

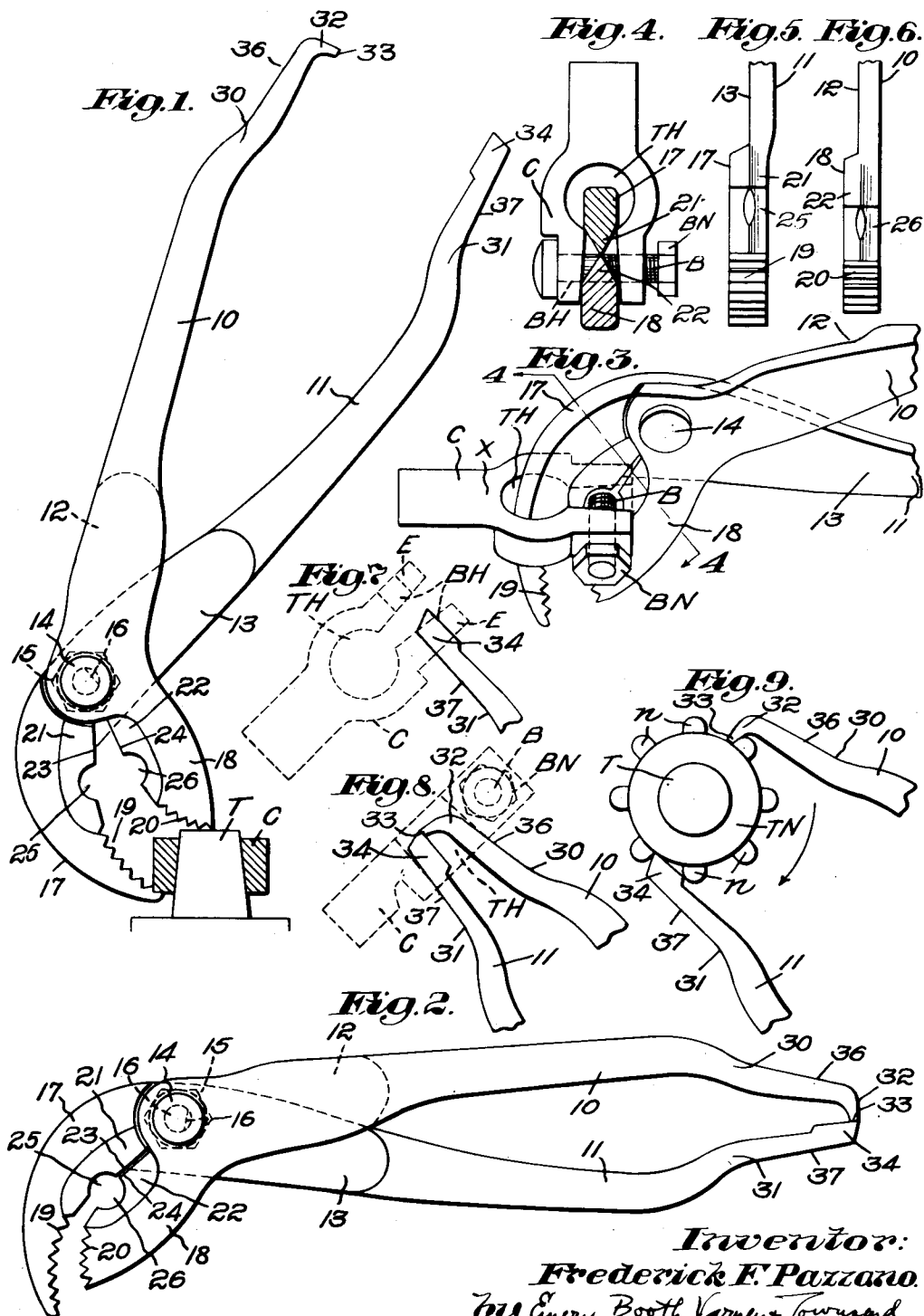
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F. F. PAZZANO

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COMBINATION BATTERY TOOL

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Inventor:
Frederick F. Pazzano.
by Emory Booth, Varney & Townsend
Attys

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COMBINATION BATTERY TOOL

Frederick F. Passano, Waltham, Mass.

