

Aug. 8, 1939.

J. R. HAAS

2,168,405

TOOL

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Fig. 1.

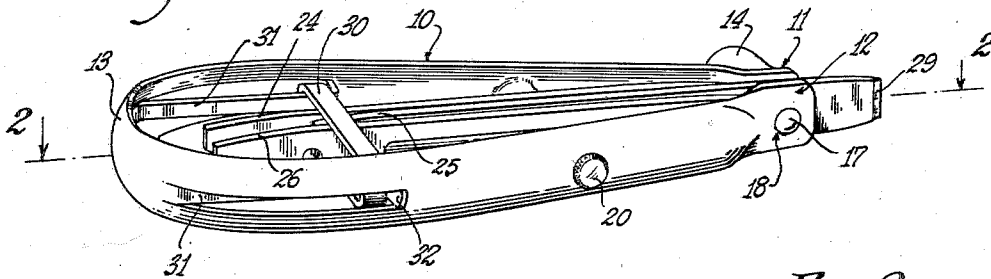


Fig. 2.

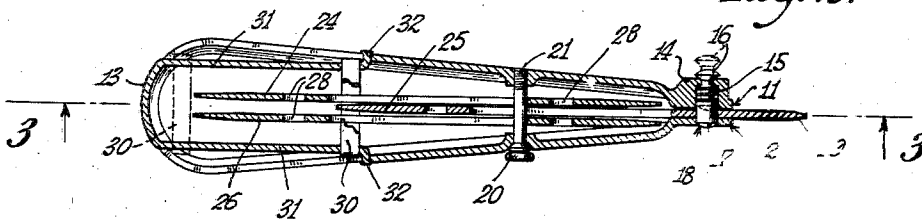


Fig. 3.

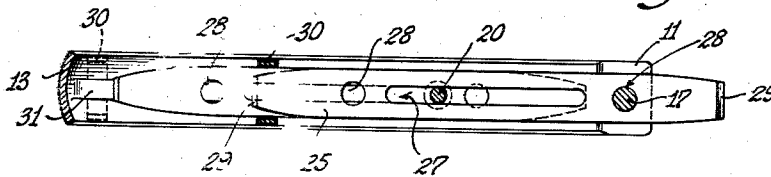


Fig. 5.

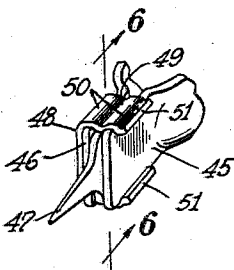


Fig. 4.

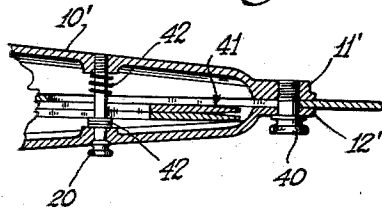


Fig. 6.

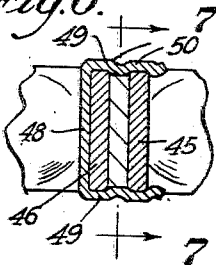
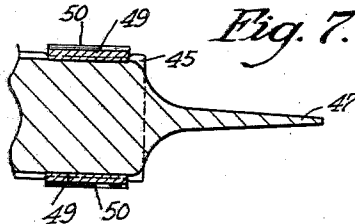


Fig. 7.



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UNITED STATES PATENT OFFICE

2,168,405

TOOL

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Application March 26, 1938, Serial No. 198,169

8 Claims. (Cl. 145—50)

This invention relates to tools and has as one of its principal objects the provision of a tool with interchangeable tool elements.

Another object is the provision of a tool of simple, compact and rugged construction, and having tool elements which may be withdrawn one at a time from a handle member and secured in operative position.

Another object is the provision of a tool in the nature of a screw driver with interchangeable driving elements arranged in the handle portion, the elements being extended from the handle individually and secured in operative position thereon.

Another object is the provision of a tool having a substantially open handle structure with a plurality of tool elements slidably arranged in view in the handle structure and accessible to be selectively withdrawn therefrom and secured in operative position.

