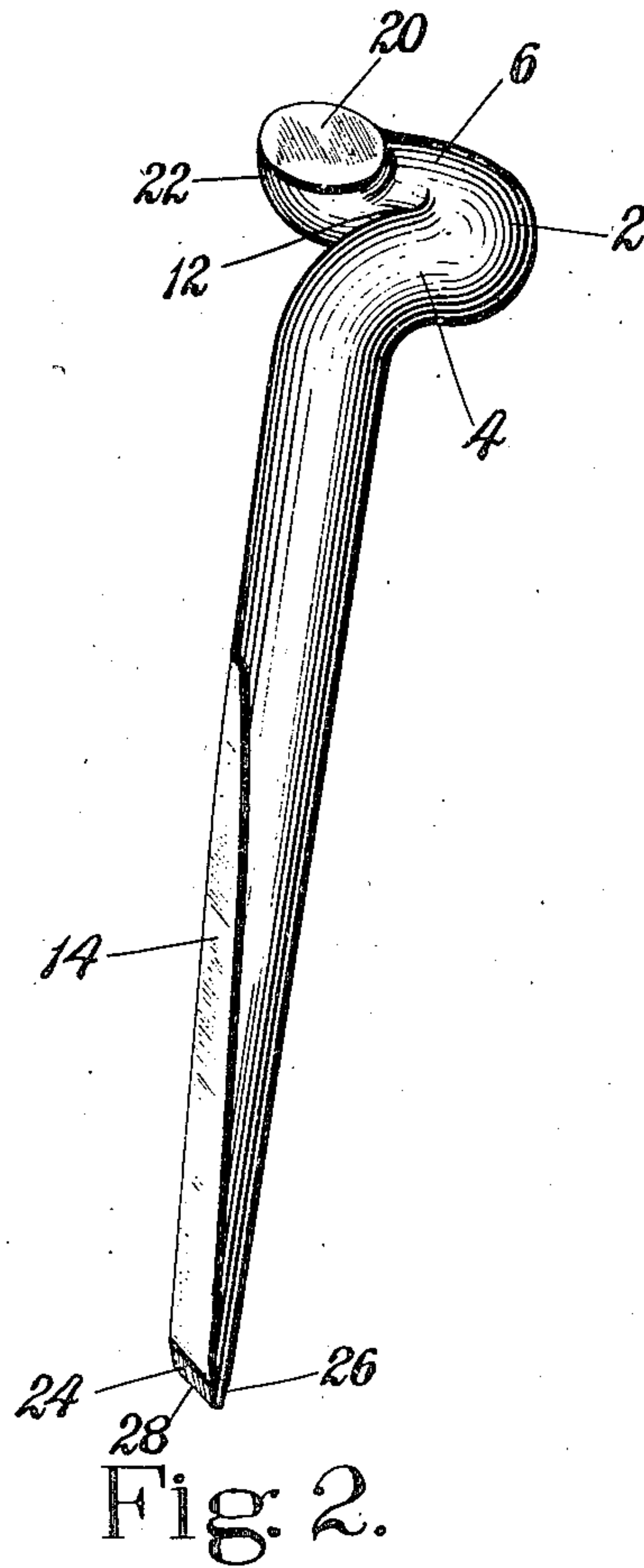
