Oct. 8, 1968 C. B. CHRISTENSEN 3,404,554

POWERED SHEET-AND PANEL-EDGE OFFSETTING TOOLS

Filed Oct. 22, 1965

Fig. 1.

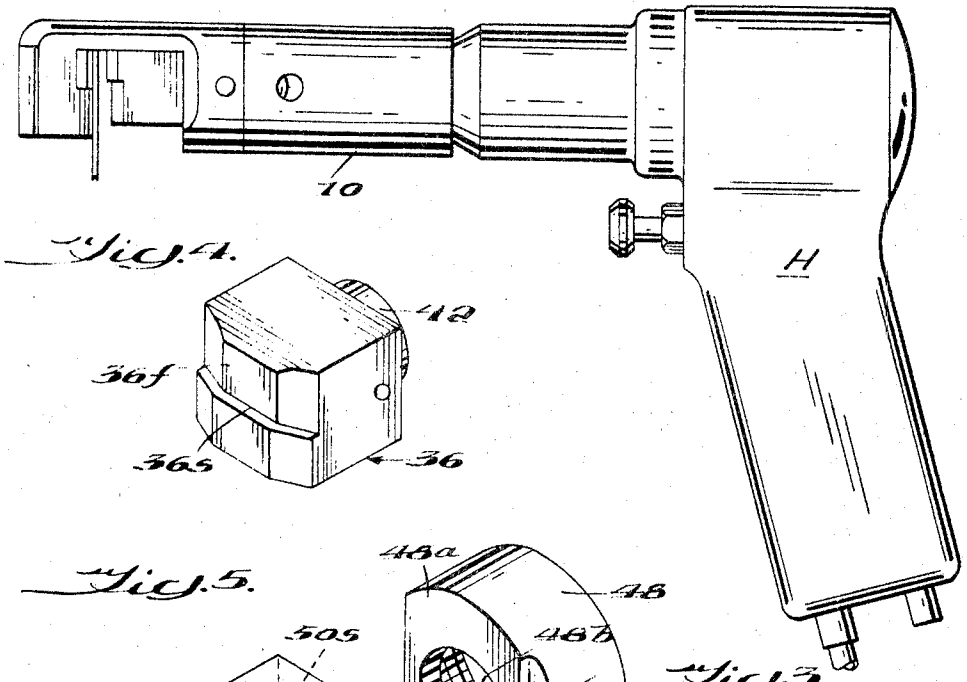


Fig. 4.

Fig. 5.

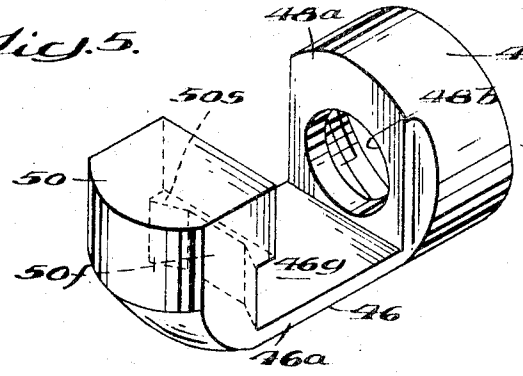


Fig. 7.

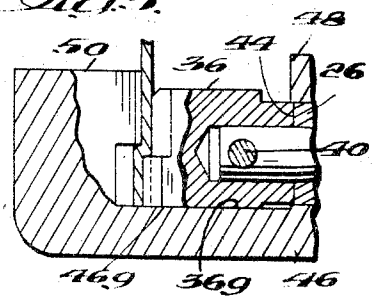
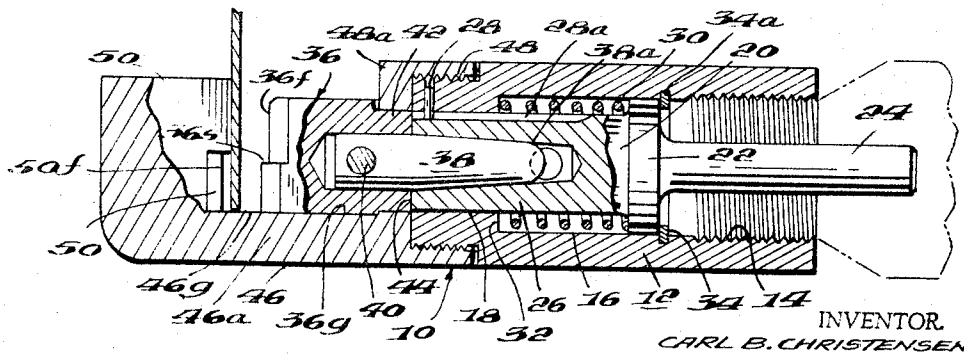


Fig. 2.



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POWERED SHEET- AND PANEL-EDGE OFFSETTING TOOLS

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6 Claims. (Cl. 72—386)

ABSTRACT OF THE DISCLOSURE

Improvements in powered impactor-type edge offsetting or edge crimping tool of the character shown and claimed in the Clark Chandler Patent No. 3,215,008, dated Nov. 2, 1965, which provide (1) a novel connection of the reciprocating hammer to the power-reciprocated plunger of the impactor-type powering means, based on the use of a connecting shank member which is separate from but pinned to the plunger, (2) an arrangement by which the plunger imparts force directly to the hammer rather than via a shank member, and (3) a disposition of the hammer and anvil faces by which the forces imparted to the anvil via the hammer are concentrated in only the small-width central width portion of said faces.

This invention relates to improvements in powered sheet- and panel-edge offsetting tools, and more particularly to an improved powered impactor-type edge offsetting or edge-crimping tool of the character disclosed and claimed in Chandler application Ser. No. 302,746, filed Aug. 16, 1963, now Patent No. 3,215,008, dated Nov. 2, 1965.

