

Feb. 17, 1953

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2,628,519

NAIL STRAIGHTENING PLIERS

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2 SHEETS—SHEET 1

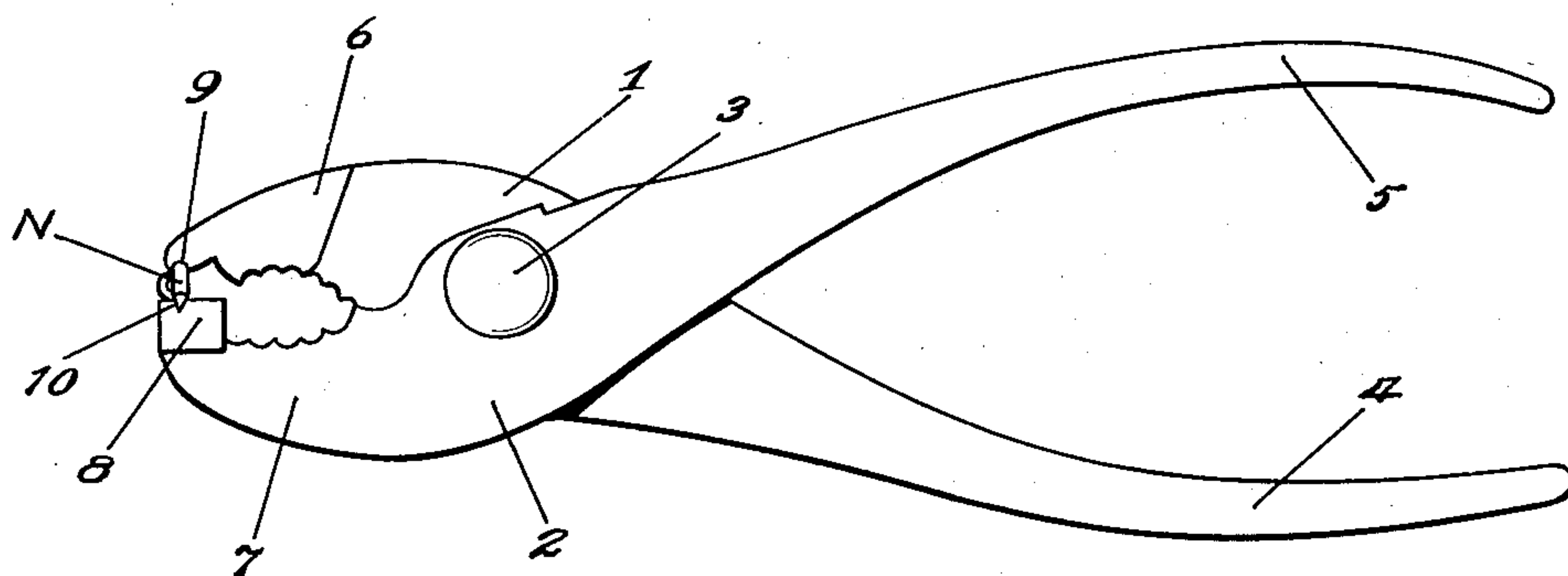


Fig. 1.