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2 Claims. (Cl. 29—85)

My present invention relates to a combination tool particularly adapted for use in connection with the servicing of automobile and other storage batteries, and aims to provide a simplified and compact implement equipped to perform the various operations commonly required in connection with such work. In various respects my present invention presents improvements over that of my Patent Reissue 19,027, reissued December 19, 1933, original Number 1,898,568, dated February 21, 1933.

In the drawing illustrating one embodiment of my invention by way of example,

Fig. 1 shows the combination tool in position for removing a terminal clip from a battery terminal;

Fig. 2 is a side elevation of said tool, in closed position, as for reaming and cleaning the inner walls of a terminal clip;

Fig. 3 is a perspective illustrating one manner of use of the tool for spreading a terminal clip which has been removed from, or prior to its positioning on, a battery terminal;

Fig. 4 shows a terminal clip in plan and the jaw portions of the tool in section, in connection with the operation illustrated in Fig. 3, the section being taken as if on the line 4—4 of Fig. 3;

Figs. 5 and 6 are elevations looking at the inside faces of the respective jaws;

Fig. 7 illustrates the reaming and cleaning element for the bolt hole of a terminal clip, showing the same in use;

Fig. 8 is a side elevation of the portion of the tool for cleaning and reaming the battery terminal hole of a terminal clip, showing it in operative position; and

Fig. 9 illustrates the tool in position for tightening or removing a terminal nut of a storage battery.

Referring more particularly to the drawing, and first to Figs. 1 and 2, the combination tool comprises a pair of crossed and pivotally connected levers 10, 11, one portion of each of which constitutes a handle member. At their adjacent side faces, in the region of their pivotal connection 12, 13, affording a transverse positioning seat for one lever with respect to the other; see also Figs. 5 and 6. The pivotal connection for the levers includes a pivot pin 14 extending through correspondingly formed apertures in the overlapping portions of the levers and held in position as by the nut 15. The pivot aperture in one of the levers, herein the lever 11, desirably is flattened or D-shape, as at 16, and the pivot pin

14 is correspondingly formed at its outer end. Hence it is held from turning with respect to the lever 11, against which the nut 15 is engaged, thus avoiding any tendency to back the nut off from the pin during relative movement of the levers.

Each lever also comprises a head portion including a jaw 17 and 18 respectively, projecting laterally on the same side of the pivot 14, and, in the same or substantially the same plane with each other, transversely of the pivot. It will be seen from the drawing that the head portions and jaws 17, 18 are of different lengths, from the pivot 14. The jaw 17 of the lever 11, as illustrated, extends substantially beyond the jaw 18 of the lever 10. At their inner, opposed portions the two jaws are equipped with toothed work-engaging faces 19 and 20 respectively. The outer or longer jaw 17 is relatively narrow and tapering, substantially as shown in the figures, and preferably is somewhat concave at its inner or work-engaging face, its series of teeth 19 being arcuate to a like extent. The other or inner jaw 18 desirably has at least an outer portion of its free end non-concave, and preferably convexly arcuate, its series of teeth 20 being disposed upon a curve adapting them for cooperation with the confronting teeth 19. As apparent particularly from Figs. 1 and 2, the toothed work-engaging faces of the two jaws have portions which are operatively positionable substantially radially opposite each other, with reference to the pivot point.

The general formation and the arrangement of the head portions of the two levers as so far described may be substantially as in my prior patent. Thus the tool is adapted for loosening and removing a terminal clip C from a terminal T of a storage battery as in said patent, by a lifting or cocking action, which may be accompanied by a rolling of the tool toward the user, about the base of the inner jaw 18 as a fulcrum, substantially as illustrated in Fig. 1 hereof and in Fig. 6 of the patent. The conformation and arrangement of the jaws also adapts them for use in loosening or tightening the bolt nut of a terminal clip C, in the manner illustrated, for example, in Fig. 5 of the patent, the thin tapered nose of the outer jaw permitting it to be engaged beneath the bolt nut. A terminal clip C which has been removed from the battery post or terminal and in which the bolt nut BN has been partially backed off, but having the bolt B still in position, is seen in Fig. 3 hereof.