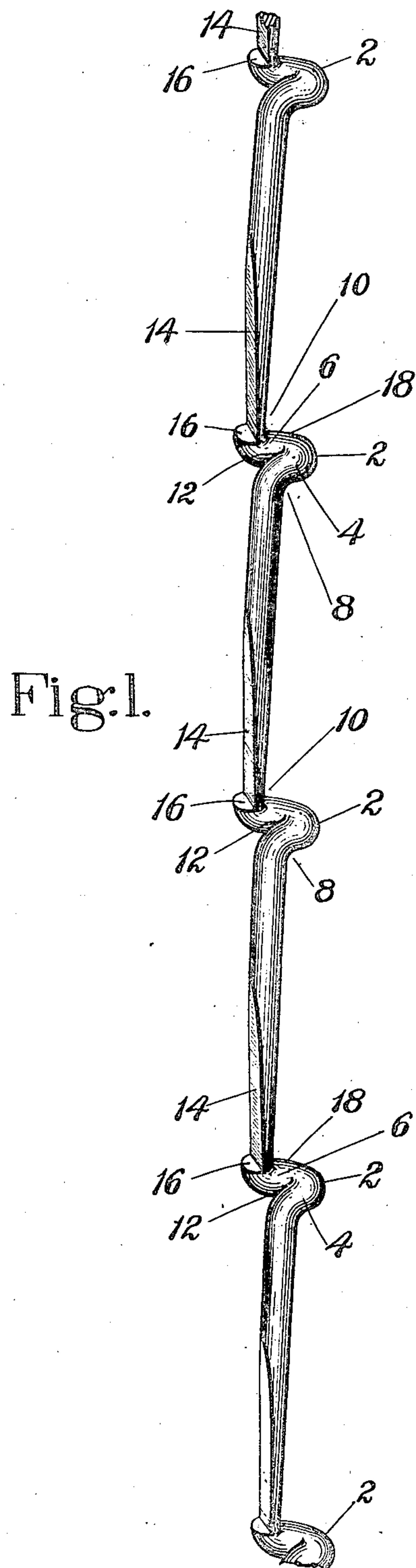