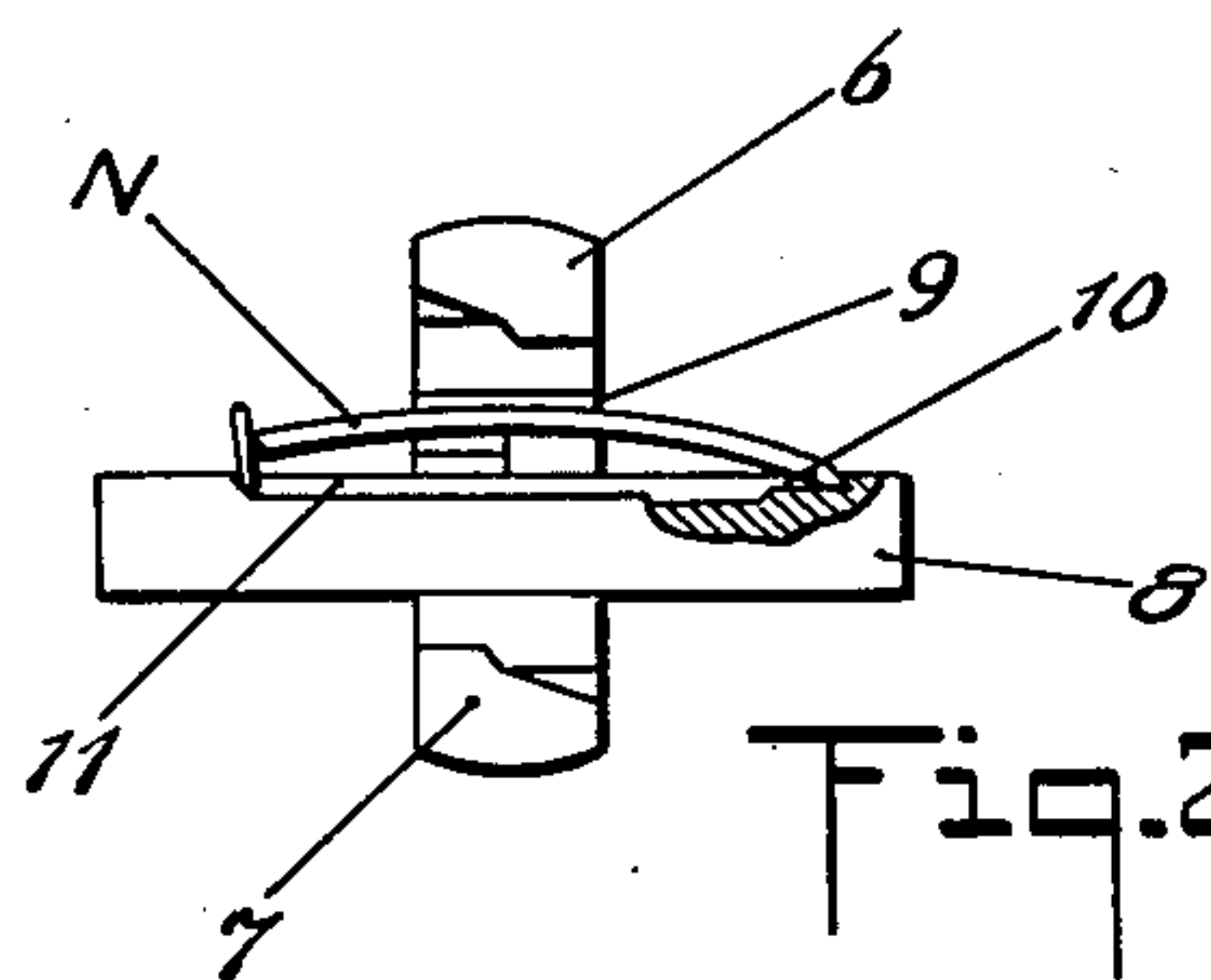


Fig. 2.