A further object is the provision of a tool in the nature of a screw driver having a loop-shaped handle with a plurality of elongated screw driving members mounted for movement longitudinally into and out of the loop portion of the handle, and means near the end of the handle engageable with a selected driving element to hold the same immovable relative to the handle.

Viewed from another aspect, it is an object of the invention to provide a screw driver having a loop-shaped handle with a plurality of elongated screw driving members each provided with an elongated slot and arranged in side by side relation within the loop portion of the handle upon pin means extended laterally of the handle and constituting also a means for holding the free end portions of the handle loop in closely confronting relation, there being detent means at the free end portions of the handle engageable in an opening in a selected one of said screw driving members which has been substantially withdrawn in a longitudinal direction from the loop portion of the handle whereby the selected driving member is disposed in operative position immovable relative to the handle, there being means provided in the handle for preventing the remaining driving members from pivotal movement on the pin means.

Other objects and novel aspects of the invention reside in certain details of construction and operation of the parts hereinafter to be described in view of the annexed drawing, in which:

Fig. 1 is a perspective of a preferred form of the tool;

Fig. 2 is a horizontal section along line 2—2 of Fig. 1;

Fig. 3 is a vertical section along line 3—3 of Fig. 2;

Fig. 4 is an enlarged fragmentary detail of a modification of the securing means;

Fig. 5 is another modification in perspective of the clip type securing means;

Fig. 6 is an enlarged vertical section along line 6—6 of Fig. 5; while

Fig. 7 is a section along line 7—7 of Fig. 6.

In a preferred form of construction shown in Fig. 1, the tool includes a loop-shaped handle or holder 10 having opposite free end portions 11 and 12 converged together by virtue of the bend in the bight portion 13, the handle portion preferably being in the nature of a metal stamping formed so as to have a certain amount of resiliency in the region of the bight portion 13 which tends to spread or diverge the end portions 11 and 12 to provide a space therebetween through which a tool element may pass in an outward direction from the handle or holder.

Formed in the free end portion 11 of the handle is a protuberance 14 providing a recess 15 in which is received the shank portion and spring means of a headed detent 16 having a nose 17 normally urged by the spring means outwardly of the protuberance 14 and into an opening 18 formed in the opposite free end portion 12.

Means for converging the free end portions 11 and 12 includes (Figs. 1 and 2 particularly) a knurled pin 20 extended through a hole in one arm or side of the holder and having its opposite end portion 21 threadably engaging the opposite arm of the holder, the pin means being located conveniently between the longitudinal extremities of the handle and being turned up or screwed in to draw the free end portions 11 and 12 of the holder together, in which condition the nose 17 of the detent 16 will be disposed in the hole 18.

A plurality of interchangeable tool elements are mounted in the handle for sliding movement longitudinally thereof. In the present embodiment, the tool elements are screw drivers in the form of elongated metal bars 24, 25 and 26 (Fig. 2), each having a longitudinally extensive slot 27 between its end portions with flanking openings or holes 28 at opposite ends of the slot 27 (Fig. 3), and the endmost extremities of each of the tool elements being chamfered or sharpened to provide screw engaging tips 29.

The tool elements 24, 25 and 26 are mounted for longitudinal movement in the handle or

holder 10 by having the pin 20 extended through the aligned slots 27 in each tool element, the several tool elements being of a length adequate to permit their rotative movement about the pin means 20 and relative to the open portion of the handle, so that either of the screw engaging end portions 29 of a given tool element may be turned toward the end of the handle for movement into operative position.

Means preventing pivotal movement of the tool elements in the handle includes a stop arranged for movement into and out of position relative to the open sides of the handle to block the several tool elements in any pivotal movement about the pin means 20.

In a preferred form of construction, the blocking means includes an oblong metal loop 30 arranged to slide longitudinally within the handle or holder on a pair of collaterally extending arms 31 punched inwardly from the body of the handle adjacent the bight portion 13. In the present construction, the innermost ends 32 of the arms 31 are severed from the body of the handle and turned outwardly so as to bear closely against the margins of the slot left by stamping the arms out. If desired, however, the end portions 32 may be left integral and the excessive length of the arms 31 (due to the bends adjacent the bight) taken up by bending the juncture of the arms 31 with the bight portion 13 before the arms are extending in parallel or collateral relation.

