

(No Model.)

2 Sheets—Sheet 1.

D. E. KEMPSTER.
HORSESHOE NAIL.

No. 553,167.

Patented Jan. 14, 1896.

Fig. 10.

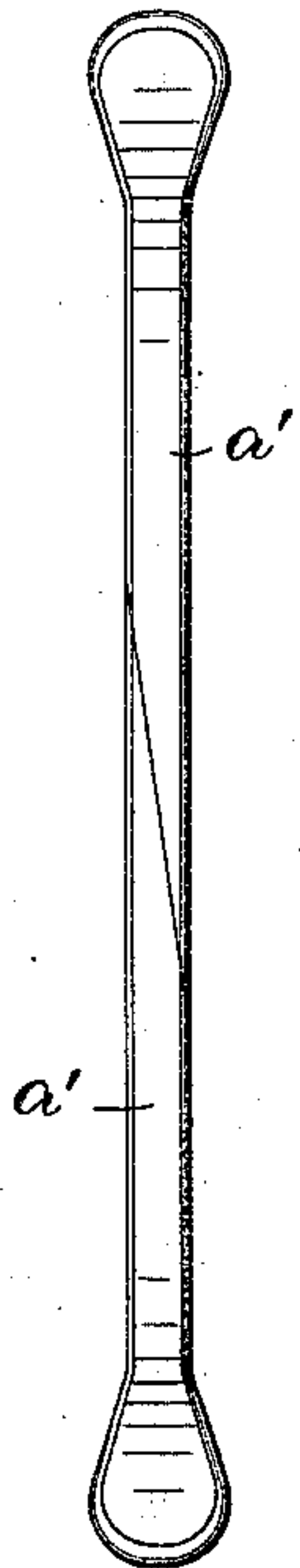


Fig. 1.

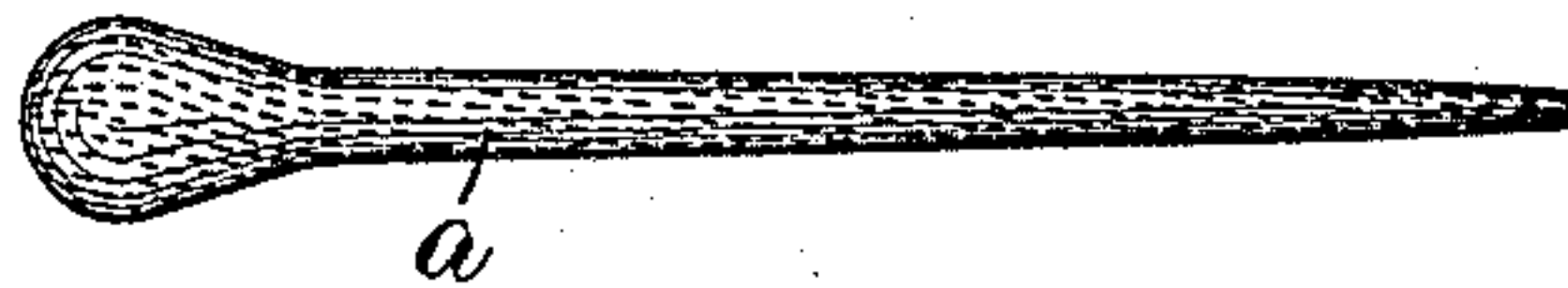


Fig. 2.

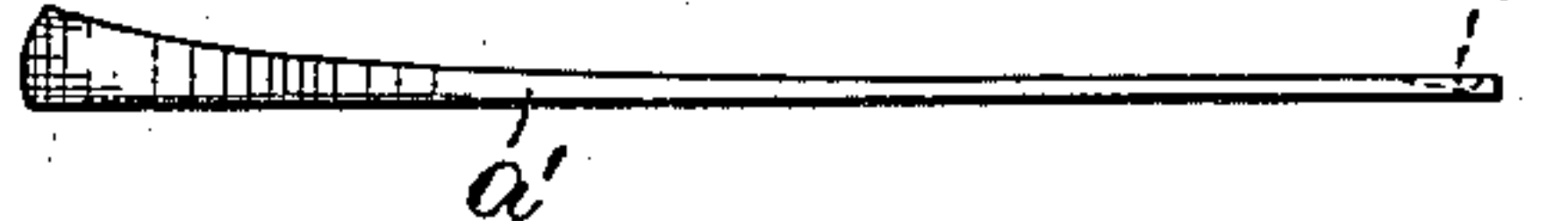


Fig. 3.

