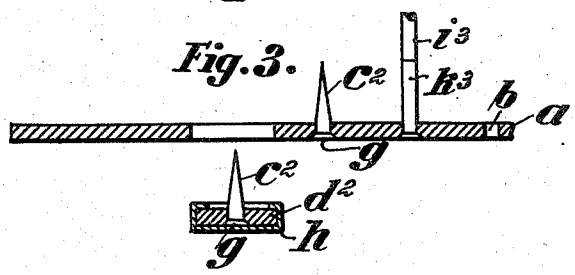
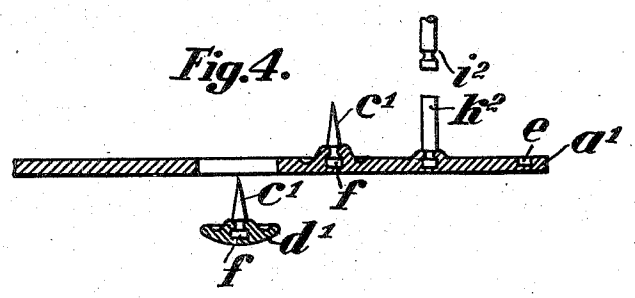


Fig.4.



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Fig. 5.

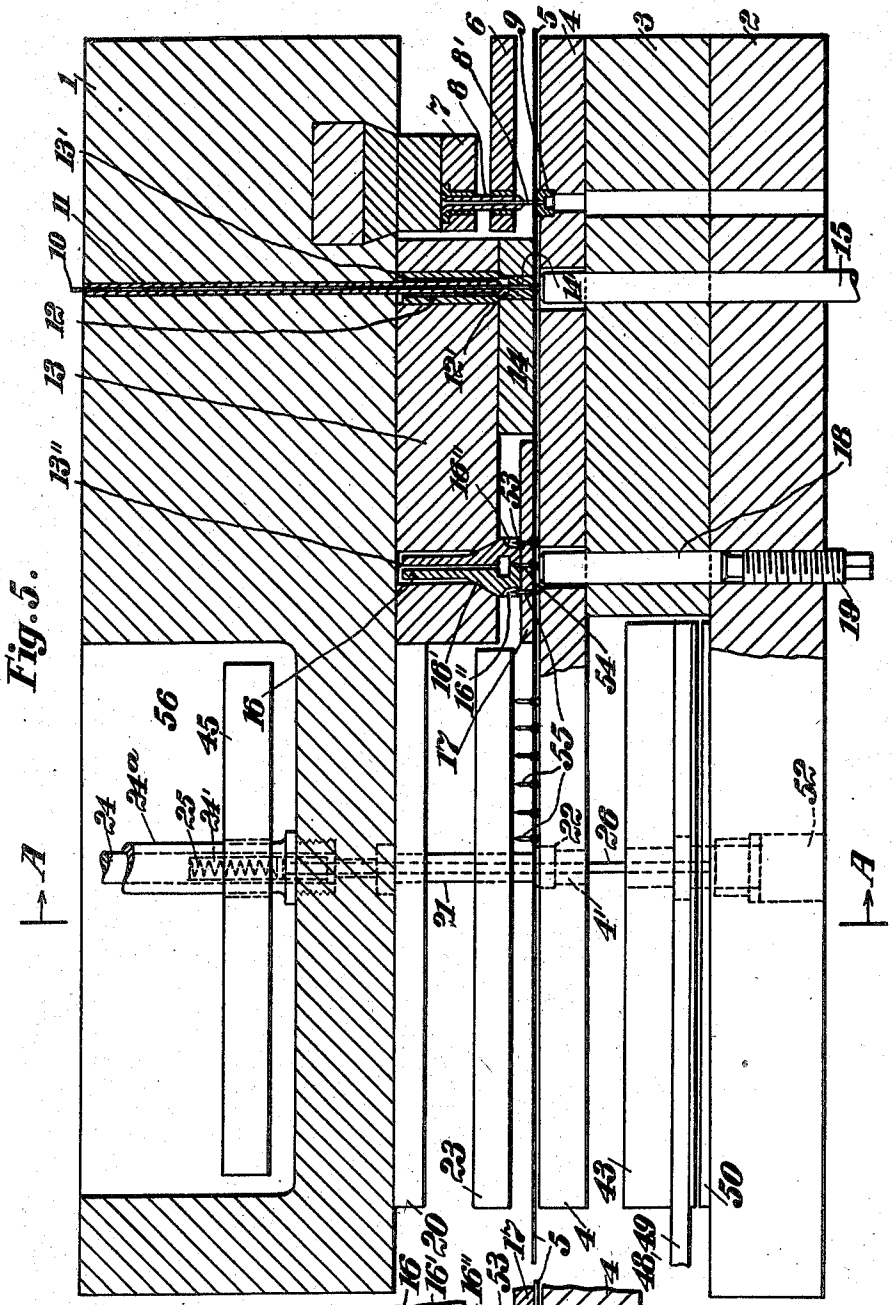
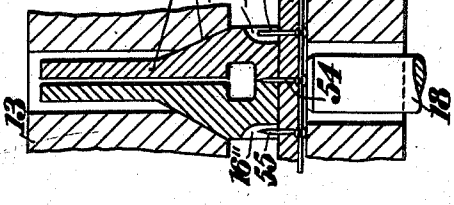