Jan. 2, 1923.

1,440,579

J. A. BROGAN.
NAIL AND NAIL STRING.
FILED MAR. 22 1920.

2 SHEETS-SHEET 1



INVENTOR.

James A. Brogan.

Jan. 2, 1923.

J. A. BROGAN.
NAIL AND NAIL STRING.
FILED MAR. 22 1920.

1,440,579

2 SHEETS-SHEET 2

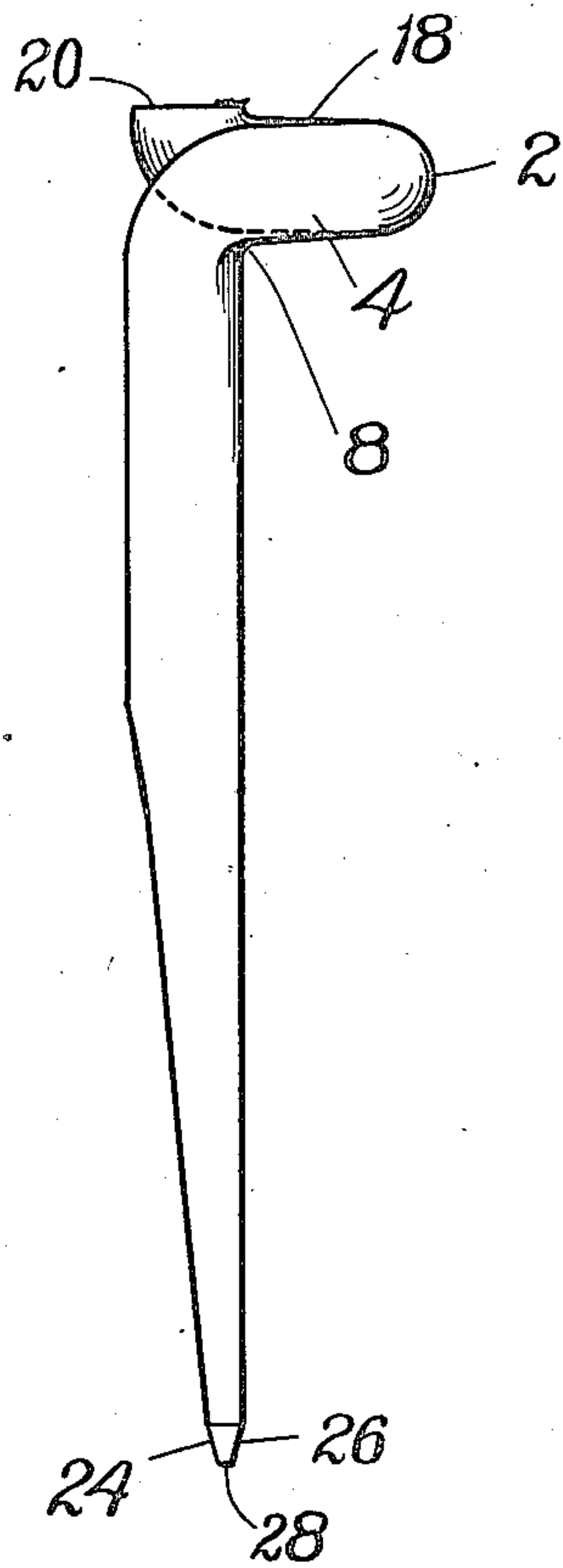


Fig. 3.

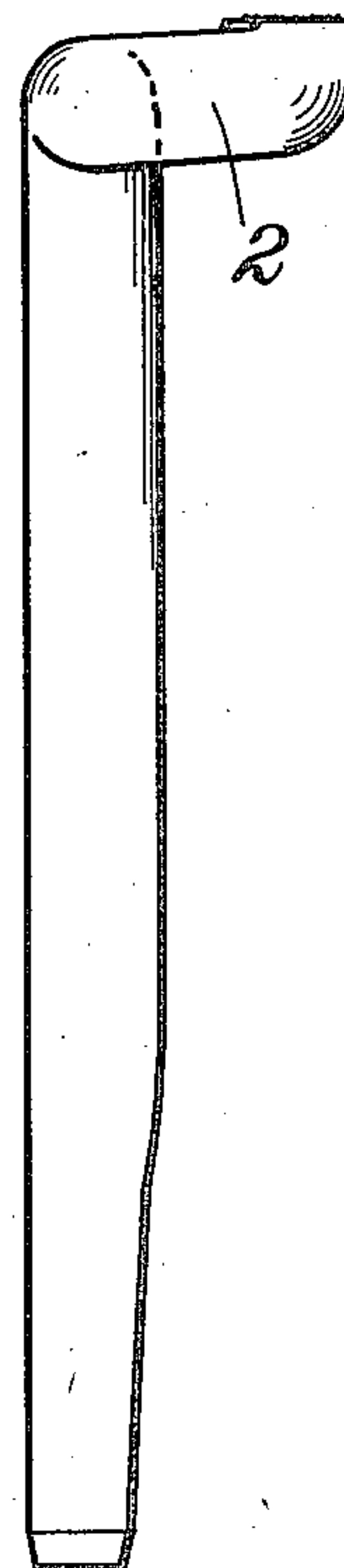


Fig. 4.