In accordance with my present invention my

battery tool, in which the head portions of the levers have jaws constructed and arranged substantially as illustrated and described, is additionally provided with cooperative means on the lever heads, at the confronting portions of the jaws themselves, for spreading the bolt-receiving portions or ears E, E of a terminal clip C, particularly when the latter is separate from the battery terminal, after its removal or preparatory to installing it.

To this end the toothed surfaces of the jaws are terminated at about midlength of the jaws, and each jaw is formed with an oppositely and inwardly facing wedge-like separator or spreading element 21 and 22 respectively. As best seen in Figs. 4, 5 and 6, as well as in Figs. 1, 2 and 3, these separating elements 21 and 22 are of rugged construction, having their bases preferably of the full width of the head or jaw portions. Said formations 21, 22 each taper inwardly substantially to a straight edge 23, 24 respectively. At said edges the spreader elements are so devised as to be readily entered between two adjoining or contacting parts to be separated but are sufficiently substantial to avoid nicking or chipping. Each of said formations extends approximately radially with respect to the lever pivot 14 and adapted to contact or substantially contact each other in the closed position of the jaws, substantially as in Fig. 2, and as determined by the end structure of the handle portions of the levers 10, 11 to be described. Portions of said separators or spreading elements 21, 22 toward the outer ends of the jaws have arcuate or semi-circular cut-out formations 25, 26, which together adapt the jaws and said spreaders to enclose the bolt B of a terminal clip but without making injurious contact with it.

By reference particularly to Figs. 3 and 4 it will be understood that a terminal clip, such as that illustrated by way of example at C, is required to have its bolt-holding portion or ears E, E separated in preparation for installing the clip on the battery terminal. If the clip is one which has previously been in use, the bolt nut BN generally is backed off on the bolt B to some extent prior to removal of the clip, but the ears remain closed or partly so when the clip is removed.

To spread the clip ears, the combination tool of my present invention is applied to the clip substantially as in Fig. 3. The relatively narrow and tapered formation of the outer jaw 17 conveniently adapts it for insertion through the terminal hole TH of the clip, while the other jaw 18 is positioned outside of the clip ears and centrally between them. Pressure applied to the handles of the levers 10, 11 in the jaw-closing direction inserts the two wedge-like spreader elements 21, 22 oppositely between the ears, and forces them apart to the desired extent, as seen in Figs. 3 and 4. The clearance formations 25, 26 permit the spreaders 21, 22 to have full or substantial contact with each other without marring the clip bolt, should the latter be in position at the time. It will also be seen that the spreaders 21, 22, being located relatively close to the pivot point 14, are subject to a substantial leverage, and hence exert a maximum spreading force consistent with a given length for the levers 10, 11. And by engaging directly between the ears in the manner illustrated and described, one jaw working outwardly from within the terminal hole and the other one inwardly at the extreme ends of the ears, the spreading action is imparted to the ears

at the most favorable position, remote from the point where the ears or the side walls of the terminal hole TH join the body of the clip. The maximum advantage is thus obtained, by effecting a two-point spreading operation upon the ears, both points being adjacent the outer extremities of the latter, as contrasted with the fulcrum point X, Fig. 3, with respect to which the spreading movement of the ears may be considered as taking place.

Referring now more particularly to Figs. 2 and 8, the ends of the handle portions of the levers 10, 11 remote from the lever heads, are desirably set in toward each other to form generally parallel end portions 30, 31. One of these portions, herein the part 30 of the lever 10, terminates in a transverse toe 32 having a flat nose 33 adapting it to contact and seat firmly against a squared terminal part 34 on the end part 31 of the other lever 11. The end portions 30, 31 and their contacting parts described are so arranged in combination with the lever pivot, the jaws and the spreaders 21, 22, that the nose 33 and squared portion 34 have firm abutting contact with each other as the spreaders 21, 22 reach their maximum closed position, and hence may serve as limiting means for said spreaders, preventing forcible or harmful engagement of their narrow edge portions.

