

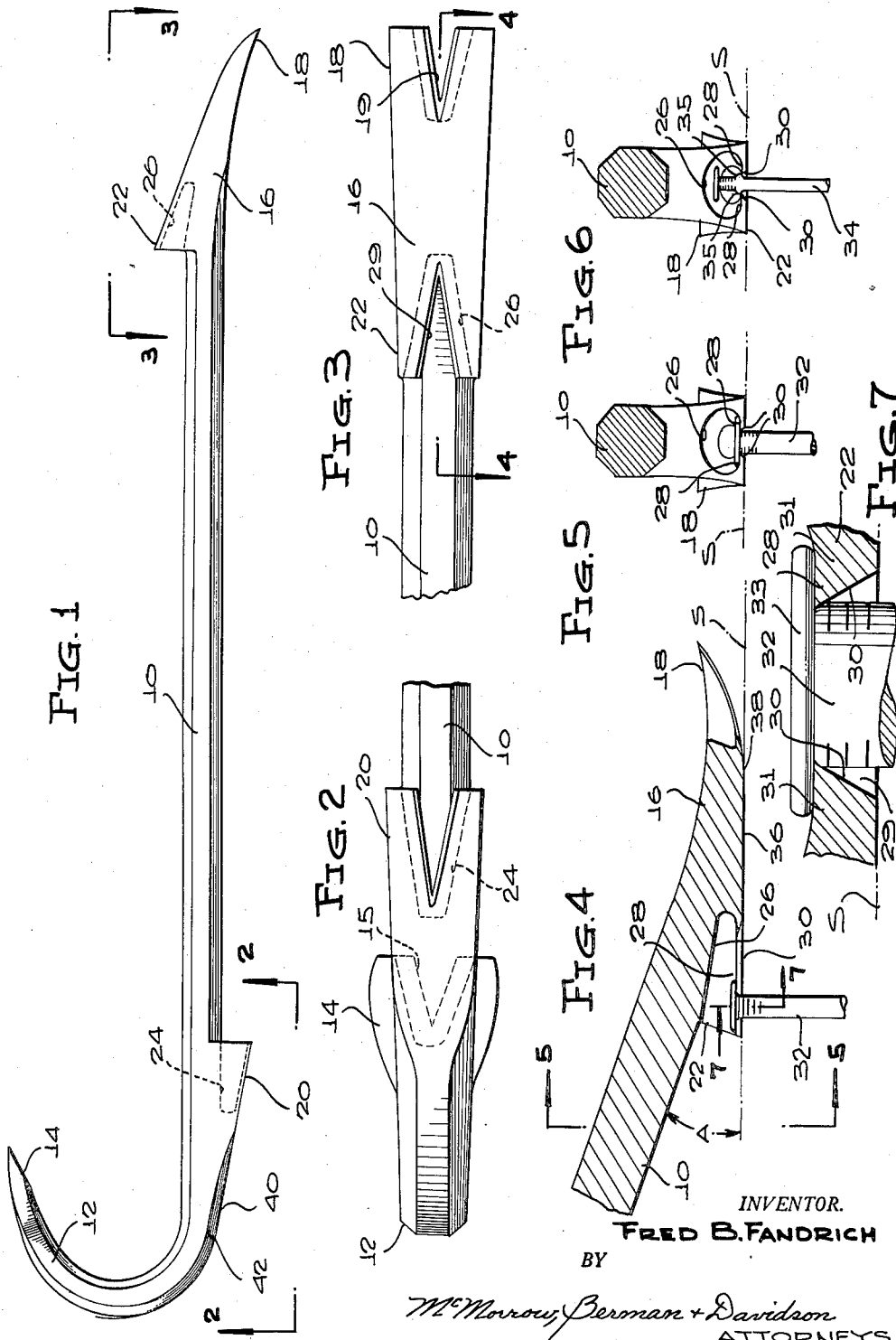
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F. B. FANDRICH

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SURE GRIP COMBINATION BAR

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1

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## SURE GRIP COMBINATION BAR

Fred B. Fandrich, Jamestown, N. Dak.

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1 Claim. (Cl. 254—25)

This invention relates to a tool designed to provide, in a one piece bar member, features permitting efficient employment of the device for nail pulling, prying, and various other functions ordinarily discharged by wrecking bars and similar devices.

While the invention has general utility as a wrecking bar, it is mainly characterized by jaw formations thereon, disposed both at the opposite extremities of the bar and at locations inwardly from said opposite extremities, that impart thereto the ability for engaging and pulling nails of this type, to a markedly greater extent than is true of nail pullers, claw hammers, wrecking bars, and equivalent devices previously conceived.

