Feb. 14, 1933. F. H. WILLIAMS 1,897,159

PROCESS FOR MAKING SPIKES

Original Filed Nov. 16. 1922 2 Sheets-Sheet 1

Fig. 1.

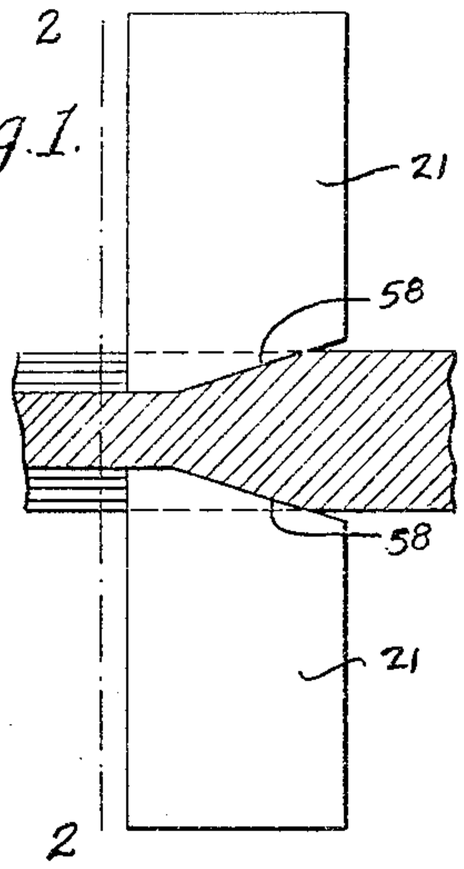
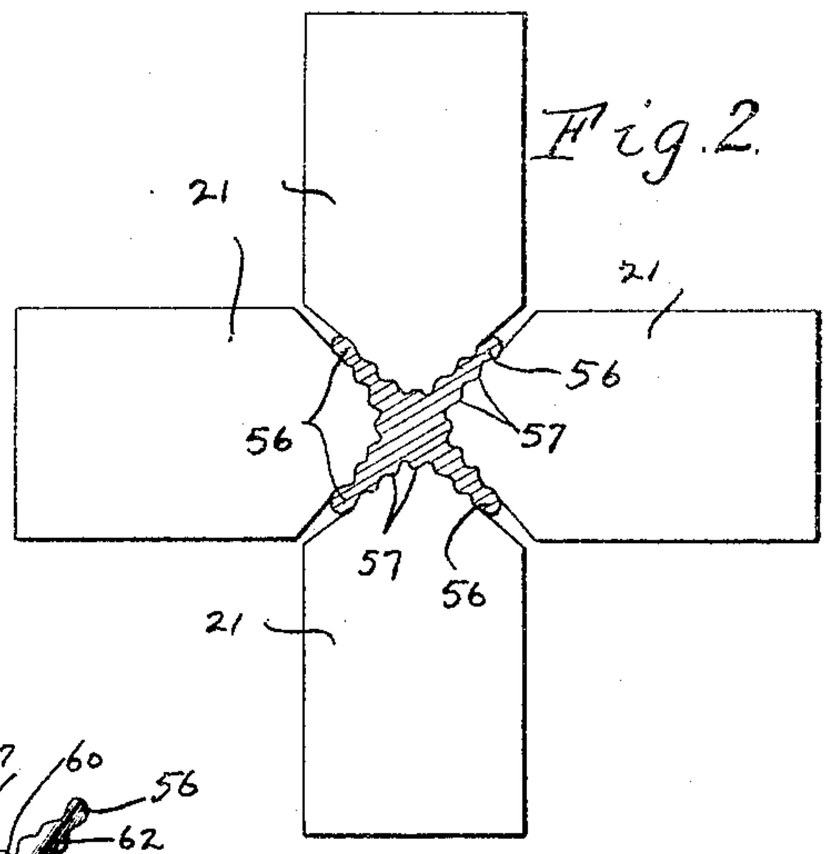


Fig. 2.