The loop 30 may be preformed and passed over the unattached end portions 32 of the arms 31 so as to slide back and forth on the spaced arms 31 longitudinally of the handle with the opening of the loop surrounding the end portions of the tool elements 24, 25, etc., between the pin means 20 and the end or bight portion 13 of the holder. Where the arms 31 are integral with the handle at both ends, the loop 30 may be folded around the arms instead of being slipped over the free end portions thereof.

When the retaining loop 30 is slipped over the ends of the tool elements, as seen in Figs. 1 and 2, it will be apparent that the latter are restrained against pivotal movement about the pin means 20. By sliding the loop 30 into the dotted line positions shown in Figs. 2 and 3 where it clears the innermost ends of the tool elements, the latter may pivot about the pin 20 so as to turn the opposite end portions selectively toward the detent means 16.

In Fig. 2, there are shown only three tool elements, the middle one 25 of which has been moved longitudinally of the handle on the pin means 20 to project the tool end 29 thereof outwardly of the handle between the free end portions 11 and 12 with the detent nose 17 projected through the hole 28 therein whereby the tool element is held immovable relative to the handle and in operative position, the pin means 20 being drawn up so as to converge or clamp the end portions 11-12 to assure adequate seating of the nose portion 17 of the detent in the detent slot.

Attention is called to the fact that it is not essential to provide threaded means, such as the pin means 20, for drawing the free end portions 11 and 12 together, since the pin means may be relatively immovable so as to hold the end portions 11 and 12 in a predetermined spaced relation adequate to permit passage therebetween of any one of the tool elements, the detent means 16-17 being, in such case, dimensioned to permit withdrawal of the nose portion 17 completely into the recess 15 and out of the path of a tool element.

Such an arrangement thus makes it unnecessary to unscrew the pin 20 each time a tool element is to be changed, and while entirely satisfactory results may be had from the arrangement wherein the pin means 20 is not adjustable to effect spreading of the arms of the handle as aforesaid, the arrangement shown wherein the free end portions 11 and 12 may be diverged and converged by manipulation of the pin 20 is preferred because of the added rigidity afforded in the region of the free end portions 11 and 12, and the increased structural resistance of the handle or holder in this region against torsional stresses and strains.

In order to interchange the tool elements in the device shown in Figs. 1 and 2, it is merely necessary to unscrew the pin 20 whereupon the end portions 11 and 12 of the handle will spread apart due to the bias on the arms of the handle resulting from the bend 13 therein, the detent 16 thereupon being raised against the tension of its spring means in the recess 15 to withdraw the nose 17 from the hole 28 in the middle tool element 25 theretofore selected, the tool element then being free to shift in a longitudinal direction or turn about the pin 20 as a center so as to dispose the opposite end portion thereof between the ends 11 and 12, it being understood in the latter event that the loop 30 has been slid to the left to permit such pivotal movement.

In the case where the middle tool element is not turned, but is simply pushed back into the handle, one of the other tool elements 24 or 26 may be moved longitudinally into operative position to replace the previously selected tool, and as soon as the hole 28 is aligned with the detent 17, the pin means 20 may be drawn up and the newly selected tool is ready for use.

In Fig. 4 there is shown a modified form of tool-positioning means which may be substituted for the detent 16. In the modified arrangement, the free end portions 11' and 12' of the handle 10' are provided with a threaded pin 40 extending from one of the ends 12' into threaded engagement with the opposite end 11', with the pin 40 projecting through the flanking holes 28 in a selected tool element. In the arrangement of Fig. 4, the positioning holes 28 at the ends of the elongated slot 27 are omitted, and the elongated slot 41, corresponding to the slot 27 in the tool elements of Figs. 1 to 3, is made somewhat longer at both ends so that the pin 40 projects through the slot 41 and thus holds the tool element in operative position with substantially the same rigidity as the device of Figs. 1 to 3. Attention is also called to the fact that in the form of the invention illustrated in Fig. 4, there is additionally provided spring means 42 arranged on the pin means 20 on opposite sides of the several tool elements and effective not only to spread the free end portions of the holder quickly but also to restrain the several tool elements against lateral movement.