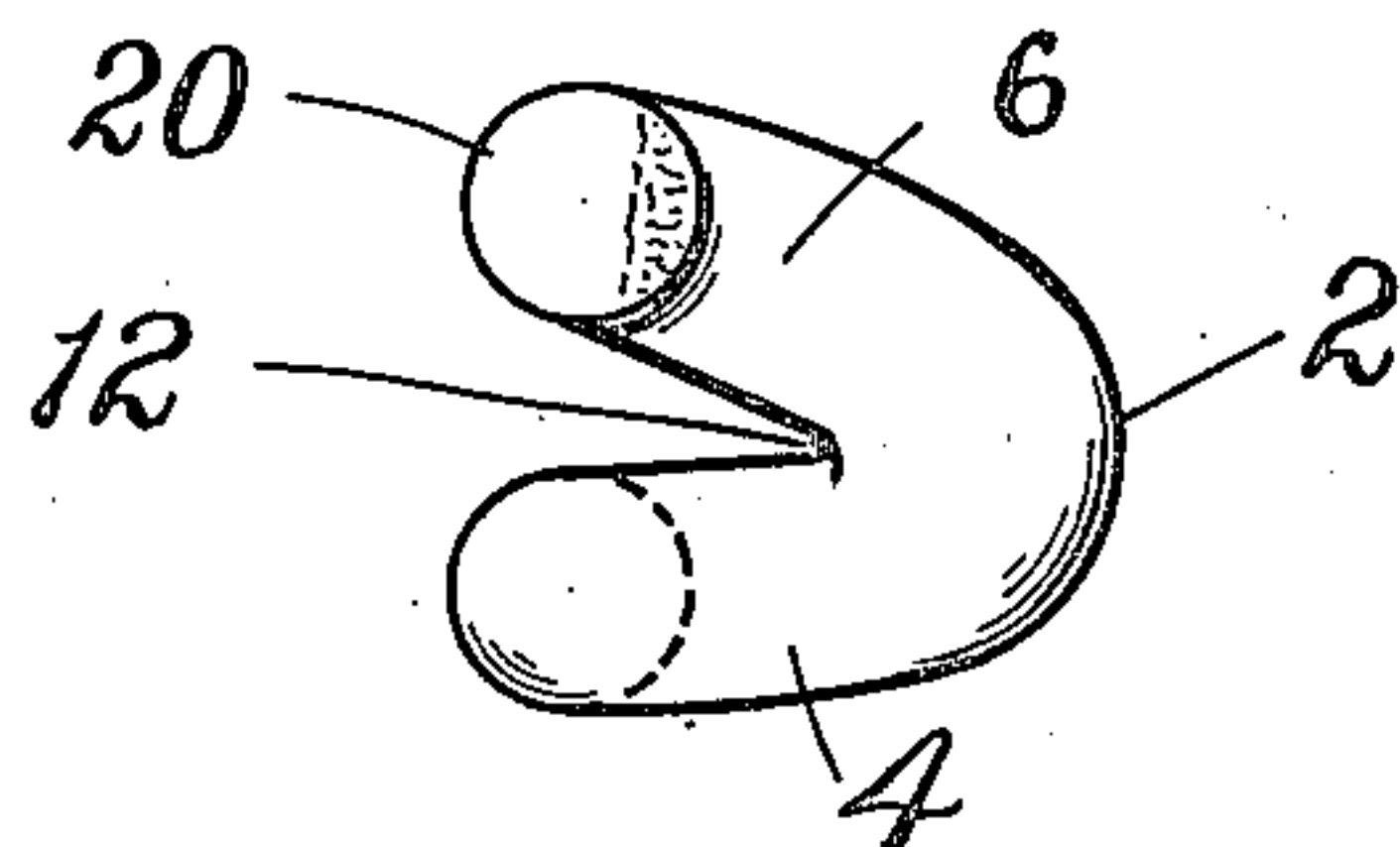


Fig. 5.

INVENTOR.

James A. Brogan
By his Attorney,
Kelson M. Howard

UNITED STATES PATENT OFFICE.

JAMES A. BROGAN, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

NAIL AND NAIL STRING.

Application filed March 22, 1920. Serial No. 367,752.

To all whom it may concern:

Be it known that I, JAMES A. BROGAN, a citizen of the United States, residing at Lawrence, in the county of Essex and State of Massachusetts, have invented certain Improvements in Nails and Nail Strings, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to the manufacture of nails, and an object of the invention is to devise an improved nail and nail string adapted for use in attaching together pieces of shoe stock.

Heretofore, it has been customary to make the nail strings which have been used in the manufacture or repair of shoes from relatively thin, flat, metal strips of substantially uniform width and thickness by removing portions of the strips at equally spaced intervals so as to reduce the width of the strips at such points. The parts of such a strip where its width is reduced constitute the shanks of the nails in the nail string, and the intermediate, unreduced portions of the strip constitute the heads of the nails. The production of a nail string of such a character is attended by great waste, inasmuch as the portions removed from the strip make up a large part of the strip. Moreover, the strips are rolled very hard, in consequence of which it is impracticable to form sharp points on the nails when they are severed from the nail string by a nailing machine. On the contrary, the nails are usually, if not invariably, sheared off of the nail string, with the result that their entering ends are blunt so that they do not readily penetrate the work.

