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E. A. BURNS.
DIE FOR PRODUCING HORSESHOE CALKS.

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Fig. 1

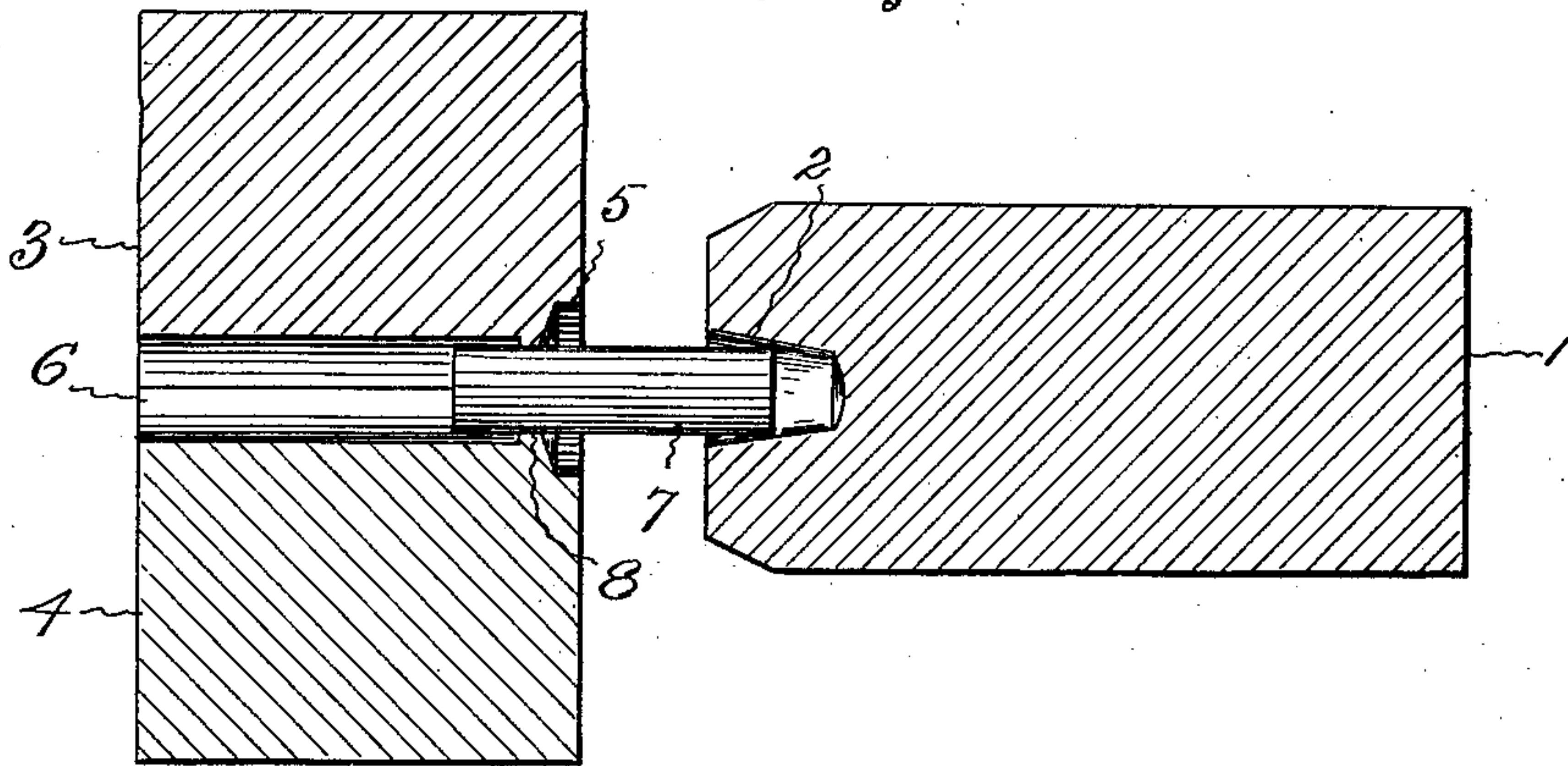


Fig. 2

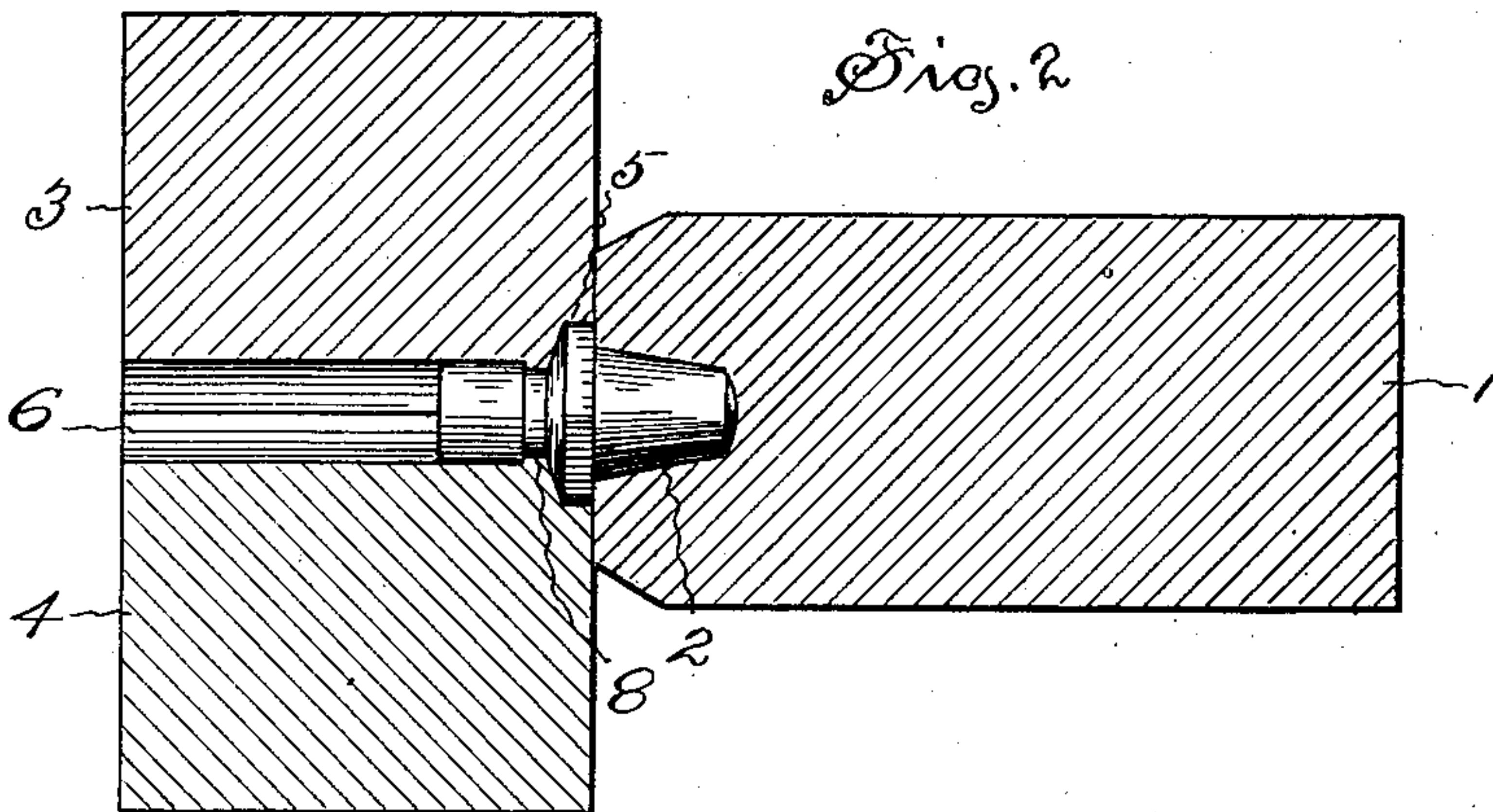


Fig. 3

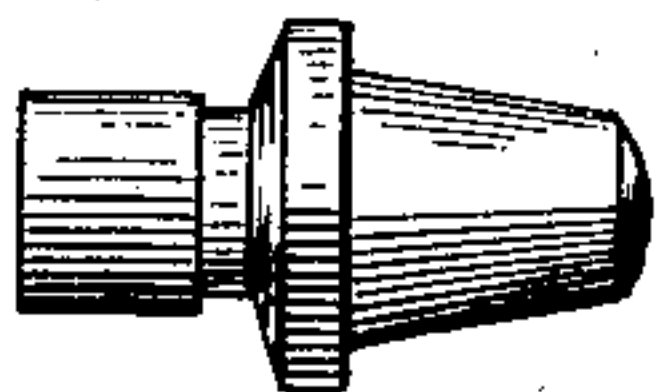
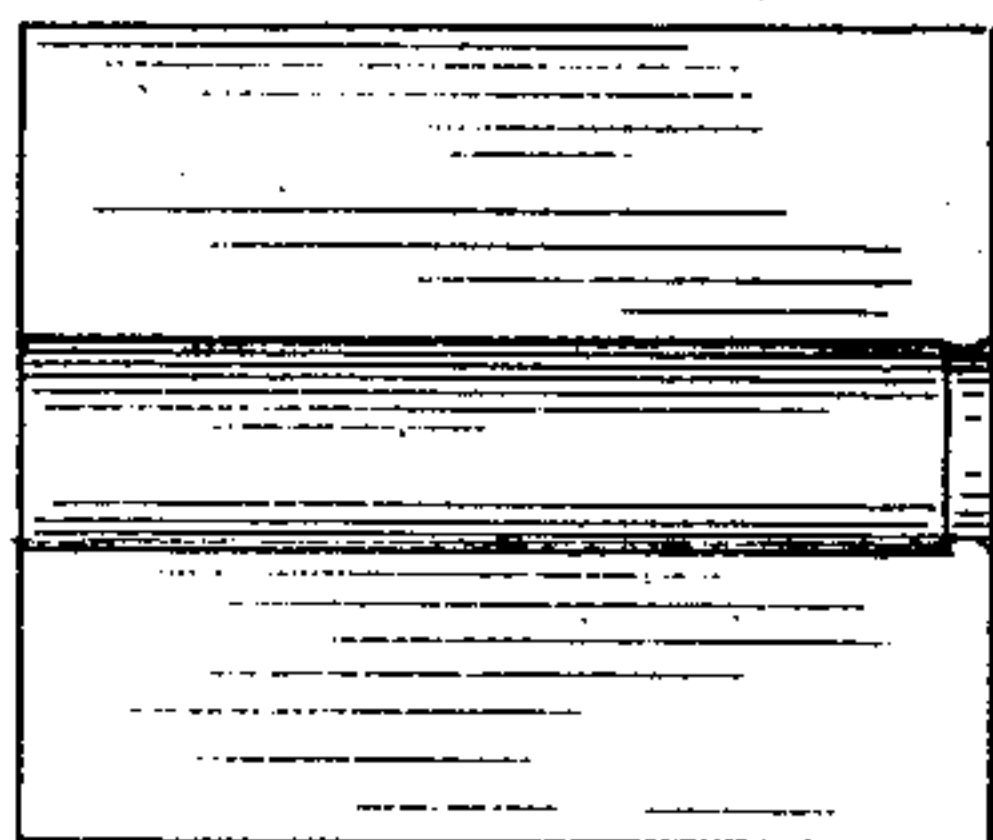


Fig. 4

Fig. 6



Fig. 5



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UNITED STATES PATENT OFFICE.

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DIE FOR PRODUCING HORSESHOE-CALKS.

No. 896,433.

Specification of Letters Patent.

Patented Aug. 18, 1908.

Application filed March 12, 1907. Serial No. 361,941.

To all whom it may concern:

Be it known that I, EDWARD A. BURNS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented new and useful Dies for Producing Horseshoe-Calks, of which the following is a specification.

This invention relates to the construction or formation of dies designed to be used in an open die header for producing horseshoe calks from blanks of round or square metal.