Fig. 7.



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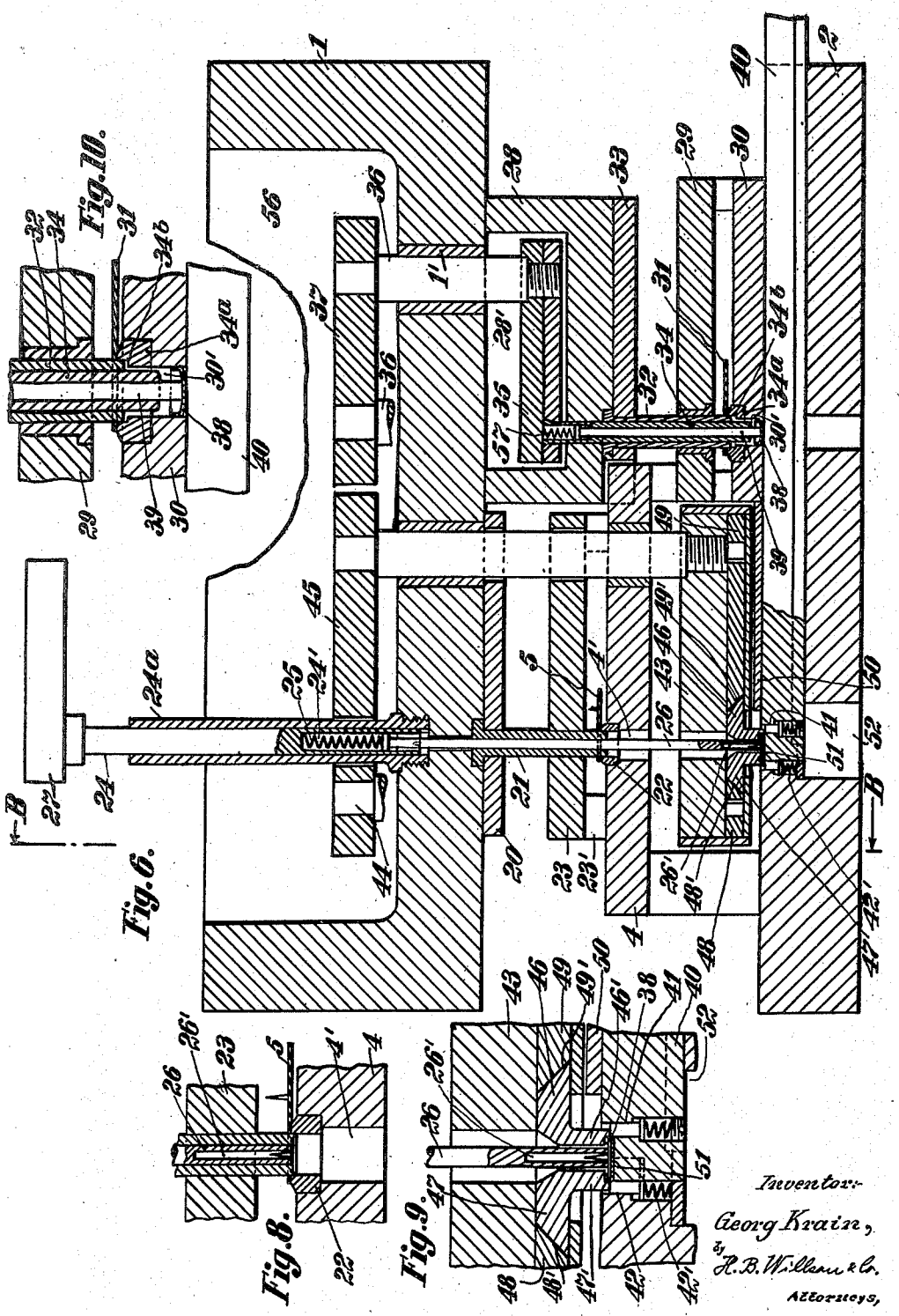