Further objects of this invention are to provide a nail string which can be manufactured cheaply, for the reason, among others, that its production will involve no substantial loss of nail stock, and which will be so constructed as to enable the nails when they are severed from the string to be formed at their points in such a manner as to cause them readily to penetrate the work and to clinch easily. With this end in view, an important feature of the invention resides in the provision of a nail string consisting of a strip of nail stock having the heads of the nails in the string formed by bends compris-

ing portions extending outwardly from the strip and joined at their outer ends. In the present instance of the invention, the portions of the bends are folded upon each other in planes transverse to the length of the strip. It is recognized, however, that the bends constituting the heads of the nails may be formed in other ways without departing from the principles of the invention. The nail string of this invention is preferably made from wire, for example, iron or brass, soft enough to enable it to be bent or cut readily, and portions may be removed from the wire above the heads of the nails in the string to assist in forming points on the nails. By reason of the relatively soft nature of the material from which the improved nail string is made, it may be cut, rather than sheared, by the nailing machine, and the entering ends of the nails may, accordingly, be shaped in a manner to facilitate the insertion of the nails into the work.

A further feature of the invention resides in the novel form of the nails of which the nail string is composed.

In the drawings,

Fig. 1 is a perspective view of a nail string according to the invention;

Fig. 2 is an enlarged perspective view of a nail severed from the nail string;

Figs. 3 and 4 are elevations taken from view points at 90° to one another of a nail severed from the nail string of Fig. 1; and Fig. 5 is a plan view of a nail severed from the nail string.

As illustrated, the nail string consists of a strip of nail stock in the form of a wire of substantially circular cross-section. The wire is bent or folded upon itself at intervals as indicated at 2 to constitute the heads of the nails in the nail string. The heads 2 of the nails preferably extend from one side only of the nail string and on the same side of the string. Each of the nail heads 2 comprises portions 4 and 6 extending transversely of the length of the wire and joined at their outer ends. The bent parts of the wire form terminal angles 8 and 10 with the body of the wire, and the portions 4 and 6 of the bends meet in angles 12 which may be termed the angles of the bends. In order to provide for the shanks of the nails, the bends or folds 2 are preferably spaced from each other by a distance substantially greater than the distance between their terminal

angles 8 and 10. As shown, the heads 2 of the nails are curved in the form of a substantially closed loop and are disposed in planes transverse to the length of the nail string. Moreover, as clearly appears from Fig. 1, the portions of the nail string located between the heads 2 of the nails and constituting the shanks of the nails are disposed in a plane substantially at right angles to the direction of projection of the nail heads 2 from the string.

In order to assist in forming points on the nails when they are severed from the nail string, their shanks are cut away contiguous to the heads of the adjacent nails as indicated at 14. The depth of the cut is gradually increased toward the point where the entering end of the nail shank joins the head of the adjacent nail, at which point the cut is of a depth greater than half the diameter of the wire, so that the entering ends of the nails are reduced in all their cross-sectional dimensions to enable them more readily to penetrate the work. It is desirable that as much material as practicable be left in the heads 2 of the nails and that the upper surfaces of the heads shall be smooth. Accordingly, it is deemed preferable in shaping the entering end of a nail to remove material from the wire only to a point substantially opposite from the surface 18 of the portion 6 of the head of the adjacent nail. A shoulder 16 is thus formed substantially in line with the surface 18 which constitutes the upper surface of the head of the nail. It is usual in the operation of string nailing machines to sever nails from a nail string by a cutter which operates along the upper surfaces of the heads of the nails. Consequently, when a nail is severed from the improved nail string, the line of cut will register with the shoulder 16 so that a plane surface 20 constituted by the shoulder 16 and the line of cut will be formed on the head of the nail.

The free end of the portion 6 of the nail head is rounded on its bottom and sides as indicated at 22, and the nail is preferably formed when it is severed from the nail string with oppositely beveled surfaces 24 and 26 converging to the apex 28 of its point. The shaping of the point of the nail in this manner is made possible by the relatively soft material from which the nail string is made and enables the nail to be easily driven. Moreover, the formation of the entering end of the nail renders it easy to clinch it properly, and inasmuch as the point of the nail is about equally beveled on opposite sides of its apex, it can be driven straight without difficulty.