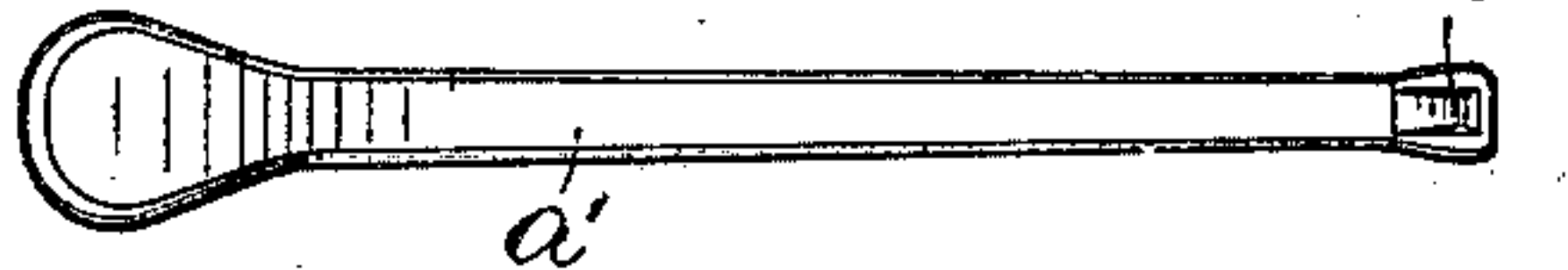


Fig. 4.

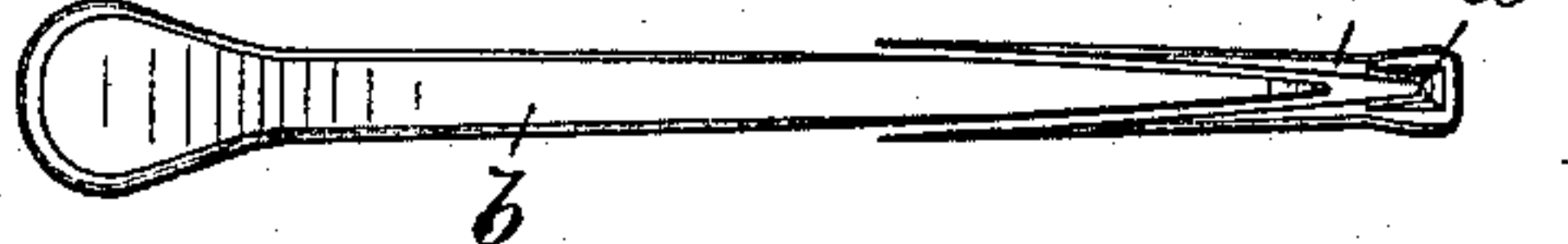


Fig. 6.

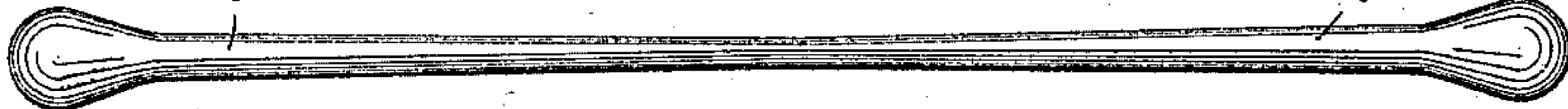


Fig. 7.



Fig. 8.

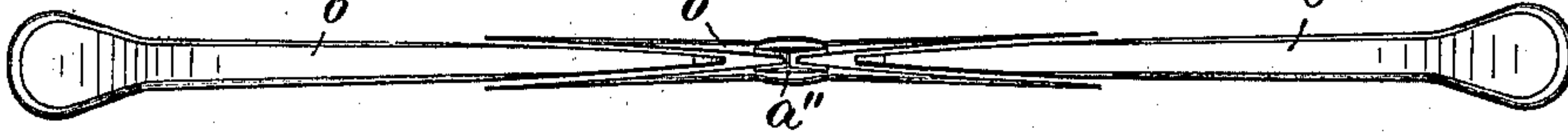


Fig. 9.

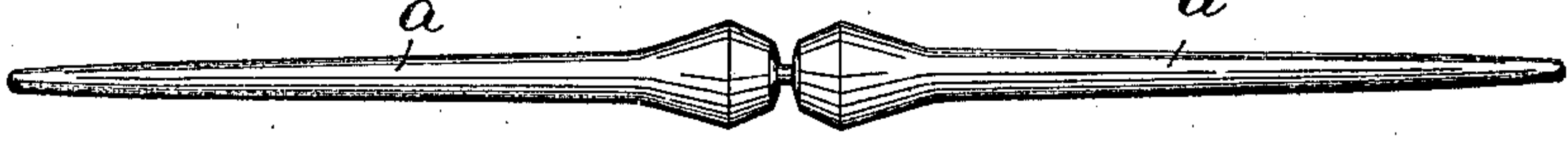


Fig. 5.