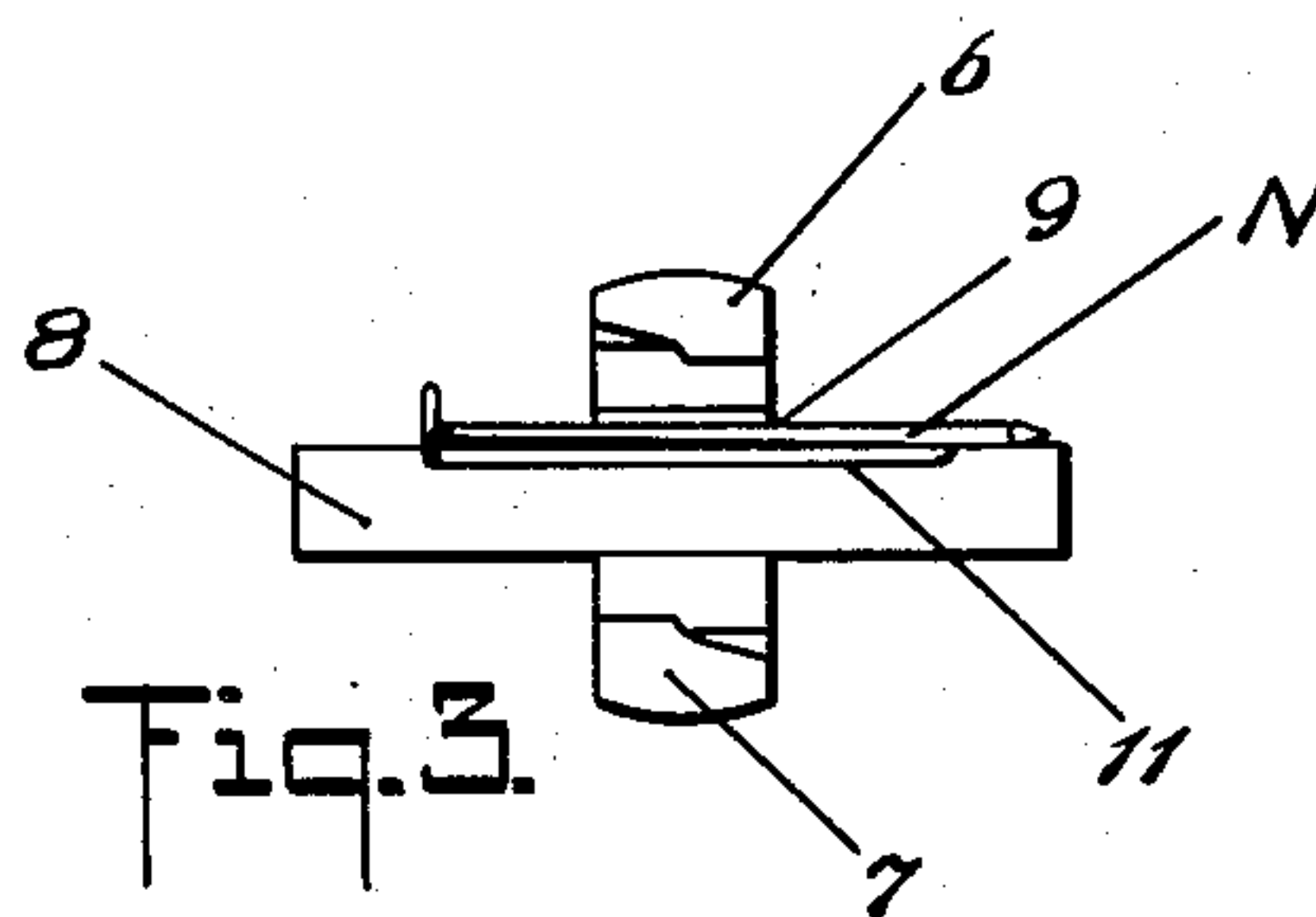


Fig. 3.