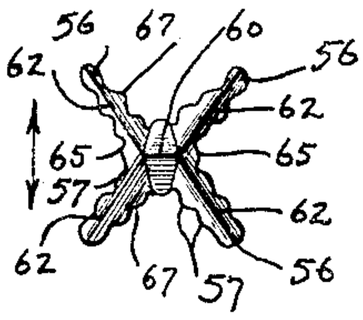


Fig. 10.

Fig. 3.

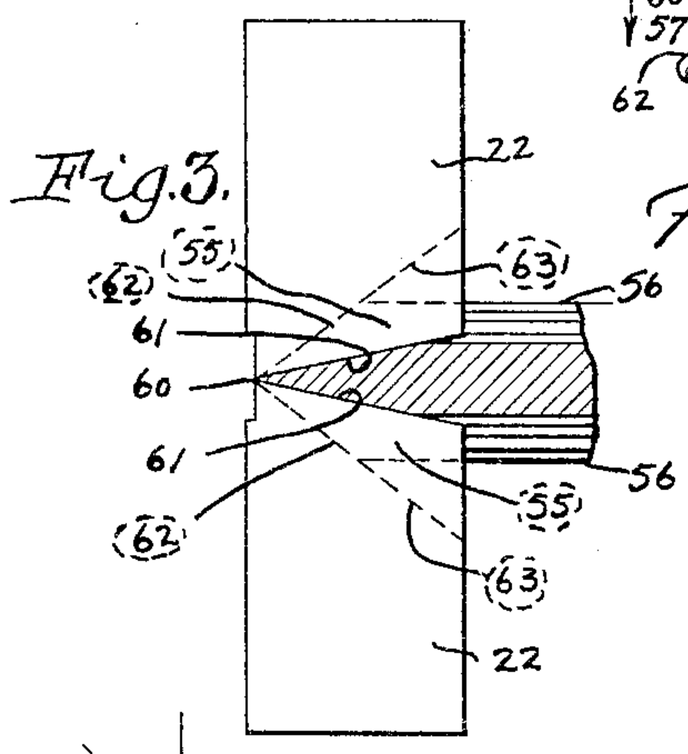


Fig. 4.

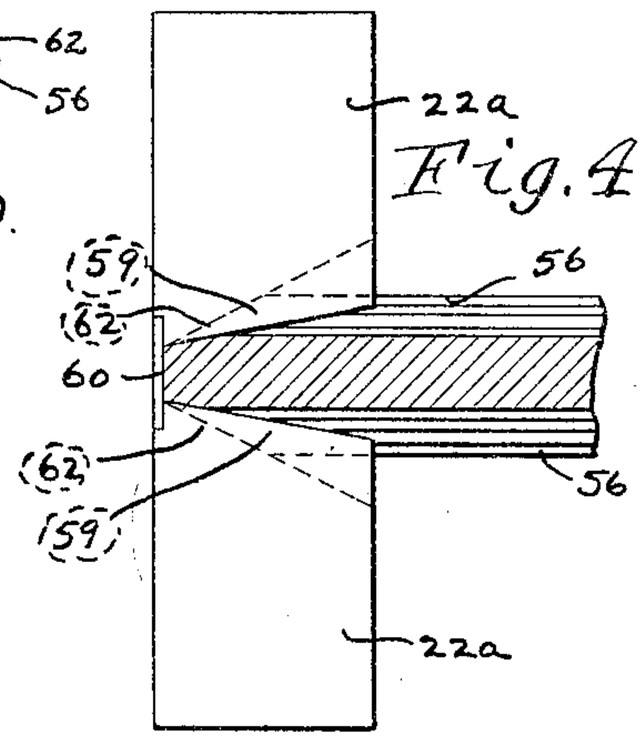
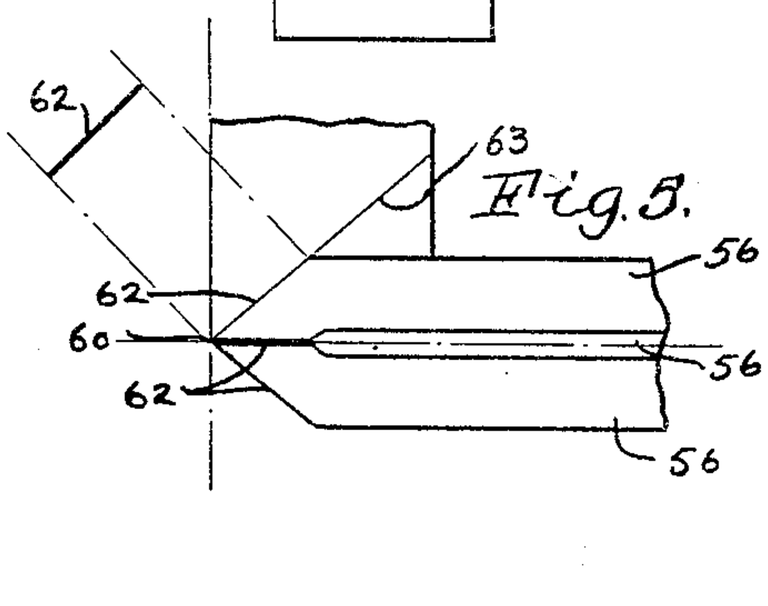