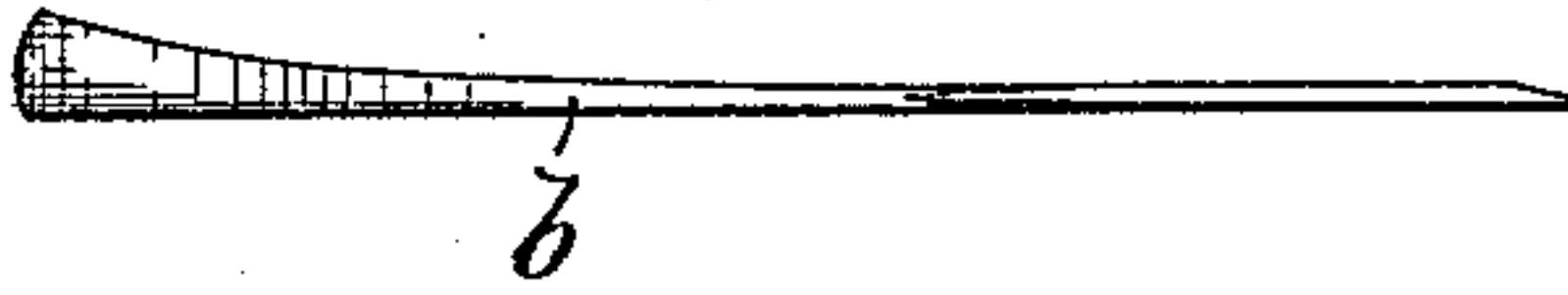
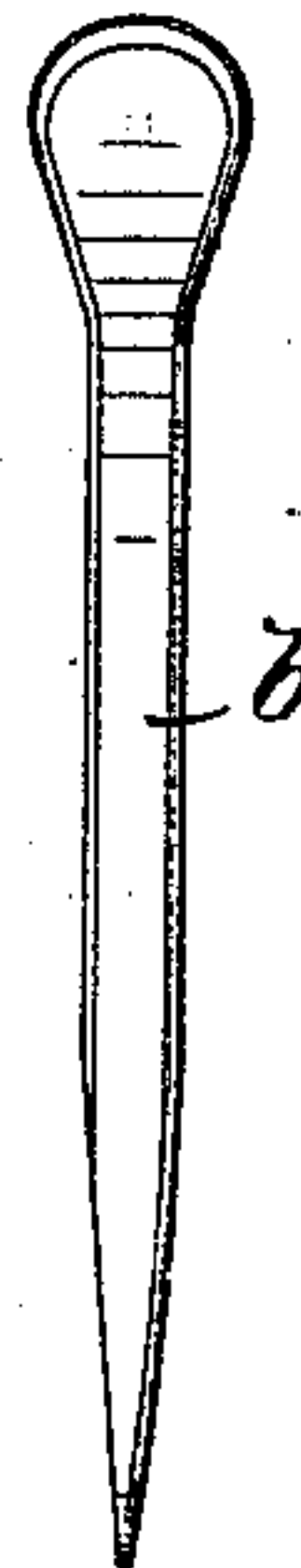


Fig. 11.



Witnesses

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(No Model.)

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Fig 12.

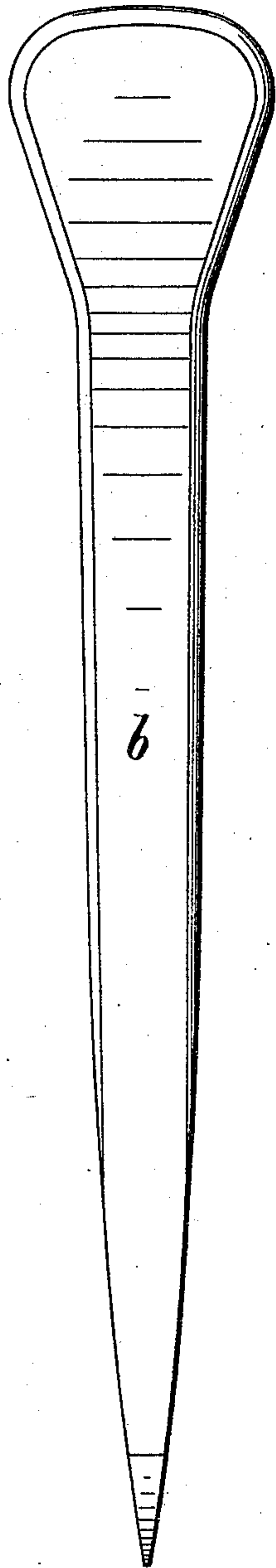


Fig 18.