Fig. 6.

Fig. 10.

Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE.

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DEVICE FOR MAKING PINS WITH HEADPLATES.

Application filed November 8, 1924, Serial No. 748,683, and in Germany November 12, 1923.

This invention relates to a method and machine for the production of thumb tacks, tacks for upholstering, for fixing carpets, pins for fixing wand-hooks, and the like, that is to say of tacks of that type in which the pin is not stamped from the head plate but is inserted in the same. Hitherto such tacks have been made in the following manner:—The head plate with a central hole or cavity designed for the pin is stamped from a strip or band of sheet metal whereupon the pin is inserted into said head plate and securely fixed in the same. The fixing of the pin in the head plate in this case is done either by hand or with the aid of special tools or machines in a special working step.

According to the present invention I proceed in the following manner:—The strip or band of sheet metal is first provided with the holes or cavities for inserting the pins whereupon the end of a wire which is continuously fed to the working place is connected with the continuously fed perforated strip or band of sheet metal, the pin being then either at the same time and on the same spot or subsequently cut from the wire and shaped (pointed) whereupon the head plate is finally stamped out of the strip or band of sheet metal. The thumb tacks or other tacks and pins thus are ready for use when the head plate is stamped out of the strip and they are manufactured in one operation or during one revolution of the shaft of the machine employed. The thumb tacks ready for use are consequently mechanically produced from a continuous band of sheet metal and from a continuous wire in one operation while hitherto at least two operations and at least two separate devices were necessary for the same work.

In this manner as well the so-called riveted pins the point of which is fixed in the head plate by riveting, as the so-called sunk pins in which the end of the wire or the point is sunk in the head plate, as also the so-called capsuled pins can be produced.

The working method and a device for carrying the same into effect are illustrated, by way of example, in the accompanying drawings, in which:—

Figs. 1, 2, 3 and 4 illustrate diagrammatically different forms of the improved working method for the production of thumb tacks.

Fig. 5 shows partly in full lines and partly in longitudinal section on line B—B of Fig. 6 one form of execution of a device for carrying out the working method, the stamping means for the head plates and the capsuling means being shown in dotted lines.

Fig. 6 is a cross section on line A—A of Fig. 5.

Fig. 7 shows on a larger scale a constructional detail of Fig. 5.

Fig. 8 is a detail vertical sectional view on a larger scale of the parts shown in Fig. 6 for stamping out the head plates of the pins.

Fig. 9 is a similar view of the parts for applying the capsules to the head plates of the pins.

Fig. 10 is a similar view of the parts for forming the capsules for the head plates of the pins.

In carrying out the improved working method for the production of riveted pins, tacks or needles the hole b for the reception of the wire is first punched into a continuous strip a (Fig. 1) whereupon the wire i is fed, the end k of the wire is cut off and at the same time inserted through the hole b, and it is then firmly riveted therein. Then the wire end k is sharpened at another working place to form a point c. The sharpening of the cut off wire end k^1 could however also be done according to Fig. 2 at the same working place at which the cutting off from the wire i^1 and the connection of the end k^1 with the strip a is effected. In both these cases the head plate d with the point or pin c riveted in the same is subsequently stamped out of the continuous strip a. All these operations can be executed in one working phase and by one and the same machine the one directly after or simultaneously with the other, and the thumb tack or the like is thus produced in one operation and during one single revolution of the machine shaft.