The terminal parts 30, 31 are further so formed that in their said closed position, wherein the nose 33 abuts the squared part 34, the outer side faces 36, 37 of said parts together form a truncated conical or cone-like element whose sides taper in substantial conformity with the usual taper of a battery terminal, see Fig. 1, and with the corresponding taper of the terminal hole TH of a terminal clip. Thus the two outer end portions 30, 31 of the levers together provide an appropriately tapered cleaning and reaming element for the inner surface of the terminal hole of the clip, operable substantially in the manner illustrated in Fig. 8. The side edges of the outer faces 36, 37 are squared or sharp, to afford efficient reaming means. Due to the substantial and flat contact of the nose 33 of the part 30 upon the squared part 34 of the opposite part 31, which contact is extended transversely across the full width of the levers, in parallelism with the lever pivot, the two parts have a solid, firm seat one upon the other. They are thus prevented from shifting or being displaced one with respect to the other during a reaming operation such as that of Fig. 8.

Advantage is additionally taken of the squared seating part 34 of the terminal part 31 to provide efficient means for reaming the bolt holes BH, Fig. 7, of the ears E of a terminal clip C. The four or more edges of said squared part 34 are given a sharp angular conformation, while the part 34 and its adjacent supporting portion 37 are longitudinally tapered as a whole, additionally to adapt them as a bolt hole reamer. The length of the inner face of the squared reamer portion 34, in the direction of the lever axes, is preferably made such as to adapt such part for insertion between adjacent nubbins n of the usual battery terminal nut TN, such as illustrated in Fig. 9. Said part 34 and the toe 32 are accordingly adapted and arranged for cooperative use, in connection with the levers 10, 11, in a partly spread condition thereof substantially as shown in Fig. 9, as a spanner wrench for tightening or loosening such terminal nut. In said Fig. 9 the parts are illustrated as disposed

for turning the terminal nut clockwise, to tighten it. For turning the nut reversely the tool is simply turned over, reversing the positions of the two levers 10, 11 from that shown in Fig. 9. The substantially right angular toe 32 is additionally adapted for engagement beneath a connector link, strap or other convenient part by which a battery may be lifted, whereby the tool is rendered effective as a battery lifter or carrier, said toe being retained in such carrying engagement by closing in the other lever toward it to the extent permitted. Said toe, while of sufficient area at its end face to seat firmly against the other lever, for the purposes previously described, is devised, preferably with somewhat of a wedge shape, readily to enter beneath a battery link or strap in said use of the tool as a battery carrier.

My invention is not limited to the particular embodiment thereof illustrated and described herein, its scope being set forth in the following claims:

I claim:

1. In a storage battery tool having a pair of pivoted levers of which corresponding ends are formed as handle members and crossed portions of which levers each provide a transverse positioning seat and pivot mounting for the other lever, the ends of the levers opposite the handle members having laterally projecting jaws, at the same side of said pivot mounting, one jaw being shorter than the other, the provision in such tool

of a wedge-like clip-spreader element on each jaw between the pivot mounting and the outer end portion of the jaw, said spreader elements being of substantial extent lengthwise of their jaws and having their bases approximately the full width of the jaws and being located to confront each other with their narrower leading edge portions in opposing alignment and in non-interfering relation to the other portions of the jaws, each of said spreader elements having at its leading edge portion a transverse arcuate recess, said recesses lying opposite each other in the closing position of the jaws to provide together a bolt-clearance passage between the spreader elements whereby the latter may be brought substantially together while straddling a bolt or the like, and the longer jaw of the pair being so constructed with relation to the spreader elements as to adapt it for insertion through the terminal hole of a battery terminal clip in position to present its spreader element in opposed cooperative relation to that of the other and shorter jaw then outside and centrally between the clip parts which are to be spread.

2. A storage battery tool in accordance with claim 1 wherein the free ends of the handle members are provided with opposed intumed abutment portions, at least one of said portions being squared and being elongated longitudinally of its handle member.

FREDERICK F. PAZZANO.