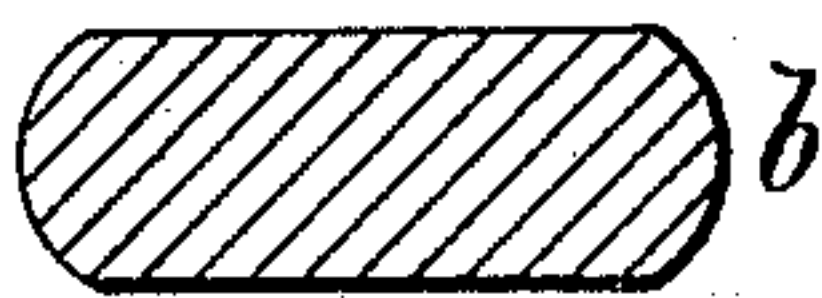


Fig 17.

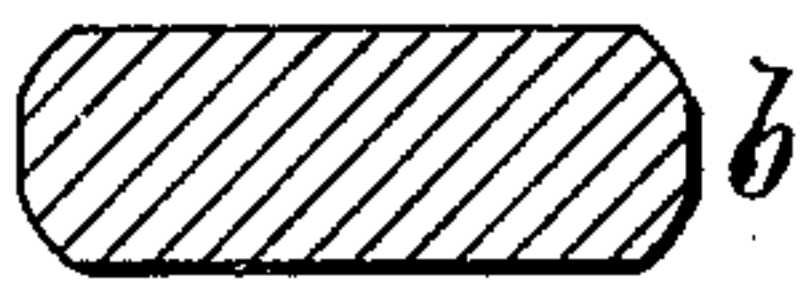


Fig 16.



Fig 15.

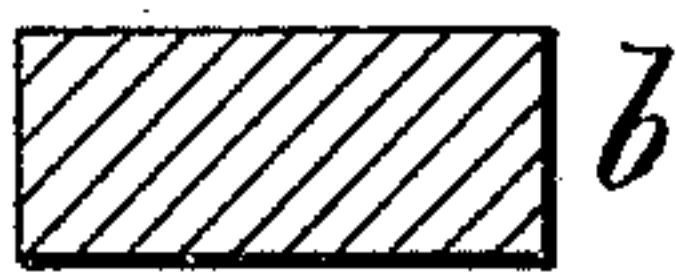
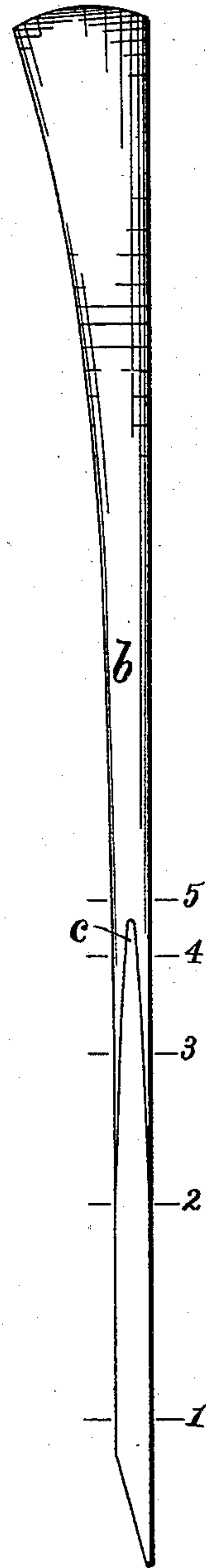


Fig 14.



Fig 13.



Witnesses

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UNITED STATES PATENT OFFICE.

DANIEL E. KEMPSTER, OF BOSTON, MASSACHUSETTS.

HORSESHOE-NAIL.

SPECIFICATION forming part of Letters Patent No. 553,167, dated January 14, 1896.

Application filed October 10, 1889. Serial No. 326,593. (No model.)

To all whom it may concern:

Be it known that I, DANIEL E. KEMPSTER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Horseshoe-Nails and Blanks Therefor; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to nails for fastening shoes upon the feet of animals, and especially to that class of such nails as are sheared or clipped to form the point of the nail.

My invention has for its object to provide an improved nail of the above class and an improved method of manufacture, whereby the nails can be made more economically and cheaper than heretofore.