When tacks with sunk pins or points are to be produced a cavity e (Fig. 4) is first pressed into the strip or band a^1 whereupon the end of wire i^2 is notched and cut off, and the cut off piece k^2 is pressed into said cavity e and is upset. At the next working point the wire end k^2 is fastened in the cavity e by further squeezing the material of the band a and at the same time is sharpened so as to form the point or pin c^1. The

head plate d^1 together with the pin c^1 is then stamped out of the strip or band a and simultaneously a vaulted form is given to this head plate. All these performances too are executed in direct succession or simultaneously in one working phase.

When capsuled tacks have to be produced according to Fig. 3 the continuous band a of sheet metal is first perforated to form hole b whereupon the wire i^3 from which the pin c^2 is made at the same time with or, as shown, after its being connected with the band of sheet metal a by cutting off and pointing, is inserted through the hole b. Then the head g of the point or pin is produced by upsetting, and the head plate d^2 together with the point c^2 is stamped out of the band a of sheet metal, immediately pushed into the capsule h arranged under that place where the head plate d^2 is stamped out, whereupon the edges of the capsule h are bent around those of the head plate d^2. Instead of producing a point with an upset head the point c^2 might also be riveted in the hole b, in a similar manner as shown in Figs. 1 and 2 with reference to the pin c. A sunk pin of the type shown in Fig. 4 could also be used for the production of capsuled tacks.

The manufacturing of the capsuled tacks can also be carried out in one single working phase and with the aid of one single machine. The capsules for the tacks can be made as usual from metal, celluloid or other convenient material employed in the form of a band or strip.

The wire for making the points or pins can be taken either from a bobbin or from straight wire (having the form of a long, thin rod). In the described manner drawing pins, carpet tacks, tacks for upholstering, pins or needles for fastening wall-hooks, or in short, all kinds of needles and pins can be produced the point or needle of which is inserted into a head plate.

Several holes or cavities may be produced at the same time in the continuous band of sheet metal and several wires or pins may be attached to the endless band at the same time, several head plates with the pins being in this case stamped out at the same time.

More than one pin might further be fixed in one head plate also where the improved working method of the present invention is applied.

For carrying out the improved working method a device as shown by example in Figs. 5 to 9 can preferably be used. The machine shown is especially adapted for the production of drawing pins or the like riveted in the head plate and capsuled. In Figs. 5 and 6 the several parts of the device are shown in their lowest position of working.

The apparatus or device shown on the drawing is preferably mounted on a multiple-acting press of commonly used construction which is not shown.

In the lower surface of the top part 1 of the device which part may be fastened to one of the tool-holders of the press employed a holder 7 for the punch 8 (Fig. 5) is inserted which carries the punching needle 8'. At a certain distance from this punching needle and under the same the cutting plate 9 for the punching needle is arranged. This cutting plate is sunk into a plate 4 which is fixed on the base plate 2, a plate 3 being inserted between the base plate and plate 4. A stationary guide plate 6 is arranged between the punch holder 7 and plate 4, this guide plate having a hole designed to guide the punch 8.

In the top part 1 a vertical channel is arranged at some distance at the side of the holder 7. In this channel a guide sleeve 11 for the wire 10 is mounted. This guide sleeve 11 projects at the lower end from the top part 1 and through a plate 13 fixed on the lower surface of this top part 1. This plate 13 serves to guide the cutting jaws for cutting the end of the wire 10 and it has, with this object in view, a bore 13' extending in downward direction. In this bore 13' the jaws 12 for cutting the end of the wire 10 are guided so that they can be moved towards one another. The tapered lower ends 12' of these jaws 12 project from the guide plate 13, and they are adapted to engage with a bore of a plate 14 arranged under plate 13 but independently of this plate. The walls of the bore of this plate 14 are slightly conically tapered in the direction to the lower end of said bore. A riveting set or die 15 is arranged below the cutting jaws 12 and at a certain distance therefrom, said riveting die projecting through cross bores of the plates 2 and 3 in which it is guided and further through a corresponding bore of plate 4 which latter bore is slightly wider than the other bores.

At some distance from the bore 13' a second bore 13'' parallel to the bore 13' is arranged in the guide plate 13. The lower end of this bore 13'' is conically enlarged. Two shaping-jaws 16 project from below into the bore 13'' and have inclined surfaces 16' corresponding with the conical part of the bore 13''. The lower ends of the shaping-jaws 16 rest upon a plate 17 adapted to be raised and lowered and having holes for passing the points 53, 54 and 55 connected with the strip 5 of sheet metal. The two shaping-jaws 16 are provided with incisions 16'' in their side-walls. Below the shaping-jaws 16 and the plate 17 and at a certain distance therefrom a counter-pressure bar 18 is adjustably arranged in the supporting plates 3 and 4 and held by an adjusting screw 19.