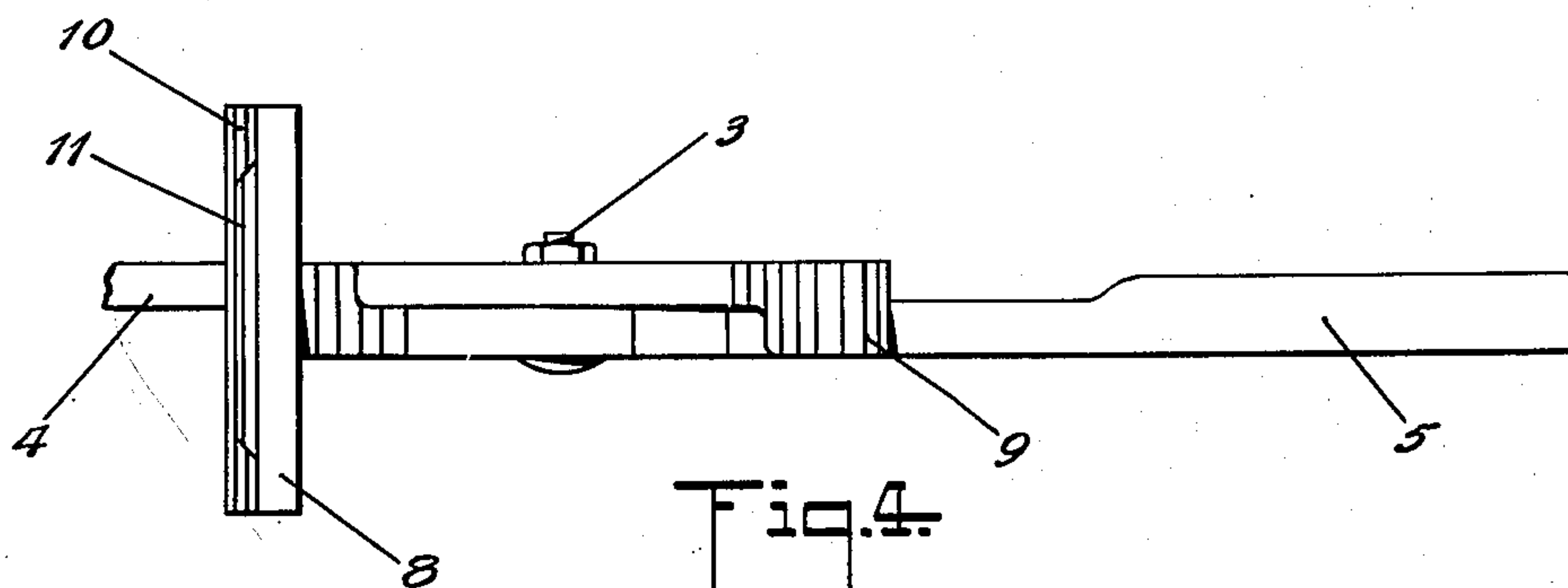


Fig. 4.

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2 SHEETS—SHEET 2

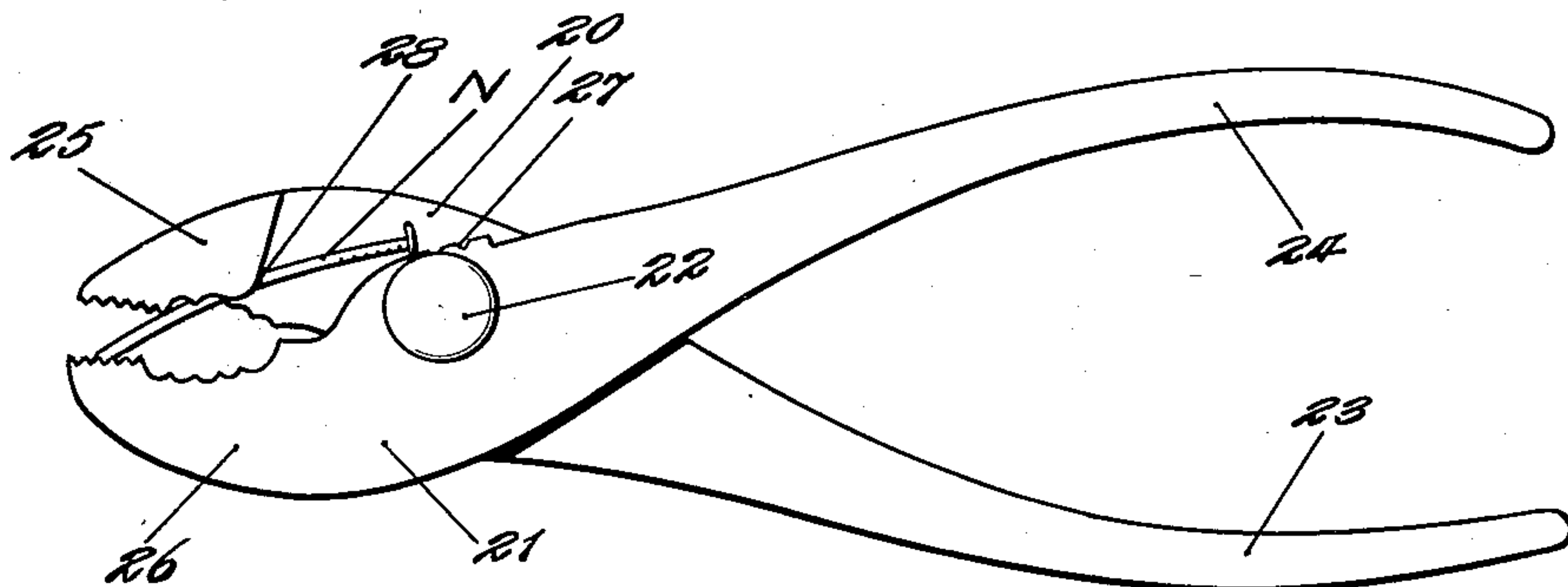


Fig. 5.