My invention consists, first, in new animal-shoe nail-blanks of peculiar shape or form of construction, as will be fully described hereinafter.

My invention further consists in a new form of animal-shoe nail, characterized by a flattened face and back, and combined laterally curved or rounded and flat or square side edges and a beveled point.

My invention further consists in the hereinafter described improved method of manufacture, whereby a new form of nail or article of manufacture is produced embodying superior qualities.

My invention further consists in other new features, all of which will be fully described, and pointed out in the claims at the end of this specification.

In the drawings hereto annexed and forming part of this specification similar letters of reference indicate similar parts wherever they occur thereon.

Figure 1 represents a side view of a single animal-shoe nail-blank having circular cross-sectional area throughout and the metal distributed therein in accordance with my invention. Fig. 2 is a side edge view of said nail-blank after being flattened to the proper thickness of a finished nail and indented to

form the beveled point. Fig. 3 is a face view of the same. Fig. 4 is a face view of the same after being sheared or clipped to form the tapering point of the finished nail, and also shows the waste metal or clipping. Fig. 5 is a side edge view of the finished nail, showing the combined laterally curved or rounded and flat or square surfaces thereon. Fig. 6 is a side view of a duplex or twin animal-shoe nail-blank having circular cross-sectional area throughout and the metal distributed therein in accordance with my invention. Fig. 7 is a face view of the same after being flattened and indented for the beveled points. Fig. 8 is a face view of the same after being sheared or clipped to form the tapering points of two finished nails, and also shows the waste metal or clipping. Fig. 9 is a side view of a modified form of my improved duplex or twin nail-blank. Fig. 10 is a face view of a flattened duplex or twin nail-blank sheared or clipped apart in a different manner from that shown in Fig. 7. Fig. 11 is a face view of a finished nail from said nail-blank in Fig. 10 after having its point beveled and thrown over central with its blade or shank. Fig. 12 is an enlarged face view of my improved nail. Fig. 13 is an enlarged side edge view of the same. Figs. 14 to 18, inclusive, represent enlarged cross-sectional views of different parts of the blade or shank of my improved nail on the respective lines 1, 2, 3, 4, and 5, and show plainly the gradual order of progression and change in form of the blade or shank of the nail and the consequent form of the hole made thereby when driven into the hoof.

I would state that for convenience in making the drawings I have shown the flattened nail in Figs. 2, 5, and 13 as straight edgewise; but it should be understood that in practice the nails when flattened and stiffened are also given the proper curvature or set required for this class of nails, as will readily be understood by those skilled in the art to which said nails appertain.

In the drawings, *a, a a*, respectively, represent single and duplex round nail-blanks, which may be formed cold by swaging or upsetting the ends of wire blanks to form heads thereon in the old and well-known manner of making wire nails, or they may be made from hot metal by any suitable mechanism for

forging them into shape, and they may, if preferred, have their blade or shank portion formed straight longitudinally instead of tapering, as shown.

5 I prefer to form the nail-blanks substantially as shown, with head and shank-forming portions circular in cross-sectional area, the shank-forming portion of greater length than the shank of the finished nail, and tapering
10 so as to reduce the percentage of waste metal to a minimum in clipping or finishing the nail. The head-forming portion and preferably the greater part of the shank-forming portion adjoining the head are formed substantially
15 equal in cross-sectional area to the same portions of the finished nail, the remainder of the shank-forming portion being formed larger in cross-sectional area than the same portion of the shank of the finished nail, so
20 that when the blank is flattened to the proper thickness edgewise it will leave a small margin of metal around the edges to be removed or cut therefrom to produce the tapering point of the finished nail.

25 *a'*, *a' a'* are respectively single and duplex flattened nail-blanks after being brought to the proper thickness and taper edgewise of the finished nail by compression, preferably when cold to temper or stiffen them, between
30 die-surfaces suitably shaped for this purpose. The flattening-die which forms the face of the nail, may also, if preferred, be provided with a projection, the converse of the indentation *a''*, (shown in the point part of the flattened nail-blanks in Figs. 2, 3, and 7,) and
35 thereby indent the metal in the flattening operation, to form the beveled point of the nail when clipped.

40 *b* is the complete or finished nail after being sheared or clipped by suitable dies or cutters, and, as shown in this drawings, has a flattened face and back, a head portion flush with the back and projecting laterally from the face and two side edges, a tapering blade or shank
45 portion of greater width than thickness, said portion having laterally curved or rounded side edges, a point portion tapering widthwise and having laterally-flat or square side edges, and a beveled point, thereby constituting a new form of nail in which the side
50 edges have laterally curved or rounded surfaces combined with flat or square surfaces, which union imparts to the nails new qualities or characteristics not found in any other
55 nail.