Fig. 5.



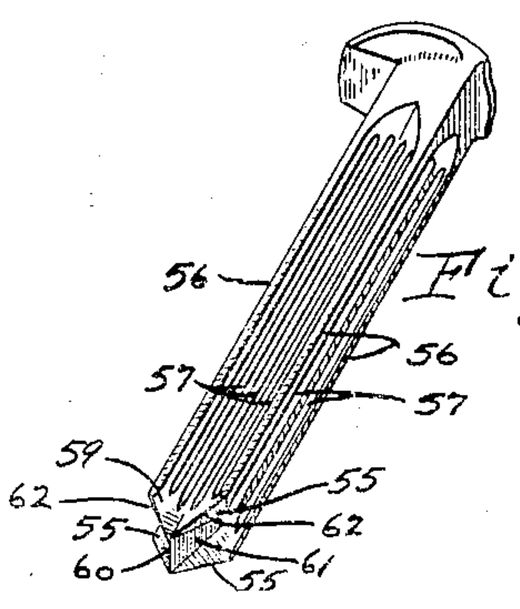


Fig. 9.

Inventor

Frank H. Williams, Incompetent
by Annie M. Williams, Guardian

Attorney

Feb. 14, 1933. F. H. WILLIAMS 1,897,159

PROCESS FOR MAKING SPIKES

Original Filed Nov. 16. 1922 2 Sheets-Sheet 2

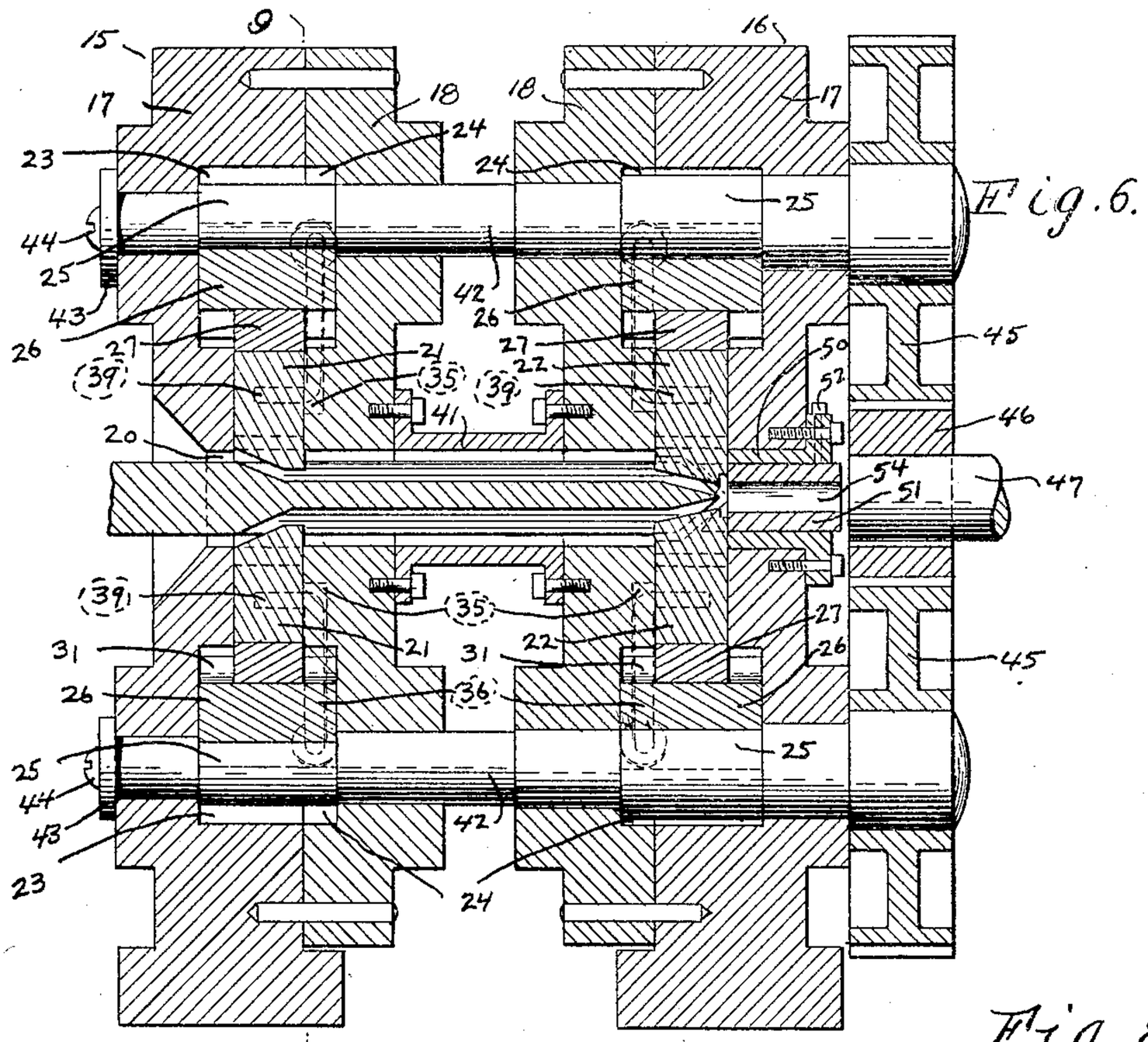


Fig. 6.