This adjusting screw is screwed into an internally threaded bore of the base plate 2.

One portion of the top part 1 is provided with a hole 56. Under this portion of part 1 a plate 20 is fixed which carries the cutting die 21 (Fig. 6) for stamping out the head plate for the pins. This cutting die 21 traverses a cross bore of a guide plate 23 which, by means of supports 23', is fixed on plate 4. Below the cutting die 21 a bore 4' is arranged in plate 4, in the upper end of which a ring 22 is inserted which has cutting edges designed to co-operate with the corresponding cutting edges of the cutting die 21.

A rod 26 projects through the hollow cutting die 21 and has in its lower end a bore 26' designed to accommodate and hold the pin during the cutting out of the head plate and during the covering of the same by a cap. The rod 26 is inserted at its upper end into the lower bored end of a rod 24. In the bore 24' of rod 24 a spring 25 is inserted above the upper end of rod 26. The rod 24 is guided in a sleeve 24^a fixed in the top part 1, and the upper end of rod 24 is fixed in a head plate 27 adapted to be raised and lowered in vertical direction independently of the top part 1. Behind the head plate 20 a tool head 28 is fixed to the lower surface of that portion of the top part 1 in which the aperture 56 is arranged, this tool head having an aperture 28' and carrying on its lower surface the head plate 33. Into this head plate 33 a cutting die 32 for the tool designed for producing the capsule is inserted. The cutting die 32 is guided in a bore of a guide plate 29 fixed to a plate 30 by means of supports which are not shown. Plate 30 is fixed by corresponding, not shown supports on the plate 2. Between plates 2 and 30 a slide 40 is arranged adapted to be moved from backward to forward and vice versa, and inserted into a corresponding guide of the base plate 2. In the plate 30 below the cutting die 32 a bore 30' is arranged into which a cutting ring 34^a is inserted adapted to co-operate with the cutting die 32.

In the hollow cutting die 32 a die 34 for drawing the cap or capsule of the pins is movably arranged. The upper end of this die 34 is fixed on a head plate 35 which is fixed itself by means of connecting bolts 36 (of which the one is shown broken away for clearness sake) to a plate 37. The bolts 36 traverse bores 1' of the top part 1. The plate 37 is mounted on a tool-carrier of the press, not shown on the drawings, which tool-carrier can be moved up and down independently of the tool carrier for the top part 1.

In the hollow die 34 a pin 39 is movably mounted above which a spring 57 is arranged which has the tendency to press this pin permanently in the downward direction. The cutting and drawing ring 34^a has on its inner surface a circumferential shoulder 34^b.

In front of plate 37 a second plate 45 is fixed to the same tool-carrier of the press as plate 37 and is connected by means of bolts 44 (of which also the one is shown as being broken away) with a part 43. This part 43 is holding two jaws 46 and 47 having bevelled outer faces. Two sliding plates 48, 49 having correspondingly bevelled inner faces 48' and 49' are acting upon said jaws 46, 47.

In the forward end of the slide block or slide 40 a groove is arranged on its surface for inserting the capsule for the pin to be manufactured. Behind this groove a pin 41 is arranged on a spring in the slide 40, said pin 41 acting as an abutment for the capsule or cap during its being moved forward. In the base plate 2 below the jaws 46, 47 a half ring 42 is arranged on a spring 42', said half ring serving as a butt for the capsule moved forward by the slide 40. Behind the studs 46' and 47' of jaws 46, 47 and directly above the slide-block 40 a plate 50 is fixed to the plate 30 connected with base plate 2, said plate 50 serving for ejecting the finished pins when the slide is moving back. Below the jaws 46, 47 the base plate 2 has a hole 52 through which the finished pins drop upon a delivery place.

The operation of the apparatus is as follows:—The band 5 of sheet metal for the head plates of the thumb tacks or the like is conveyed by means of a conveyor, not shown, to and through the apparatus, the wire 10 from which the points or pins are to be made being fed to the guide sleeve 11 from a bobbin or the like through the intermediary of a wire feeding mechanism, not shown.