Most usually, a nail pulling device will have a slot defining jaws at opposite sides thereof, with the device being positioned for disposition of the nail within the slot, after which the device is rocked with the jaws engaging under diametrically opposite portions of the nail head, for the purpose of pulling the nail.

In this connection, the usual construction involves positioning the walls of the slot in an angular relationship in which said walls diverge, viewing the nail-engaging portion of the tool in cross section, in a direction away from the surface in which the nail is engaged.

Due to this arrangement, the total area of the underside of the nail head, that bears against the jaws, is considerably reduced, due to the upwardly divergent relationship of the slot walls. The tendency, accordingly, is to concentrate an excessive amount of pressure on a relatively small amount of the nail head area, so that the diametrically opposite portions of the head of the nail many times tend to bend upwardly into substantial conformity to the angularity of the slot walls to each other, preventing a proper grip and pulling action, and often causing the nail head to be broken off in circumstances which thereafter complicate and make exceedingly more difficult the extraction of the nail.

Still further, the conventional construction fails to permit the walls of the slot to bite into the diametrically opposite portions of the nail shank, should the nail be left without a head or should the head be disposed a substantial distance above the surface in which the nail is engaged.

Yet another characteristic of conventional nail pulling devices resides in the fact that a relatively long stroke is required during the extraction of the nail. This also is undesirable, not only because of the added difficulty in pulling the nail, but also because the tool may be necessarily disposed in a relatively confined area preventing the travel of the tool through the necessarily wide arc.

In view of the above, the main object of the present invention is to provide a generally improved tool of the character described, which will not have any of the various disadvantages noted above. The tool is designed, instead, with slot walls which converge in a direction away from the surface in which the nail is engaged, in a manner to provide a maximum area at the underside of the nail head, thus distributing the pulling pressure over a

2

measurably greater area than is true of conventional devices.

Another object is to so form the device that the pulling action upon the nail will be exerted both upon the head and upon the shank of the nail, as distinguished from conventional bars previously in use, wherein the pressure is mainly exerted against the head of the nail with no biting action being exerted upon the nail shank.

Still another object is to provide a device of the character described wherein there will be located, inwardly from the opposite extremities of the tool, projections having nail-head receiving recesses and having slots in communication with said recesses, with the slot walls being formed in the manner previously described during the above stated short summary of the novel features of the invention, said projections being so arranged that the surfaces thereof that are in contact with the surface in which the nail is engaged will lie in planes related at a relatively small acute angle to the length of the tool, so that the tool need only be rocked through a relatively short arc as compared with tools previously devised.

Still another object is to so dispose the planes of said surfaces of the projections as to cause them to merge, along substantially a straight line, into adjacent surfaces of the tool, so as to locate the fulcrum about which the tool will be rocked at a substantial distance from the point of which the pressure is exerted against the nail, despite the relatively small angle which the length of the tool will bear to the surface in which the nail is engaged at the initiation of the pulling operation.

Still another object is to so locate said recess projections as to dispose the same at a minimum lateral distance from the major axis or longitudinal median of the tool, again for the purpose of permitting operation of the tool in close quarters. This arrangement has the further desirable characteristic in that the projections will interfere to a minimum extent with use of the tool for prying or for wrecking purposes.

Still another object is to so design the nail-engaging jaws as to provide a substantially flat surface for the nail head to rest upon, with the nail head being engaged over a maximum area to distribute the pulling pressure to the maximum extent over the nail head, with the jaws further being designed to have a positive "bite" on the shank of the nail, eliminating slippage of the jaws upon the nail and also providing pressure relief so far as the nail head is concerned.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a side elevational view of a combination tool formed according to the present invention;

Figure 2 is a greatly enlarged, fragmentary bottom plan view of the tool as seen from the line 2—2 of Figure 1;

Figure 3 is a greatly enlarged, fragmentary top plan view of the tool as seen from the line 3—3 of Figure 1;

Figure 4 is an enlarged, fragmentary longitudinal sectional view substantially on line 4—4 of Figure 3, with the tool in position for extracting a nail;

Figure 5 is an enlarged transverse section on line 5—5 of Figure 4;

Figure 6 is a view similar to Figure 5 in which a different type of nail is being pulled; and

Figure 7 is a detail section, on a scale substantially enlarged above that used in Figure 4, taken on line 7—7 of Figure 4.