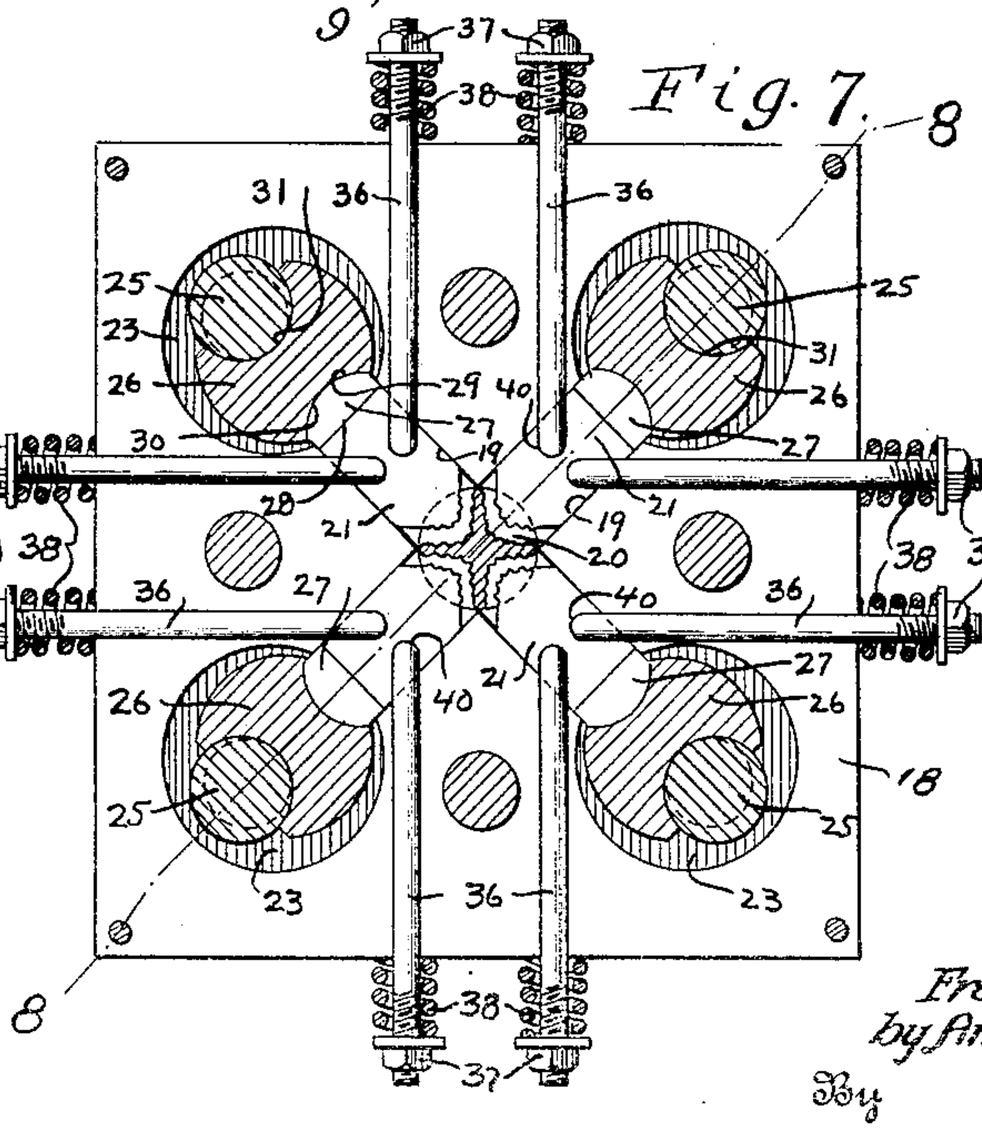


Fig. 7.

Fig. 8.

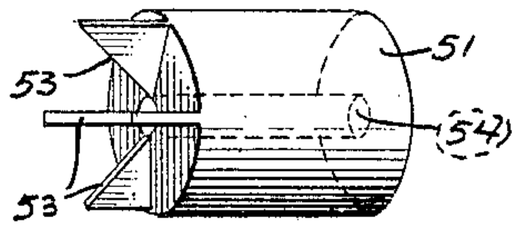
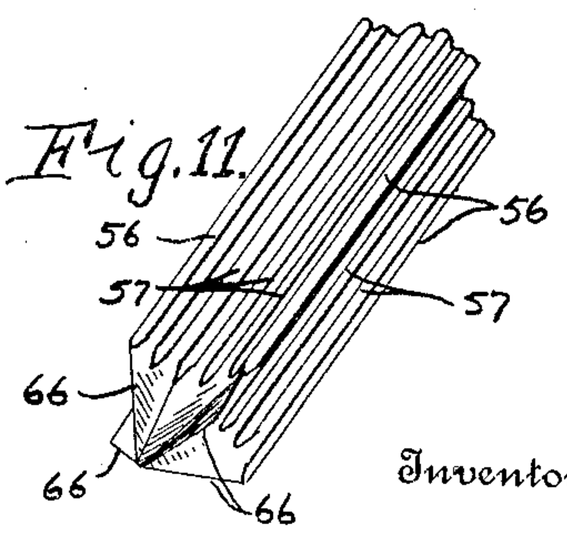


Fig. 11.



Inventor

Frank H. Williams, Incompetent
by Annie M. Williams, Guardian

By

J. Wm. Ellis

Attorney

Patented Feb. 14, 1933 1,897,159

UNITED STATES PATENT OFFICE

FRANK H. WILLIAMS, INCOMPETENT, OF BUFFALO, NEW YORK, BY ANNIE M. WILLIAMS, GUARDIAN, OF BUFFALO, NEW YORK, ASSIGNOR TO SPIRAL-ROLLED PRODUCTS COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

PROCESS FOR MAKING SPIKES

Original application filed November 16, 1922, Serial No. 601,262. Divided and this application filed July 19, 1929. Serial No. 379,443.

This invention relates in general to the reduction and pointing of metals, and in particular to a process for making railroad spikes.