When the top part 1, mounted on the main tool-carrier of the press, is descending the pin 8' of the punch 8 punches a hole in the band 5. The part of band 5 which has just been perforated is then brought under the guide sleeve 11 and the jaws 12 where the wire 10 is fed. The end of this wire is cut off by means of the jaws 12, 12' advancing into the hole of plate 14. Then the cut wire end is immediately inserted through the hole of band 5 punched before and then at once is riveted in the band of sheet metal 5 by means of the lower end faces of the jaws 12' on the one hand, and by means of the set or die 15 on the other hand, said set or die 15 being moved upwards by means of not shown levers arranged on the press.

When the band of sheet iron 5 with the wire ends riveted therein continues to advance these wire ends get between the shaping jaws 16. The shaping jaws are pressed together by the inclined faces of plate 13 acting upon the inclined faces 16' at the descending movement of the top part 1, whereby the point on the piece of wire or

pin 54 is formed. The apertures 16'' serve during this time to give room to the ends of the preceding, already sharpened pin 55 and of the following pin 54. The plate 17 can serve for removing the burr after the shaping and sharpening of the points.

When the advancing continues further the band of sheet iron 5 with the pins gets under the cutting die 21 (Fig. 6). At this moment the elements are in the mutual positions shown in Fig. 8, viz, the lower end of rod 26 is approximately at the same height or somewhat higher than the lower end of the die 21 and descends firstly with this die, so that, at the moment when the cutting die 21 through the movement of the top part 1 is pushed over a point of the band 5, this point engages with the bore 26' of rod 26 and is thus held. At the further descending of the die 21 the head plate is stamped out of the sheet iron band 5. As soon as this has been done the rod 26 descends farther owing to the descending movement of plate 27 and rod 24, and pushes downward the pin with the stamped out head plate.

In Fig. 5 the strip 5 is shown in the position which it will have after the three first steps of operations. It is assumed that the strip 5 before the beginning of the working has been pushed through the machine to such an extent that it can be gripped by a conveying device of known type which is to be arranged to the left of the machine and which is not shown in the drawing. It is by this conveying device that the strip 5 and the blanks formed therefrom by the fastening thereto of the wire ends are fed through the several stations of the cycle of operation.

Prior to this the band- or strip-material 31 for the production of the capsules or caps has been brought under the cutting die 32 by the aid of a conveying means, not shown. By this cutting die 32 a plate of somewhat greater diameter is stamped out of the band material 31 than that which is stamped out by the die 21 from the band 5. The movement of the cutting die 32 for the capsule is caused by the head plate 33 simultaneously with the descending of the top part 1. Immediately after the stamping of the small plate for the capsule by means of the die 32 this small plate is pushed farther down by the drawing ram or die 34 which is operated by plate 37 which, together with the plate 45, is mounted on a second tool-holder of the press. The drawing ram 34 pushes the small plate into the hollow space 30' of plate 30, and in doing so the shape of a capsule is given to the small plate when the same is moving along the inner surface 34^b of the cutting and drawing ring 34^a, the edges of the small plate being folded over. By the spring-controlled pin 39 the capsule 38 which is thus formed is brought in downward direction on the slide-block 40. At this instant the slide-block 40 is in such a position that the capsule 38 formed in the preceding downward movement of parts 1 and 37 and lying in the groove of the slide-block 40 before pin 41 is worked by the jaws 46 and 47 within said groove of slide-block 40. (To see Fig. 9.) After the thus formed object has been finished the slide-block 40 is moved backwards by means of levers arranged on the press and not shown in the drawing, in such a manner that its groove arranged before pin 41 comes under hole 30' and that the freshly formed capsule 38 enters into said groove. Now the slide-block 40 is advanced again, capsule 38 borne in said groove passing below plate 30 and being finally pushed against the half ring 42. The tack or pin which has been previously stamped out of the band 5 by means of the cutting die 21 is then inserted by the descending rod 26 into the cap 38 lying under the same, whereupon the plate 45 and consequently the jaws 46, 47 descend. By the action of the inclined faces 48', 49' of the plates 48, 49, laterally moved by not shown levers, upon the corresponding inclined faces of the jaws 46, 47 these jaws are pressed the one towards the other during their downward movement. By the studs 46', 47' which have grooves in their lower faces pressing on the edges of the capsule the flanging of the edge of this capsule is produced which, thereby is being folded around the head plate of tack or pin 51. The tack is now finished. The rod 26 ascends again, the jaws 46, 47 being still closed thus holding the pin 51 which in this way is removed from the bore of rod 26. It is only then that the jaws 46 and 47 open and ascend with part 43 in releasing the capsuled pin 51. At the return movement of slide-block 40 the point of pin 51 strikes against the plate 50 whereby the pin is stripped off slide-block 40 and drops through the hole 52 onto the delivering place. In the further backward movement of the slide-block 40 the next following cap 38 which has been produced in the meantime gets in the groove before the elastic pin 41, the other elements having in the meantime returned to their initial position so that the working operation can begin again.