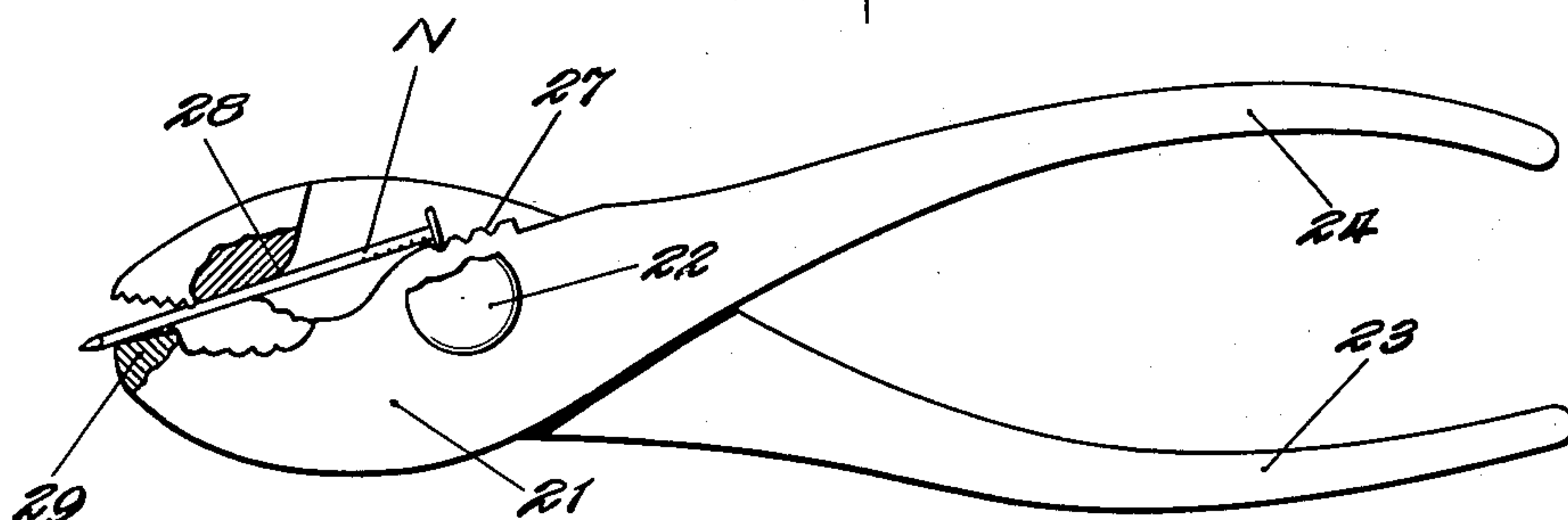


Fig. 6.

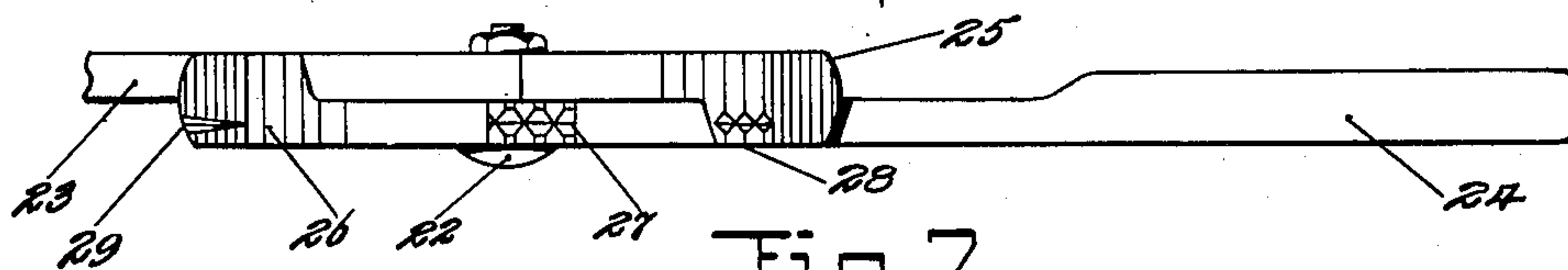


Fig. 7.

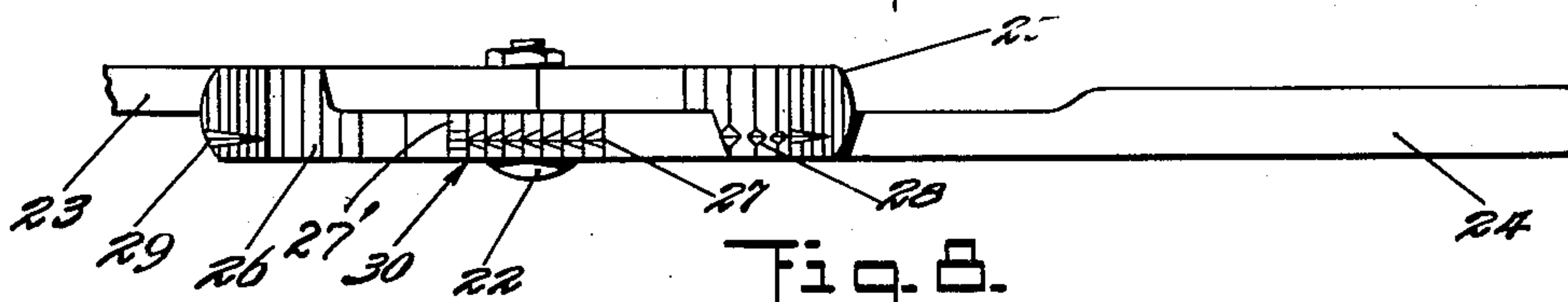


Fig. 8.