This is a divisional application, the original of which was filed November 16, 1922, and given Serial No. 601,262.

While this invention has been described as applied to the manufacture of railroad spikes, it is obvious that it is applicable to the manufacture of any other object which has a portion or the whole of its body reduced and pointed.

The principal object of this invention has been to provide a process whereby the formation of, for instance, a spike may be made in a progressive manner.

Moreover, this process is such that the pointing of the product may be accomplished continuously with or as a part of the reducing process, or concurrently with the completion thereof.

Furthermore, by this process the product may be provided with a point in the form of a chisel edge without the necessity of having to shear off any surplus metal.

In the accompanying drawings, has been shown a complete spike and one form of apparatus by which the process of forming the body and the point of the same may be carried out, it being obvious that the operation of forming the head of the spike may be separately performed in a manner so well known to those skilled in the art that it needs no further description. While there has been shown and described one form of apparatus for carrying out this process, it is clear that other forms of apparatus may be employed for obtaining the desired results. In the drawings:

Fig 1 shows in a diagrammatical manner a longitudinal, sectional view of a bar being reduced by this process.

Fig 2 is a cross-sectional view, taken on line 2—2 of Fig. 1.

Fig 3 shows also in a diagrammatical manner, a longitudinal, sectional view of a bar being pointed by this process.

Fig 4 is a similar view, taken in a plane at 90° to that shown in Fig. 3.

Fig 5 shows in a diagrammatical manner the product being pointed by dies, having the proper angle.

Fig. 6 shows a longitudinal, sectional view of the complete apparatus for producing this spike, and is taken on line 8—8 of Fig. 7.

Fig. 7 is a sectional elevation, taken on line 9—9 of Fig. 6.

Fig. 8 is an enlarged, perspective view of the stop used in this apparatus.

Fig. 9 is a perspective view of a complete spike made by this process.

Fig. 10 is an end view of the point of the spike, showing the grain of the cross-tie indicated by the double arrow.

Fig. 11 is a fragmentary, perspective view of a spike showing a modified form of point.

The apparatus shown in the drawings is designed primarily for forming railroad track spikes, and comprises a shaper 15, and a pointer 16. The pointer 16 is substantially identical to the shaper 15 except for the dies and the stop, to be hereinafter described. These devices are arranged in parallel relation, as shown in Fig. 6, whereby a spike being formed will pass through the shaper 15 directly into the pointer 16, and thereby be pointed as the shaping operation is being completed.

Inasmuch as the shaper 15 and the pointer 16 are substantially identical, the general parts of both of these devices will be described together, and given the same numerals. Each device comprises a die plate 17, and a cover plate 18. A plurality of radial slots 19 are formed in each of the die plates and they terminate at a central aperture 20 through which the work-piece is passed. Since the spike, shown and described, comprises four longitudinal ribs, each of the

die plates 17 is provided with four radial slots 19. In each of the slots of the shaper die plate 17 is disposed a shaper die 21, and in each of the slots of the pointer die plate 17 is disposed pointed dies 22 and 22*a*, which will be hereinafter described.

Formed in the die plate 17 is a plurality of circular recesses 23, equal in number to the number of radial slots 19. These recesses are arranged in line with the slots 19 and they register with a plurality of similarly formed recesses 24 formed in the cover plate 18. Rotatably mounted in each of the registering recesses 23 and 24 is an eccentric 25 with which a pitman 26 is engageable. This pitman is also inclosed within the recesses 23 and 24 and is connected to its respective die by means of a die block 27. Each of the die blocks is provideed with a flat surface 28 which engages with the end surface of the die, and with a curved surface 29 which engages with a concave recess 30 formed in the face of the pitman. Diametrically opposite the curved recess 30, the pitman is formed with a curved recess 31 which engages with the eccentric 25.