If riveted or sunk tacks without capsules have to be made with the aid of the machine the element designed for producing the caps 38 and for feeding these caps may be omitted.

The sharpening and shaping of the cut off wire ends may be carried out, if desired, at the same point as the cutting off, viz, by means of the jaws 12 which in this case must be shaped accordingly. In this case the jaws 16 may be omitted. The removing of the

burr from the points may be carried out in another manner and at another point than described, for instance the jaws 16 could be used also for removing the burr. The shaping and sharpening of the riveted wire end could, if desired, be carried out at more points than shown and by other means than the jaws. Previously perforated sheet metal could also be used so that the punch 8 may be omitted. The feeding of the wire and of the strip of sheet metal must not necessarily be effected by the press itself. The band of sheet metal may be of any desired width and several tacks might be simultaneously produced the one at the side of the other; in this case the represented tools must correspondingly be multiplied.

For clearness sake the wire ends are not shown on the drawings on the band of sheet metal 5 behind the place where they are united with the band but only some of them are shown at those places where the further treatment takes place, e. g. under the jaws 16 and under the die 21.

Instead of the device shown devices of quite another type may be used for the production of the tacks according to the method which forms the object of the present invention.

Having now particularly described and ascertained the nature of my said invention, I declare that what I claim is:—

1. In a machine for the production of pins with head plates from continuously fed wire and a continuously fed strip of sheet metal, means for connecting the end of said wire with said sheet metal strip, means for cutting off the end of said wire, means for shaping and sharpening said cut off wire end, means for stamping out head plates from said sheet metal strip, means beyond and in line with said head plate stamping means for capsuling said stamped out head plates of the pins, a rod for projecting the pins after the head plates are stamped out directly to the capsuling means, means for stamping out capsuling plates, means for shaping said capsule plates, and means for feeding the shaped capsules to said capsuling means.

2. In a machine for the production of pins with head plates, a hollow cutting die for stamping said head plates from a strip of sheet metal, means arranged directly below said hollow cutting die for pressing the edges of capsules around the edges of said head plates, and a rod movable through said hollow cutting die to project said head plates into the capsules.

3. In a machine for the production of pins with head plates from continuously fed wire and a continuously fed strip of sheet metal, a hollow cutting die for stamping out said head plates, means for forming and for applying capsules to said head plates, and a suitably operated rod passing through said hollow cutting die to project said stamped out head plates directly to said capsuling means.

4. In a machine for the production of pins with head plates from continuously fed wire and a continuously fed strip of sheet metal, means for stamping out and applying said head plates to the pins, means for applying capsules to said head plates, said means comprising a slide block having a groove to receive the capsule, a spring projected pin and a spring projected half-ring serving as abutments for the capsule, and a pair of suitably operated jaws having studs provided in their lower ends with grooves and adapted to engage and press the edges of the capsule around the head plate of the pin.

5. In a machine for the production of pins with head plates from wire and a strip of sheet metal, means for stamping said head plates from said strip of metal after the pins have been applied thereto, means for forming capsules for said head plates, said means comprising a hollow cutting die for stamping capsule plates from a sheet of material fed thereto, a capsule shaping-ring arranged below said cutting die, a pin movable through said hollow cutting die to project said capsule plate with said shaping-ring, and means for feeding said capsules to a point immediately below and in line with the axis of the stamping out means of said head plates.

In testimony whereof I have hereunto set my hand.

GEORG KRAIN.