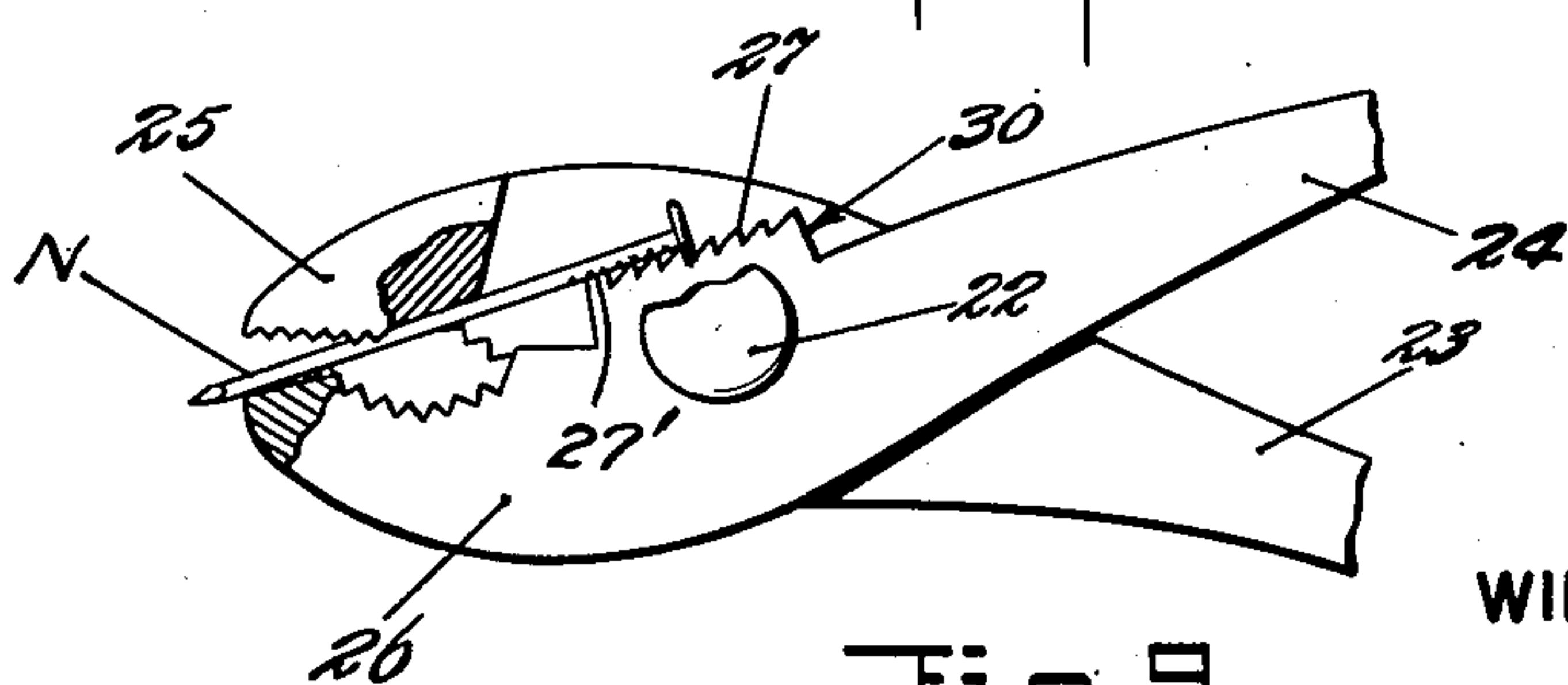


Fig. 9.

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## UNITED STATES PATENT OFFICE

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## NAIL STRAIGHTENING PLIERS

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Application February 15, 1949, Serial No. 76,621

## 1 Claim. (Cl. 81-15)

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This invention relates to improvements in tools of the type suitable for straightening nails and the like.