Referring to the drawings in detail, designated at 10 is an elongated shank which may be of various cross sectional shapes, the shank being illustrated, by way of example, as being of octagonal cross section.

3

At one end, the elongated, straight shank 10 merges into a rearwardly curving hook portion 12, terminating in a work-engaging end portion or head 14 which is progressively decreased in thickness toward its outer extremity as shown in Figure 1, and is substantially wider than the normal width of the hook portion, as shown in Figure 2. The head 14 is formed with a V-shaped slot 15 as shown in Figure 2, defining at opposite sides of the slot jaws the particular formation of which will be discussed in greater detail hereinafter.

The opposite end portion 16 of the tool is at a wide, obtuse angle to the length of the shank 10, extending in a lateral direction from the shank oppositely to the direction in which the hook portion 12 extends. The end portion 16 is progressively decreased in thickness toward its work-engaging head or tip 18, said head or tip being slightly curved when viewed as in side elevation, as best shown in Figure 1 and being formed with a V-shaped slot 19 defining jaws similar to those on the head 14.

Integrally formed upon the shank, at the heel or inner ends of the work-engaging portions 12, 16, are oppositely extending, lateral projections 20, 22. These are of generally triangular shape when seen in side elevation, and are hollowed out to form recesses tapering correspondingly to the substantially triangular configuration of the projections, said recesses opening upon the larger ends of the projections and being respectively designated 24, 26.

The recesses have the function of receiving the heads of nails, and since the construction 22 is identical to that of the projection 20, hereafter the description will be confined to the projection 22. It will be understood, however, that the projection 20 is similarly formed.

The projection 22 has a wall 28 of its recess, and this constitutes the wall of the recess that will engage a surface S in which a nail has been driven, and from which the nail is to be pulled. The inner surface of said wall is substantially planiform, and the plane thereof lies substantially parallel to the outer surface of the wall, that is, the surface that engages against the surface S in which the nail is lodged. In the wall 28 there is formed a V-shaped slot, opening at its larger end upon the larger end of the projection 22, said slot being designated at 29. The walls 30 of the slot, as previously noted, converge in a direction longitudinally of the slot to extend into full convergence at the inner end of the slot as shown in Figure 3. A progressively reduced nail-receiving space is thus provided, permitting the device to receive nails the shanks of which differ in diameter.

The walls 30, viewing the projection in cross section, converge in a direction away from the outer surface of the wall 28, so that the width of the slot, at any location along the length thereof, is greater where the slot intersects with the inner surface of wall 28, than it is where the slot will intersect with the outer surface of said wall 28.

The slots thus define undercut jaws 31 at opposite sides thereof, adapted to engage under the head of a nail 32 as shown in Figures 5 and 7. Due to the upwardly converging relationship of the walls 30, a maximum area of the underside of the nail head 33 is disposed in engagement with the inner surface of wall 28, thus distributing to the maximum extent the pressure exerted against the head during the extraction of the nail. Heretofore, the conventional construction has been such that a relatively small amount of nail head area was engaged by the jaws 31, so that only a small portion of the head bore the full pressure, causing upward bending of diametrically opposite portions of the nail head, or alternatively, causing the nail head to be completely snapped off.

Of importance, in this regard, is the fact that the upwardly converging relationships of the walls 30 also have the effect of defining blade-like edges where the walls 30 intersect with the inner surface of the recessed wall 28, said blade-like edges lying in the plane of the underside of the nail head in a situation such as depicted in Figures

4

4, 5, and 7. Figure 7 is slightly exaggerated with respect to the manner in which said blade-like edges bite into the shank of the nail, but nevertheless, the shank of the nail is positively penetrated by the opposite sides of the slot, so that the pulling pressure is exerted not only against the underside of the nail head, but also is borne in part by the shank itself of the nail. With the shank and the nail head both assuming a part of the pressure during pulling of the nail, the nail will be extracted with considerably more ease than has heretofore been true, and the tendency toward damaging or slipping of the nail head is measurably reduced.

In Figure 6, the device is shown in use pulling a nail 34, which is a different type than that shown in Figures 4, 5, and 7. The type shown in Figures 4, 5, and 7, in this regard, is a flat-headed roofing nail, the heads of these nails being generally quite soft, as a result of which bending of the heads or full breakage thereof has been quite common.

In Figure 6, the device is shown advantageously employed in pulling a nail head which is disposed a substantial distance above the surface S. In this arrangement, the blade-like edges defined by the upwardly converging relationship of the walls 30 bite into the shank, in effect operating as an upsetting tool, to build up small, diametrically opposed projections 35 upon the shank of the nail A substantial distances downwardly from the nail head. The jaws 31 engage under said projections, thus facilitating the extraction of the nail.