Removable horseshoe calks, that is, those devices which are screwed into threaded openings in a horseshoe so that they project downwardly for the purpose of preventing a horse's hoof from slipping on ice or snow, are constructed with a stem that is provided with a thread whereby the calk may be screwed into the opening in the shoe, a shoulder which is preferably square for the application of a machine wrench but may be circular for the application of a pipe wrench, by means of which the calk is screwed into or unscrewed from position, and a tapering body which projects downwardly for the purpose of providing a wearing point. Such calks are formed of iron or soft steel and frequently formed of both, that is, with an iron exterior and a steel core. Previously such calks have been made by turning them down in a screw machine and some attempts have been made without success to produce them in presses. Attempts have also been made to produce the blanks with the stems, shoulders and tapering bodies by the machines which are known as open die headers, which operate very rapidly upon blanks of the proper material. The forming of blanks in a rapidly operating open-die header has previously been unsuccessful because it was necessary to swell the material for the shoulder and for the base of the body and at the same time to draw the material into a smaller cross-section for producing the wearing end, and to accomplish this required the use of a solid punch for swelling and drawing the body, and opening dies, that is, dies which are capable of separation, for holding the stem. Even with these tools it for some time has been considered impossible to produce the calks by an open-die heading machine for the reason that the expansion and contraction of the body in the punch, al-

though the exterior of the blank was left tapering and the opening in the punch was tapering, produced such a great amount of surface friction, that is, the body became bound so tightly in the punch, that when the punch was withdrawn after the blank had been formed, the body would not draw from the punch, but on the other hand the shoulder and the stem would draw out of the open dies, and thus the blank would not be discharged from the machine so as to permit another piece of stock to be fed into place to be operated upon.