It has been found in practical shoeing that some hoofs are much harder and more brittle than others and very difficult to drive a nail into without splitting or rupturing the hoof
60 so as to roughen its surface and make it unsightly in appearance. Such hoofs are more easily penetrated by nails having thin, smooth, flat or square edged gradually-tapering points, such as are attained by shearing
65 or clipping the nails; but such flat or square edged nails, when fully driven into the hoof, owing to their cross-sectional size and shape,

rupture and displace the horny fibers or substance of the hoof and cause the nail-holes therein to be larger than necessary to receive
70 the nails, which is objectionable aside from the unsightly appearance, inasmuch as it impairs the power of the clinch on the nail to hold the shoe tightly to the hoof, for it is found in practice that hard and brittle hoofs
75 do not conform to the surface of nails which are rectangular in cross-section when completely driven, and this is due to the fact that the hoof is made up of layers of horny substance, which layers are approximately edge-
80 wise to the tread-surface of the hoof and tend to separate under the wedge-like pressure of the body of a nail that is square cornered. These objections have been eliminated by forming the shank of the nail in cross-section
85 with two opposite flat sides and two opposite curved or rounded sides, substantially as set forth in the Patent No. 417,490, issued to me December 17, 1889. Nails of this description
90 when fully driven into a hard hoof do not rupture the fiber thereof, but leave the surface of the hoof smooth and of neat appearance and the nail-holes therein small, so as to closely hug the rounded corners of the shank of the nail and assist the clinch of the nail in securely
95 holding the shoe. It is difficult, however, to automatically forge these nails from hot metal with points uniform in size and shape, as said points will necessarily run heavy and light, according as the metal varies in heat, and consequently to insure perfectly uniform easy-driving nails I now shear or clip the points
100 of the curved-edged shanks when cold.

Hitherto all flat-edged shanks have been laterally flat from head to point and the
105 sheared or tapering surfaces thereof have been the full width of the thickness of the shank; but in my present nail the laterally-flat tapering surfaces of the sheared edges gradually merge into the laterally curved or
110 rounded edges of the shank, as shown at *c* in Fig. 13, and this gradually merging of the flat sheared edges must be about midway of the shank of the nail and is essential in the preferred form of my nail to form the shank of
115 the nail the proper taper widthwise and to prevent the formation of shoulders on the side edges of the nail.

Were the laterally curved or rounded edges of the nail shown in my Patent No. 417,490
120 sheared or clipped merely in the old way practiced on laterally-flat or square-edged blanks—that is, so as to form flat-edge surfaces of the full width of the thickness of the shank—a shoulder would be necessarily produced on both side edges of the nail, as will
125 be plain to all skilled in the art.

My new improved nail presented in this application, while combining in itself the structural advantages possessed by both a nail
130 having a flattened face and back and laterally curved or rounded side edges, and a nail having a laterally-flat or square-edged easy-driving point formed by shearing, also pos-

sesses a new and additional quality, characteristic or function not found in either of the above nails separately, but which is a new result arising from the union of the elements found in both—as, for instance, my improved nail when driven into a hard and brittle hoof easily penetrates the same, forming a small hole of rectangular area until it has entered the hoof to about midway or thereabouts of the length of the blade or shank of the nail and then, by reason of the peculiar shape or form of its side edges, as clearly shown in Figs. 12 to 18, inclusive, enlarges the hole and changes its cross-sectional form by gradually expanding and rounding the corners thereof, thereby causing the nail to progressively expand the hoof substance without splitting or rupturing the same and insuring the driving of the nail with the least possible amount of power.

b' is the superfluous metal or clipping removed from the point of the nail, and which might extend the length of the blade or shank, or even the entire length of the nail, if it were desirable to form the nails with square corners or edges; but for reasons already pointed out I prefer to shear or clip the nails, as shown, with less waste of metal.

It is evident the indentation *a''* in the point part of the nail-blank might extend entirely across the blank if so desired; but I prefer to indent it as shown, as thereby the metal forming the beveled point of the nail is condensed and hardened without harmfully spreading the fibers thereof, the side walls of metal around the indentation helping to sustain the central portion or bevel from spreading laterally. It also requires less power to bevel the point in this manner than if compressing the metal across the entire nail-blank.