The invention is concerned with a plier form of tool by means of which nails and the like even when acutely bent can be easily brought back to substantially straight condition.

A further object of the invention is to provide a construction in a nail straightener such that the bent nail is substantially prevented from flying out of the plier during the straightening operation.

Still another object of the invention is to provide a form of nail straightener by means of which it is impossible to overstraighten the nail and thus bend it in the opposite direction.

Still another object of the invention is to provide a nail straightener in the form of a plier by means of which the nail may be sprung sufficiently beyond a straight line condition during straightening in order to allow for springiness of of the metal of the nail so that upon the release of straightening pressure it will spring back to a substantially straight line formation.

A more detailed object of the invention is to provide means in a common form of known plier whereby to impart to such plier a nail straightening function.

A still more specific object of the invention is to provide a pair of aligned spaced seats for the nail, one seat being formed to receive the head of the nail and hold it against ejection by reason of the application of the forces which straighten it.

Other and more detailed objects of the invention will be apparent from the following description of the two embodiments of the invention illustrated in the attached drawings.

This application is a continuation in part of my copending application Serial No. 39,725, filed July 20, 1948, for Tool, and later abandoned.

In the attached drawings:

Figure 1 is a side elevational view of one form of nail straightening plier embodying the features of this invention;

Figure 2 is a lefthand end elevational view thereof with a portion of the jaw broken away showing relative position of the plier parts and a bent nail at the beginning of the straightening operation;

Figure 3 is a similar view showing the nail after it has been straightened;

Figure 4 is a top plan view of this plier with the lever arms swung so that the clamping jaws are wide open;

Figure 5 is a side elevational view of a modified form of the invention in which the function of nail straightening has been imparted to a standard form of plier by modification of its construc-

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tion and showing the position of the parts when a bent nail is inserted ready for straightening;

Figure 6 is a similar view with a portion of the plier broken away showing the nail at the end of the straightening operation;

Figure 7 is a top plan view of this form of the invention showing the plier arms swung wide open;

Figure 8 is a view similar to Figure 4 of a still further modified form of nail straightening plier showing the aligned seats for the nail displaced outwardly from the member of the plier carrying the other seat to permit use of the tool in straightening larger nails than in the case of the structure of Figures 5, 6 and 7; and

Figure 9 is a view similar to Figure 6 of this final modification illustrating the special construction of the nail head receiving seat to prevent ejection of the nail during straightening.

The construction of Figures 1 to 4 inclusive comprises a pair of levers 1 and 2 pivotally connected together by a bolt 3 thereby defining suitably shaped handles 4 and 5 respectively and clamping or gripping jaws or heads 6 and 7 respectively. Secured to the inner face at the end of the clamping head 7 is an elongated metal block which serves as an anvil on which the bent nail N is placed. The anvil 8 is provided on its top surface with a longitudinal groove 10 extending from end to end, which groove is relieved or deepened intermediate its ends, as indicated at 11 in the several figures. An opposed inner face of the clamping head 6 is provided with a groove 9 to engage the bent nail N, as shown in Fig. 2 at the high point of its curvature.

In order to use this plier the curved nail N is placed on the anvil as indicated in Figure 2 and engaged in the groove 9 of the head 6 by moving the handle ends of the levers towards each other until the nail is gripped between them. Pressure is applied to the handles 4 and 5, causing the heads 6 and 7 to approach each other and forcing the nail downwardly to a straightened position, as indicated in Figure 3. The relieved portion 11 of the groove 10 is provided so that the nail end can be overbent an amount corresponding to the springiness of the metal so that when the pressure is relieved thereon it will return to a substantially straight condition. As indicated in Figures 3 and 4, for shorter lighter nails the head may be rested against the shoulder resulting from relieving the grooved face of the anvil 8, as indicated at 11. As the nail is forced to a straight condition its pointed end will slide along the anvil to allow for the effective lengthening of the nail as it is straightened. For larger nails especially, as it is preferable to have the high point of the bend at the longitudinal center of the groove 9, the head can be rested to the left



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of the shoulder, that is the left of the position shown in Figure 2, in which case as the nail is straightened and effectively increased in length both ends may slide in the groove 10 as it is straightened.