The object of this invention is to remedy this fatal defect, and to so construct the dies that the stem will be held by the dies and not be withdrawn therefrom when the punch is drawn back, and thus allow the calk to be discharged by opening the dies which hold the stem, thereby enabling the calks to be rapidly produced in a heading machine.

Figure 1 of the drawings shows a section of a pair of open dies and a punch with a blank in the position occupied when the punch first starts forward to upset it. Fig. 2 is a similar view showing the punch fully forward and the blank completely formed. Fig. 3 shows a side view of a calk produced by the dies and punch shown in Fig. 2. Fig. 4 shows an end view of the same calk. Fig. 5 shows a face view of a die of modified construction. And Fig. 6 shows a side view of such a calk as would be produced with a pair of dies like that in Fig. 5.

The punch 1 is made of suitably hardened steel, of a form designed to be fastened into the movable gate of an ordinary open-die heading machine. In the front end of this punch is a tapering socket 2 having an outline that conforms to the outline of the finished tapering body of the calk.

The dies 3 and 4 are formed of suitably hardened steel of a size and shape to be received by the die holder of a common heading machine. These dies are formed of similar blocks each containing a section of the opening for the shoulder and stem of the blank. These dies when used in this type of machine are arranged to be drawn apart for the purpose of permitting the ejection of the blank which has been formed, and the feeding of the short piece of stock from which the succeeding calk is to be formed, and when

closed together the openings between these dies are of the shape necessary to produce the finished calk.

5 The dies shown have a recess 5 for shaping the shoulder of the calk and an opening 6 through which the blank 7 is fed and which is of the size of the stem of the finished calk. The opening through the dies near the forward end and just at the base of the stem and
10 beneath the shoulder is slightly contracted as at 8. The blank 7 is of such a size that it will just pass through the contracted opening, and it is a little smaller in diameter than the larger end of the socket in the punch, and
15 slightly larger in diameter than the smaller end of the socket in the punch.

When the punch is driven up the stock, which in the form of dies shown is backed up by the following blank, the following blank
20 being backed by the usual backing block used in heading machines, is compressed longitudinally and expanded at the center so as to form the shoulder and the larger section of the body and is reduced to form the smaller
25 or point end of the body. This action compacts and hardens the wearing end or point in a very desirable manner. The compression of the punch also causes the stem to expand to the full size of the opening in the dies.
30 This results in making the stem slightly larger in diameter than the forward end of the opening, that is, the contracted portion of the opening in the dies. As a result of this when the punch is withdrawn the shaped calk cannot be pulled from the dies and consequently the punch in retiring leaves the calk in the dies, after which as is customary, the dies are opened and the calk pushed out by
35 the forward feed of the following piece of stock.
40

The contracted portion of the opening, in the dies first shown, is rectangular. In the die shown in Fig. 5 this contracted portion is rounded. The shape of this contracted portion is immaterial and of course, in the
45 dies as used, it is quite slight, but as a result of this the calks can be made very rapidly in an open-die heading machine when previously it was thought that they could not be made in such machine for the reason that
50 the bodies could not be removed from the punches.

The shoulder of the blank made by the dies first shown is nearly square. The shoulder of the blank shown in Fig. 6 is circular. The
55 shape of the shoulder is immaterial.

The stems of these calks are subsequently threaded by any desired process.

The invention claimed is:

In a mechanism for forming horseshoe
60 calks, the combination of a solid punch having an outwardly tapering socket in its forward end for shaping the bodies of the calks, a cooperating separable die with an opening for receiving the stock and shaping the stems
65 of the calks, said opening in the separable die being contracted adjacent to its forward end whereby, when the punch and die are drawn apart, the reduced section of the opening will prevent the stems of the calks from being
70 pulled from the separable die and will cause the bodies of the calks to be pulled from the socket in the punch and will form the stems of the calks somewhat smaller in diameter adjacent to the shoulders than at their other
75 ends, substantially as specified.

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