The round nail-blanks may be formed singly or in series by any suitable mechanism, and, as before stated, from either hot or cold metal as may seem preferable for the quality of nail desired to make. I prefer to make them from hot metal by a process of roll-forging shown and described in the Patent No. 427,030, issued to me April 29, 1890, wherein the nail-blanks are automatically forged into shape by continuous pressure and rotation of the metal between converging die-surfaces corresponding in cross-section to and the converse of the longitudinal configuration of one-half, more or less, of the round nail or nails, as the case may be.

As fully described in the patents hereinbefore referred to, by roll-forging or cross-rolling the metal into circular cross-section to form the round nail-blanks, the grain or fibers of the metal are condensed and twisted together similar to that shown in dotted lines in Fig. 1, thus knitting the metal firmly together, giving great strength and toughness to the nails, and effectually precludes the possibility of said nails ever slivering or splitting at the point when being driven into the hoof,

to the great detriment and injury of the animal being shod thereby.

Heretofore animal-shoe nails having sheared or clipped points, owing to flaws or laminations in the nail engendered by the process of working the metal cold in making the nail, have been very liable to the great objection of slivering or splitting at the point when being driven, especially if driven into a hard brittle hoof; but with my improved construction of nail the admirable driving qualities and uniformity of taper and finish of sheared or clipped points are retained and their disadvantage or liability to split points is entirely eliminated, and while retaining all the superior qualities of forged nails, such as great strength, toughness and clinching quality, yet the disadvantage of their inferior driving quality incident to forged points is completely removed.

By referring to the drawings it will be seen that my improved nail is flattened upon its face and back to taper, stiffen, and give it the proper thickness edgewise, the side edges of the body of the blade or shank are smoothly curved or rounded laterally, and the point portion is sheared or clipped, forming a uniform, gradually-tapering and beveled point having smooth laterally flat or square side edges extending approximately midway the length of the shank and gradually merging into the laterally curved or rounded side edges thereof, thus well adapting the nail for handling and easy driving into the hardest hoof, as before described.

My improvement in the art of making nails, consisting in the combined operations of first forming a headed nail-blank having circular cross-section throughout, flattening and indenting the blank, and shearing or clipping the point portion, substantially as hereinbefore described, constitutes a new and useful method of manufacture, producing new results—viz., a new form of nail having new and peculiar characteristics, making a more serviceable and better nail, and also resulting in great economy and reduction in the costs of producing nails of this class.

I prefer to make the nail-blanks in duplex form, as shown in Figs. 6 or 9, as by so doing the capacity of the blank-forming, flattening and shearing or pointing machine is doubled. Half the labor of handling the metal is saved, and there is also much less waste metal.

When using duplex nail-blanks similar to that shown in Fig. 9, the dies for flattening said blank will be shaped accordingly and be provided with suitable projections for forming the point indentations or bevels therein, and the dies for shearing or clipping the points of the nails may have combined therewith suitable dies or cutters for cutting apart or separating the two nails at one and the same operation by which they are clipped or finished.

In Fig. 10 is shown the flattened duplex nail-

blank cut apart by a diagonal cut across the middle of the blade or shank portion thereof, thereby bringing the two nails to a point without waste of metal, with each nail having one
 5 laterally curved or rounded edge and one combined laterally curved or rounded and flat or square edge, and in some cases this might be a desirable way of cutting them apart; but I prefer to operate upon the nails as first described and shown in Figs. 4 and 8, as by so
 10 doing I avoid the expense of the additional operation of throwing the sheared point of the nail around in line with the center of the blade or shank and beveling the point, as
 15 shown in Fig. 11.

I do not consider it necessary in this application to minutely describe the dies or mechanism for carrying out my improved method in the manufacture of my improved nail, as
 20 such dies or mechanism forms no part of this invention.

It is of course evident that some parts of the nail or nail-blank may be slightly varied in form from that shown and described here-
 25 in without departing from or evading the essential features and spirit of my invention.

The metal of which my new nail is composed is altered elementally or in respect of its molecular condition by forces applied in
 30 flattening, curving, compressing and clipping the various portions of the nail. The compressed bevel is rendered by my process of a proper elemental or molecular condition for that part of the nail-point, and the edge in-
 35 clines, which disappear approximately midway of the shank, are given a peculiar molecular or elemental condition, owing to the fact that they are formed by clipping instead of
 40 by swaging. It will be plain to those skilled in the art that when my new method is practiced the material operated on to produce the nail is changed several times, at different parts of the nail, in respect of molecular or
 45 elemental condition.