As shown, the portion 6 of the head 2 of the nail is disposed somewhat above the portion 4. When the nail is driven, however, the main impact of the driver is borne by the portion 6 which is thereby embedded in

the work to substantially the same extent as the portion 4. Nailing machines of the type in which it is contemplated that the improved nail string will be utilized are commonly provided with a member having a nail receiving passage of a diameter such as to allow the heads of the nails to pass readily through it and are also provided with a driver of a diameter substantially equal to that of the passage. Consequently, the end of the driver will engage other portions of the head of the nail as well as the plane surface 20. The surface 20, however, tends to bring about better driving engagement of the driver with the head of the nail than would otherwise be obtained. The arrangement of the portions 4 and 6 of the head of the nail close together enables the head to sustain the impact of the driver without such displacement of its parts as would impair its holding power in the work.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A nail string consisting of a strip of nail stock and having the heads of the nails in the string constituted by folds in the strip disposed at spaced intervals along the strip and each made up of portions bent into approximate parallelism to one another.

2. A nail string consisting of a strip of nail stock and having the heads of the nails in the string constituted by portions extending outwardly from the strip and joined at their outer ends.

3. A nail string consisting of wire and having the heads of the nails in the string constituted by curved loops disposed at spaced intervals along the wire.

4. A nail string consisting of a strip of nail stock and having the heads of the nails in the string formed by portions of the strip offset from the main body of the strip and bent in planes transverse to the length of the strip.

5. A nail string consisting of wire and having the heads of the nails in the string constituted by folds disposed at spaced intervals along the wire and curved in planes transverse to the length of the wire.

6. A nail string consisting of wire and having the heads of the nails in the string constituted by loops curved in planes transverse to the length of the wire and spaced from each other by portions of the wire which constitute the shanks of the nails when they are severed from the nail string and which are cut away adjacent to the loops so as to assist in forming points on the entering ends of the nails.

7. A nail string consisting of a strip of nail stock having bends formed therein at spaced intervals along the stock each presenting a terminal angle between it and the fastening stock at each side of the bend and

a third angle in the bend, adjacent bends being spaced from each other by a distance greater than that between the terminal angles of the individual bends, so that the bends and the portions of the stock between the bends are adapted to form the heads and the shanks respectively of the nails in the string.

8. A nail string formed from a strip of nail stock and having the heads of the nails in the string formed by bends disposed at spaced intervals along the strip, the parts of the strip between the bends constituting the shanks of the nails in the string and said parts being cut away on one side of the bends to form points on the shanks of the nails and shoulders on the strip disposed substantially in the planes of the upper surfaces of the heads of the nails.

9. A nail comprising a shank and a head having portions disposed at an acute angle to each other and in a plane transverse to the axis of the shank.

10. A nail having its shank consisting of a substantially straight section of wire and its head constituted by a flattened substantially closed single loop in the wire adapted to sustain the impact of the driver of a nailing machine.

11. A nail having its shank consisting of a substantially straight section of a strip of nail stock and having its head constituted by a part of the strip having a single bend upon itself in a plane transverse to the shank with the sides of the bend immediately adjacent one another firmly to support engagement with a driver.

12. A nail having its shank consisting of

a substantially straight section of a strip of nail stock and having its head constituted by a portion of the strip offset from one side of the shank and a second portion connected to the outer end of the first-mentioned portion and disposed substantially parallel to the first-mentioned portion, said second portion having its other end aligned substantially with the side of the nail shank opposite from the side from which the first-mentioned portion of the head projects.

13. A nail comprising a shank and having its head constituted by a portion offset from the shank and having a second portion angularly related thereto, the free end of which is upturned and formed with a substantially plane surface disposed transversely of the axis of the nail shank.

14. A nail formed from a strip of nail stock substantially circular in cross-section and comprising a shank and a head constituted by a part of the strip bent transversely of the shank and having its free end upturned and provided with a substantially plane surface.

15. A nail of a type adapted to be formed from a string and comprising, in combination, a pointed shank and a head formed from a continuous piece of wire, the head consisting of a doubled portion of the wire bent transversely of the shank with the free end of the wire unobstructed, so that when in the string it may join the shank of an adjacent nail.

In testimony whereof I have signed my name to this specification.

JAMES A. BROGAN.