A plurality of slots 35 (shown in dotted lines in Fig. 6) are formed in the inner face of the cover plate 18. Two of these slots are provided for each of the dies and they extend preferably at 45° to the slots 19, terminating at their inner ends near the center of the dies, and having their outer ends extending to the outside edges of the cover plate. Arranged in each of these slots is a retracting rod 36, the outer end of which is screw-threaded and provided with a nut 37. A spring 38 is arranged under the nut and between it and the outer surface of the cover plate, whereby the rod 36 is drawn outwardly. The inner end 39 of each of these rods is bent at right angles and engages with an aperture 40 formed in one of the side faces of each of the dies. By reference to Fig. 7, it will be seen that the dies will be drawn outwardly by the two engaging rods 36, the width of the slots 35 being sufficient to permit the slight lateral motion of the rods.

The shaper 15 and the pointer 16, as shown in Fig. 6, are arranged adjacent each other and a guide 41 serves to connect them and to connect the central openings through the devices. The eccentrics 25 are of very short stroke, and adjacent pairs are preferably made a part of or connected by means of a shaft 42. Each of the shafts 42 is suitably mounted in the die plates 17 and cover plates 18 of the shaper and the pointer, and each is preferably provided at its forward end with a washer 43 held in place by means of a screw 44 which passes into the end of the shaft, whereby axial movement of the shaft is prevented. The opposite end of each of the shafts projects beyond the pointer 16, and has a gear 45 mounted thereon. A gear pin 46, carried by a shaft 47, is arranged between the gears 45 and meshes with each of them, whereby they will be rotated in unison. The shaft 47 may, of course, be supported and driven by any suitable means (not shown).

Carried by the central opening 20 of the die plate 17 of the pointer 16 is a bushing 50, which carries a stop 51 (see Figs. 6 and 8). A set screw 52 is carried by the flange of the bushing 50 whereby the stop may be securely fastened in its adjusted position. The forward face of this stop is provided preferably with a plurality of stop lugs 53, which are disposed within the spaces formed between the dies, and are designed to engage the forward edges of the point of the finished work-piece, when it has reached its predetermined position in the pointing dies. A central opening 54 is preferably formed in the stop, which provides for the passage of scale and other foreign matter, when the dies are used in a vertical position instead of the horizontal position as shown.

It has been found as a result of numerous experiments, that a spike formed with longitudinal ribs 56 gives a very great amount of resistance to the withdrawal of the spike as compared to spikes of equal size without ribs. It has been also found that the withdrawal force is further increased by the provision of a plurality of supplemental rib corrugations 57, which are arranged in parallel relation with the ribs 56. Each of the forming dies 21 is, therefore, shaped so as to form one of the flutes between adjacent ribs 56 and also to form the supplemental ribs 57, as clearly shown in Figs. 1 and 2. The entrance end of each of the dies is provided with an inclined or tapered working surface 58, the distance between the advanced edges of these surfaces on two oppositely arranged dies being substantially equal or slightly in excess of the initial size of the work-piece on the inward stroke of the dies. Because of the tapered formation of the surface 58, the flutes of the spike will be connected with the solid body portion of the spike by means of a tapered neck, as shown in Fig. 9. Each of the pointer dies 22 carried by the pointer 16 is designed to draw out the point of the spike on two opposite sides to a substantial chisel edge 60, and to bevel the ends of the adjacent ribs to form the cutting edges 62, whereby beveled surfaces 61 and 55 are formed, as shown in Figs. 3 and 9. The other two dies 22*a* as shown in Fig. 4, cause the ends of the corresponding sides of the ribs to be but slightly beveled, as shown by the surfaces 59 in Figs. 4 and 9. The surfaces 59 intersect with the adjacent surfaces 55 and form the cutting edges 62. In similar manner the two surfaces 61 intersect and form the chisel edge 60. The surfaces 59 are beveled but slightly thereby bringing these edges slightly within the external contour of those sides

of the spike at which they are arranged, for purposes to be hereinafter described. From the foregoing it will be clear that the point of this spike is fluted; or trough-shaped in cross-section.