I have found that in practice animal-shoe nails of the configuration and varying molecular condition described drive with greater ease, take the desired direction through the
 50 hoof with greater certainty, and clinch better than any other nail known to me. In my method, Patent No. 429,036, I show, in Figs. 32 and 33, a nail-point compressed or swaged on all four sides to form a beveled point, the edge incline shown beginning to disappear
 55 in the rounded side edge, where the face-bevel begins its downward slope toward the point. My nail shown in this present application is radically different from that nail which is made by a wholly different process.
 60 My present nail is substantially different from that nail in configuration and molecular condition, the difference in configuration and the fact that my present edge inclines are clipped producing a wholly different article of manu-
 65 facture, easily distinguishable at a glance from my patented nail. My present nail, owing to its flat clipped edge inclines, makes

in the hoof a hole which is entirely different in cross-section from the hole made by the nail shown in my Patent No. 426,036. It does
 70 its work gradually, because of its long tapered point, which forms a rectangular hole that is changed gradually in form by the rounded side edges of the shank merging with the in-
 75 clines at or near the middle of the shank. The nail shown in Figs. 32 and 33 of my said patent does its work of penetrating and changing the hoof-hole in cross-section at its extreme point, sometimes crippling and thereby
 80 injuring the animal, and always requiring unnecessary force in driving.

Having thus fully described the object, nature, and construction of my invention, I wish to secure by Letters Patent and claim—

1. As a new article of manufacture, the im-
 85 proved animal-shoe nail herein described having a flattened face and back and side edges laterally curved or rounded from the head to substantially midway the shank and the re-
 90 mainder of the side edges sheared or clipped flat, the sheared or clipped flat portions of the shank gradually merging into the laterally curved or rounded edges, substantially as set forth.

2. As a new article of manufacture, the im-
 95 proved animal-shoe nail herein described characterized by a flattened face, and back; side edges which are curved or rounded laterally from the head to substantially midway the shank; flat side edges from substantially
 100 midway the shank to the point; and a point beveled on its face, substantially as set forth.

3. A beveled-pointed animal-shoe nail of greater width than thickness, having the head and shank flattened on the face and back,
 105 and the shank tapering widthwise smaller toward the point with two tapers substantially as shown, the tapering part adjoining the head having laterally curved or rounded side edges, and the tapering part adjoining the point
 110 having laterally flat or square-side edges extending approximately midway the length of the shank and merging into the laterally curved or rounded side edges thereof, substantially as set forth.
 115

4. An animal-shoe nail having the head and part of the shank adjoining the head formed in cross-section with two opposite flat sides and two opposite curved or rounded edges, and the remaining part of the shank formed
 120 in cross-section with two flat sides and two flat edges, substantially as set forth.

5. As a new article of manufacture, an animal-shoe nail having a head, the back of which is flat and flush with the back of the
 125 shank, which is also flat, the head being also flat on its face, but projecting beyond the flat intersecting face of the nail, the edges of the head and shank being laterally curved, the face of the nail being beveled at the point,
 130 and the edges inclined at the point for a portion of the length of the shank above the bevel, these inclines being flat and diminishing upwardly in width and disappearing in the lat-

erally curved edges of the shank, substantially as and for the purpose set forth.

5 6. As a new article of manufacture, the improved animal shoe nail herein described, having a flattened face and back; a face bevel; side edges which are curved or rounded laterally from the head toward the point to substantially midway the shank; and clipped side edges which merge and disappear in said
10 rounded edges and extend therefrom to the point, said clipped side edges being flat, and the shank rectangular in cross-section above the face bevel toward the middle of the shank, substantially as and for the purpose set forth.
15 7. As a new article of manufacture, the improved animal-shoe-nail herein described, the same having a flat face and back; a face bevel; rounded side edges from the middle portion of the shank toward the head; flat side edges
20 which merge with and disappear in the rounded side edges and extend to the point; the shank being rectangular in cross-section at the point and upward above the bevel; approximately octagonal in cross-section above
25 the rectangular cross-section; and of flattened

oval cross-section above the octagonal cross-section; all in substance as shown and described, and for the purpose set forth.

8. As a new article of manufacture, an animal-shoe-nail having a flattened face and
30 back, and a beveled point, the shank tapering widthwise smaller toward the point with two edge tapers, the tapering part adjoining the head having laterally curved or rounded side edges, and the tapering part adjoining
35 the beveled point having laterally sheared flat side edges forming a rectangular tapering point of sufficient length to penetrate through the hoof and then merging with the laterally curved edges of the shank, so as to gradually
40 change the cross-sectional shape of the hole through the hoof from rectangular to flattish oval shape as the nail is completely driven, substantially as and for the purpose set forth.

In testimony whereof I affix my signature
45 in presence of two witnesses.

DANIEL E. KEMPSTER.

Witnesses:

HENRY CHADBURN,
HERBERT L. CHAPIN.