Another form of tool-positioning means is illustrated in Figs. 5 through 7. In this arrangement, the free end portions 45 and 46 of the handle are substantially flat projections extending collaterally when in confronting relation with a tool element 47 projecting therebetween. Means for holding the projecting end portions 45 and 46 clamped against the tool element 47 includes a substantially U-shaped clip 48 having opposite arms 49 provided with crimps 50 interlocking with the opposite edge portions of the members 45, 46 and 47, the free end portions 51 of the clip being bent to provide lips 51 and the clip being constructed of a material of adequate resiliency

to permit pressing the clip into position over the edge portions of the members 45, 46 and 47, with the lip portions 51 fitting around the edge portions of the projection 45 adequately to clamp the several members 45, 46 and 47 firmly together as seen in Figs. 5 and 6.

While the invention has been described in particular detail for purposes of illustration, it will be evident that the objects and advantages of the invention may be achieved by various equivalent modifications and rearrangements of the particular form of construction described, and the appended claims are, therefore, intended to include all such changes, modifications, rearrangements and equivalent forms of construction and operation.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A tool including a handle of elongated form and having opposite open sides, a plurality of elongated tool elements each provided with a longitudinally extensive slot and mounted on pin means extending through the slots thereof between opposite sides of the handle intermediate the ends of the latter, said handle having a passage at one end and through which said tool elements may be projected from said handle into work-engaging position, said tool elements being movable radially of said pin means for projection through said passage into work-engaging position, pin means arranged near said passage for engagement with a tool element projected as aforesaid to prevent movement of the same relative to the handle, and means in the form of a loop slidable in the plane of the handle around said tool elements to block pivotal movement of the same relative to said first-mentioned pin means.

2. A tool including a loop-shaped holder having free end portions arranged in oppositely confronting position, a plurality of elongated tool elements each provided with a longitudinally extensive slot and all mounted in side by side relation by pin means extending through the slot portions thereof between opposite arms of the holder intermediate its ends, said tool elements being selectively movable laterally of said pin means to project an end portion thereof between said free end portions of the holder and beyond the latter into work-engaging position, detent means near the free end portions of the holder and engageable with a tool element projected as aforesaid to prevent movement of the same relative to the holder, and means including a loop arranged for sliding movement into and out of position to surround the end portions of said tool elements opposite the free end portions of the holder to maintain said tool elements within the plane of the holder.

3. A tool including a loop-shaped handle having opposite free end portions spaced to provide a tool passage, a plurality of elongated tool elements formed to fit within the plane of said handle, each of said tool elements having a longitudinally extensive slot, said tool elements being arranged in side by side relation on pin means extended through said slots between opposite sides of the handle intermediate its ends whereby said tool elements may be severally pivoted into and out of the plane of said handle, said tool elements being movable laterally of said pin means to project the end portions thereof through said passage into work-engaging position, releasable detent means arranged in one of said free end

portions and normally projecting across said passage laterally through a tool element projected as aforesaid and into engagement with the opposite free end portion of the handle, whereby said tool element is prevented from moving relative to the handle, and means in said handle for preventing pivotal movement of the tool elements which are not disposed in work-engaging position.

4. A tool including a loop-shaped handle having opposite free end portions spaced to provide a tool passage, a plurality of elongated tool elements formed to fit within the plane of said handle, each of said tool elements having a longitudinally extensive slot, said tool elements being arranged in side by side relation on pin means extended through said slots between opposite sides of the handle intermediate its ends whereby said tool elements may be severally pivoted into and out of the plane of said handle, said tool elements being movable laterally of said pin means to project the end portions thereof through said passage into work-engaging position, releasable detent means arranged in one of said free end portions and normally projecting across said passage laterally through a tool element projected as aforesaid and into engagement with the opposite free end portion of the handle, whereby said tool element is prevented from moving relative to the handle, and means arranged within the handle for sliding movement longitudinally of the tool elements therein into and out of position surrounding said tool elements at one side of said pin means, whereby the tool elements which are not projected into work-engaging position are prevented from pivoting out of the plane of the handle.