It has been discovered as a result of these experiments that there is a certain definite angle which the edges 62 at the point of the spike will assume with its axis or a line parallel thereto during the pointing operation. This is the natural angle of flow of the metal as it is being pointed and will be hereinafter referred to as the pointing angle. If the spike is to be pointed so that it will have true chisel edges without flat spots or projecting fins, it is necessary that the working edges 63 of the pointing dies, which provide the cutting edges 62 of the spike, be of substantially the same angle as the pointing angle. Such a condition is shown in Fig. 5, which shows, from the projection, that the edge 62 is sharpened as desired. By making the angle of the working edges 63 the same as the pointing angle, perfect chisel formations will be provided which will extend along the entire lengths of the edges 62 and 60 formed at the point.

The apparatus, shown in the accompanying drawings, is preferably operated at high speed, and it is obvious that the dies will be rapidly reciprocated. When a work-piece is passed in between them it will be quickly shaped. When the work-piece has been reduced the predetermined length, the forward end will enter the pointing dies 22 and 22*a* and will pass in between them to the stop 51, whereupon the point shown in the drawings will be formed continuously or concurrently with the completion of the formation of the body.

The point of the spike for which the above apparatus was designed, as hereinbefore described, is formed with five cutting edges, provided by the chisel edge 60, and the four diverging cutting edges 62. The edges 62 adjacent the sides 65 displace the wood a degree equal to the area inclosed between the sides 65 and the adjacent edges 62, as shown in Fig. 10. In this figure, the double arrow shows the direction of the grain of the wood in relation to the chisel edge of the spike. The displacement longitudinally of the grain of the wood is substantially equal to the area inclosed within the lines, representing the chisel edge 60, the sides 67, and the cutting edges 62. As shown in Fig. 10, the chisel edge 60 will serve to sever the fibers of the wood and cause the greater amount of displacement to occur along lines substantially parallel to the grain of the wood. The transverse displacement, or that at right angles to the grain, is just sufficient to insure a snug fit of the wood against the sides of the spike without causing any splitting tendency. Because of this proportionate displacement, the surface of the wood at the neck of the spike is effectively closed against the admission of moisture.

In Fig. 11 is shown a fragmentary portion of a spike which is provided with a modified form of point. In this form four radial cutting edges 66 are provided. These extend from the axis of the spike to the outer edges of the body thereof, and are each preferably chisel-shaped. While this form of point is not quite so efficient, yet it does not compress the fibers of the wood beyond their elastic limits, and its tendency to split the wood, into which it is driven, is slight.

During the pointing process, the end of the spike may become slightly flared and distorted, but this is reduced and the point of the spike is again brought to its normal shape by the return passage through the reducing dies 21 as the finished spike is being withdrawn from the apparatus.

While there has been shown an apparatus in which reciprocating dies are employed, it is obvious that rolling surfaces of the proper contour, having properly located projections thereon, for reducing, pointing, and shearing off may be employed with equal efficiency.

Having thus described this invention, what is claimed is:

1. A process of making a spike, comprising the formation of a body by progressively compressing successive longitudinal portions thereof on more than two sides at once so that the displaced metal flows only inwardly toward the axis, and longitudinally thereof, and then forming a fluted point continuously with the formation of the body by compressing the point at more than two sides at once at angles which correspond to the natural angle of flow of the metal.

2. A process of making a spike, comprising the formation of a fluted body by progressively compressing successive longitudinal portions thereof on more than two sides at once so that the displaced metal flows only inwardly toward the axis, and longitudinally thereof, and then forming a point continuously with the formation of the body by compressing the point at more than two sides at once at angles which correspond to the natural angle of flow of the metal.

3. A process of making a spike, comprising the formation of a fluted body by progressively compressing successive longitudinal portions thereof on more than two sides at once so that the displaced metal flows only inwardly toward the axis, and longitudinally thereof, and then forming a fluted point continuously with the formation of the body by compressing the point at more than two sides at once at angles which correspond to the natural angle of flow of the metal.

4. A process of making a spike, comprising the formation of a fluted body by progressively compressing successive longitudinal

portions thereof on more than two sides at once so that the displaced metal flows only inwardly toward the axis, and longitudinally thereof, and then forming a fluted point concurrently with the finishing of the formation of the body by compressing the point at more than two sides at once at angles which correspond to the natural angle of flow of the metal.

In testimony whereof, I have hereunto signed my name.

ANNIE M. WILLIAMS,
Guardian of the Estate of Frank H. Williams.