During the pulling of a nail that may resist extraction, each time the nail is pulled for an additional part of its length from surface S, the tool may be swiftly repositioned and the blade-like edges of the jaws will immediately bite into the shank of the nail at a new location, close to the surface S, permitting the exertion of maximum leverage with a relatively small amount of swinging movement of the tool about its fulcrum.

The projection 20 is formed identically to the projection 22, and hence may be employed to an equal advantage. Further, the jaw formations provided at the heads 14, 18 of the tool are identical to the jaw formations 31, that is, they have undercut constructions with the side walls of the jaw defining slots converging in a direction away from the surface in which the nail is engaged, when the jaws are viewed in cross section.

Of course, with respect to the heads 14, 18, the recesses 24, 26 are not present but the pulling action is identical to that employed in respect to the projections 20, 22.

Of importance is the fact that the projections 20, 22 are formed as integral, laterally projecting formations upon the length of the shank, at opposite ends of the shank, at the heels of end portions that are bent in respect to the shank length in directions having lateral components. Further, the projections are disposed a minimum distance from the longitudinal median or major axis of shank 10, so as to interfere to a minimum extent with ordinary use of the device as a wrecking tool or pry bar. The disposition of the projections at the heel ends of the working end portions 12, 16, with the walls 28 lying in planes that are coplanar with the work-surface-engaging faces of said end portions, results in fulcrum points being provided during use of the projections 20 or 22, that add measurably to the leverage employed, while still disposing the shank 10 at a relatively small, initial distance from the surface of the work. For example, viewing Figure 4, the plane of the wall 28 is substantially common to that of the work-engaging face 36 of end portion 16, with said face 36, at the end thereof remote from the projection 22, providing a fulcrum point 38 about which the tool is rocked when the nail 32 is being extracted. In these circumstances, the tool when in its initial position as shown in Figure 4 will have its initial length disposed at a relatively small acute angle A to the surface S from which the nail is to be pulled. The tool thus

5

can be used in relatively confined quarters, with maximum leverage still being afforded. As to the projection 20, its corresponding wall is substantially coplanar with a face 40 of end portion 12, said face at the end thereof remote from projection 20 (see Figure 1) merging into a fulcrum 42.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claim.

What is claimed is:

A tool of the class described comprising an elongated shank; a work-engaging end portion integrally formed upon at least one end of the shank and having a longitudinally curved, beveled, work-engaging tip at its outer end; and a lateral projection formed upon the shank at the inner end of said end portion, having a generally triangular configuration when viewed in side elevation, said projection being hollowly formed to define therein a recess and said recess being tapered in the sense of the direction of its length correspondingly to the generally triangular configuration of the projection, the recess opening upon the larger end of the projection and including a wall in confronting relation to the surface of said shank for engaging a supporting surface from which a nail is to be pulled, said wall of the projection being formed with a V-shaped slot opening at its larger end upon the larger end of the projection, the slot having walls extending into full convergence at the inner end of the slot in the sense of extension of the slots in the direction of their lengths, thus to provide a progressively reduced nail-receiving space between the walls of the

6

slots in which space the shanks of nails may be engaged with the heads of the nails in the recess, said walls of the slot being convergent, when the projection is seen in cross section, in a direction away from the outer surface of the wall of the recess and toward the adjacent, confronting surface of the shank whereby the width of the slot at any location along the length thereof is greater where the slot walls intersect with the inner surface of said wall of the recess than where the slot walls intersect the outer surface of said wall, thus defining undercut jaws at opposite sides of the slot engaging under the head of a nail and disposed to engage a maximum area of the underside of the nail head to distribute to the maximum extent the pressure exerted against the head during the extraction of the nail, said convergence of the slot walls further defining blade-like edges where the slot walls intersect with the inner surface of the wall of said recess, said blade-like edges lying in the plane of the underside of the nail head on engagement of a nail head by the jaws, to penetrate the shank of the nail at opposite sides thereof, said inner and outer surfaces of said wall of the recess being wholly planiform, and lying in parallel planes, over the full length of the slot, said end portion of the shank having an elongated, work-engaging face which is wholly planiform for the major part of the length of said end portion, fully from said projection to said tip, said face being coplanar with and constituting an extension of said outer surface of the wall of the recess, said face merging into the curved, corresponding face of the tip for requiring rocking of the projection only about axes falling upon the curved face of the tip.

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