As distinguished from the nail straightening of Figures 1 to 4 inclusive which in one view may be considered to be a special tool suitable mainly for straightening nails, the plier of Figures 5 to 7 inclusive can, as illustrated, be a standard form of plier, which is sometimes known as a slip-joint plier. This standard plier, provided with two pairs of fluted or roughened gripping surfaces, is modified to adapt it for straightening nails. This plier comprises a pair of levers 20 and 21 pivotally connected together by means of a pivot pin 22 and formed to provide the operating handles 23 and 24 respectively of the gripping heads 25 and 26 respectively. Such plier is modified, in accordance with this invention, by notching the region of the lever 21 adjacent the pivot pin 22 as shown in Figure 6 at 27. These notches, as more clearly shown in Figure 7, include a series of transverse grooves and a single longitudinal groove intersecting all of the transverse grooves. The working faces of the heads 25 and 26 are the full width of the material of the levers 20 and 21, which are each cut away in the region of the pivot pin 22, as shown in Figure 7, so that the inner face of the head 25, which is transversely fluted or roughened, can be provided with a longitudinal groove 28 which aligns with the grooves 27. Likewise the inner face of the gripping head 26 which is also normally transversely fluted or roughened is provided with a longitudinal notch 29 which is also in line with the grooves 27 and 28. As a result of this modification of a standard slip-joint plier, a bent nail N may be gripped between the heads 25 and 26 as shown in Figure 5, with the head of the nail lying in one of the transverse grooves 27, as shown in Figure 5. The high point of the bent nail rests in the groove 28 and the pointed end rests in the groove 29. As the handles 23 and 24 are forced towards each other causing the gripping heads 25 and 26 to move towards closed position, the nail N will be brought back to a straight condition, as shown in Figure 6. As the nail is brought back to straightened condition the head N being held against movement in the grooves 27, its pointed end can slide in the groove 29 to allow for its effective increase in length.

The modified plier of Figures 8 and 9 is basically the plier of Figures 5, 6 and 7 but is to be distinguished therefrom in several aspects. The anvil 30 formed on the plier part 26—27 has been extended longitudinally as compared with the corresponding part of the smaller plier to adapt the tool for straightening larger nails. This anvil 30 is provided with a groove assembly 27, as before. As clearly shown in Figure 8, the aligned nail receiving seats 27, 28 and 29 have been spaced outwardly with respect to the center line of the anvil 30, adapting the tool for straightening larger nails in that more clearance is given with respect to the opposed face of the plier member 23—25. As in the case of the previous plier, the seat 27 consists of a longitudinal groove having a series of transverse serrations.

As clearly depicted in Figure 9, these transverse serrations form a sort of saw tooth formation in which the crests of the teeth which will engage the nail shanks, are sharp so as to bite into the shanks and prevent the nails slipping or snapping out of the slot provided by the

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groove. This distinguishes from the transverse serrations of the comparable plier Figures 5 to 7 inclusive, in that their crests are flat. This formation of the transverse serrations insures that under the straightening forces applied to the nail it will be impossible for the nail to spring from its seat, a result that might be hazardous. Upon consideration it will be seen that the intermediate pressure applying seat of the member 23—25 of the plier rotating about the pivot point 22 as the nail is straightened moves longitudinally of the nail, which fact is demonstrated by a scuffing of the surface of the nail as this seat moves longitudinally of the nail. The longitudinal component of the straightening force tends pull the head of the nail from its seat and this special formation of transverse serrations insures against its springing from the plier. The serrations of the previous plier with flat crests do not grip the nail so as to completely insure against a nail jumping free. As shown in Figures 8 and 9 there is a flat land at 27' to strengthen the anvil at that corner to prevent its chipping when straightening a nail with a bend near its head. If it is necessary to place the nail head in the first transverse serration, the anvil might chip without the flattened shoulder 27'.

From the above description of the two embodiments of the invention herein disclosed it will be apparent that the subject matter thereof is capable of embodiment in other physical forms, and I do not, therefore, desire to be strictly limited to the examples herein given. Rather I prefer to be limited only as required by the scope of the claim granted me.

What is claimed is:

A tool as described comprising a pair of levers forming gripping heads at one end and handles at the other, a pivot pin for connecting said levers together between their heads and handles, a pair of longitudinally spaced and aligned seats formed on one of said gripping heads and lying in the same plane, one of said seats being adjacent said pivot pin, the gripping head carrying said seats being relieved between said seats, and a seat formed on the other of said gripping heads and axially positioned opposite the relieved portion between said pair of seats, each of said seats having a longitudinal groove, all of which are aligned, and said seat adjacent said pivot pin having at least one transverse groove intersecting the longitudinal groove of that seat.

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