5. A tool including a substantially U-shaped handle having oppositely facing free end portions and provided with a bias normally tending to spread said free end portions apart, a plurality of tool elements each provided with an elongated slot and dimensioned to fit within the plane of the handle, said tool elements being mounted on pin means extended through the slot portions thereof between opposite sides of the handle intermediate its ends, said pin means being adjustable to draw said sides of the handle together and converge said free end portions, said tool elements being pivotable out of the plane of the handle whereby to position opposite portions thereof between said free end portions of the handle, said tool elements being movable laterally of said pin means to project an end portion thereof beyond the handle into work-engaging position, pin means engaged in said free end portions when the same are converged as aforesaid and extending laterally through a tool element projected into work-engaging position as aforesaid whereby said element is prevented from moving relative to the handle, and means mounted in said handle for movement into and out of position to prevent pivotal movement of the tool elements relative to said first-mentioned pin means.

6. A tool including a substantially U-shaped handle having oppositely positioned free end portions, said handle being provided with a bias normally tending to spread said free end portions apart, a plurality of tool elements each having an elongated slot and arranged on pin means extending threadably between opposite arms of the handle with said tool elements normally disposed within the plane of the handle, said pin means being threadable to draw the arms of the handle together to converge said free end portions, said tool elements being pivotable about said pin

means to position opposite end portions thereof selectively between said free end portions when the same are spread apart, detent means arranged in one of said free end portions and normally positioned in a detent-receiving formation in the opposite free end portion when said end portions are converged, each of said tool elements having an opening near the opposite end portions thereof through which said detent means may project when the tool element is in work-engaging position whereby said tool element will be prevented from moving relative to the handle, said handle having a pair of spaced arms extending collaterally within the plane of the handle toward said free end portions, a retaining loop slidably mounted on said arms for movement into and out of position to surround said tool elements and prevent pivotal movement of the same out of the plane of the handle.

7. A tool including a substantially U-shaped handle of resilient material having opposite free end portions and biased so as to spread said free end portions apart, a plurality of elongated tool elements each provided with a longitudinal slot and mounted in side by side relation within the plane of said handle by pin means extending through the slot portions thereof between opposite sides of the handle, said pin means being adjustable to draw said sides of the handle together to converge said free end portions, said tool elements being pivotable about said pin means and being movable laterally thereof whereby opposite ends of the several tool elements may be projected selectively between said free end portions into work-engaging position, and tool-positioning means extending from one of said free end portions into threaded engagement with the opposite free end portion laterally through a cut-out portion in a tool element selectively posi-

tioned as aforesaid to prevent movement of said tool element relative to the handle, and means movably supported by said handle for movement into and out of position therein to block pivotal movement of said tool elements out of the plane of the handle.

8. A tool including a substantially U-shaped handle of resilient material having opposite free end portions and biased so as to spread said free end portions apart, a plurality of elongated tool elements each provided with a longitudinal slot and mounted in side by side relation within the plane of said handle by pin means extending through the slot portions thereof between opposite sides of the handle, said pin means being adjustable to draw said sides of the handle together to converge said free end portions, said tool elements being pivotable about said pin means and being movable laterally thereof whereby opposite ends of the several tool elements may be projected selectively between said free end portions into work-engaging position, and tool-positioning means extending from one of said free end portions into threaded engagement with the opposite free end portion laterally through a cut-out portion in a tool element selectively positioned as aforesaid to prevent movement of said tool element relative to the handle, opposite arm portions of said handle adjacent the bight portion thereof being struck out to provide a pair of substantially parallel arms extending parallel with the plane of the handle, and a loop member slidably mounted on said arms for movement to dispose the loop portion thereof around the inner ends of said tool elements to prevent pivotal movement of the same out of the plane of the handle.

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