Among the objects of the present invention may be noted the provision of a powered edge-offsetting or crimping tool characterized by a design rendering it suitable for heavier duty service than that to which a tool according to said Chandler application is suited; the provision of a powered impactor-type sheet- or panel-edge offsetting crimping tool which is so constructed and arranged as to reduce tool breakage to a minimum; and more particularly, the provision of an impactor or percussive type of sheet or panel edge offsetting tool wherein the plunger which is impacted by the percussive or impactor element of the pneumatic hammer which powers the tool imparts its driving force directly to the head of the tool hammer rather than to a tapered shank which conventionally connects the hammer proper to the plunger.

The above and other objects and features of advantage of a powered sheet and panel edge offsetting or crimping tool according to the invention will appear from or be more fully set forth in the following detailed description thereof, in which reference is had to the accompanying illustrative drawing of a tool of my novel design, wherein—

FIG. 1 is a side elevation of said tool shown as coupled to a pneumatic hammer which powers it, and further illustrates an edge portion of a sheet or panel disposed between tool hammer and anvil in position to be worked on thereby;

FIG. 2 is a part-section taken longitudinally through the tool, which again shows an edge portion of the workpiece, i.e. sheet or panel, in position to be worked on.

FIG. 3 is a broken-away part-sectional view of the anvil end of the tool showing the hammer in its full forward or working position in which it has performed its edge-offsetting or crimping function; and

FIGS. 4 and 5 are perspective views of the hammer and anvil elements, respectively, of the tool shown in the preceding views.

Referring to the drawing in greater detail, it will be seen from FIG. 1 that a powered metal sheet or panel edge-shaping or crimping tool of the invention, like that of the aforesaid Chandler application Ser. No. 302,746, is adapted to be connected to and driven by a power (usually pneumatic) hammer H of the pistol or gun type and is designed to form an offset running along the edge of a metal sheet or panel inserted between its hammer and anvil elements to be described, as the tool is moved by hand progressively along said edge.

The tool proper of the invention which is generally designated **10**, in common with the tool of the aforesaid Chandler application Ser. No. 302,746, basically comprises a tubular barrel **12** having a rear-end bore portion **14** which is internally threaded whereby said barrel may be threaded onto the tool-receiving end of the barrel of the power hammer H, an intermediate-length smooth bore portion **16** and a forward-end bore portion **18** which is also smooth-surfaced but has lesser diameter than said intermediate bore portion; a reciprocatory plunger generally designated **20** including a large-diameter piston portion **22** having slide fit with and operating in the intermediate smoothbore portion of the barrel, a small-diameter rearwardly extending axial stem **24** which projects into the barrel of the power hammer H the requisite distance such that its end face will be impacted by the percussive or impactor element (not shown) of said power hammer, and a working end **26** having sliding fit in the reduced-diameter forward-end bore portion **18** of the tool barrel **12**; a hammer **36** connected to the working end **26** of the plunger so as to be driven thereby, and a so-called dolly **46** having a full-circular collared end **48** provided with internal threads whereby it is adapted to be screw-threaded onto the forward threaded end of the tool barrel **12** and which incorporates at its forward or working end an anvil member generally designated **50** with which said hammer **36** coacts in performing its edge-offsetting function. Reverting to said collared end, such terminates forwardly in a radially inturned flange **48***a* which is adapted to bear tight against the forward end of the barrel **10** and is provided with a central bore **48***b* which extends in continuation of and has diameter substantially equal to that of the barrel bore portion **18**, being thus adapted to receive and guide the plunger **20** during the forward-most portion of its stroke.

As best seen in FIG. 2, the plunger **20** is held against rotation with respect to the tool barrel **10** as by means of a barrel-mounted pin **28** operating in an axial slot **28***a* provided therefor in the peripheral surface of the forward or working end **26** of said plunger. FIG. 2 also shows that the tool barrel **10** mounts a plunger retracting spring **30** which encircles the working end **26** of the plunger and is reactive between the piston portion **22** thereof and a rearwardly facing front-end shoulder **32** provided in the bore of the tool barrel. Illustratively, the plunger **20** is held against rearward separating movement with respect

to the barrel by an internal spring retaining ring **34**, said ring being seated in a groove **34***a* therefor which opens into the bore of said barrel a short distance forwardly of the threaded bore portion **14**, the ring thus serving as an artificial shoulder which limits the rearward motion of the piston portion and thereby of the plunger **20** as a whole.

The present tool departs from that of the tool of the aforesaid Chandler application Ser. No. 302,746 in two principal respects; First, it employs a novel connection of hammer **36** to the power-reciprocated plunger **20** which insures a direct application of force from plunger to hammer; and, secondly, it provides a disposition of hammer and anvil such that their opposed striking faces are normal, i.e. at a right angle, to the path of motion of the hammer and hence to the line or direction of force applied to the hammer by the plunger.

More particularly, the hammer **36**, rather than being integral with a tapered shank receivable in a complementally shaped bore in the working end of the plunger, according to the earlier design, is formed separate from its tapered shank element which is herein designated **38** and which has friction fit in a tapered bore **38***a* provided therefor in the plunger **20** and it is connected to said shank element by a pin **40**, preferably a so-called roll pin. More importantly, and as best seen in FIG. 2, the end of the hammer which receives the tapered shank element **38** is formed with a circular extension **42** having diameter such that it has slide fit in the bore **48***b* of the collared end portion **48** of the dolly **46**, which in turn has diameter substantially equal to that of the forward-end bore portion **18** of the tool barrel **10** in which the plunger portion **26** has slide fit. Said circular extension **42** further has axial length slightly greater than the axial thickness of the radial-inward flange **48***a* of said collar portion **48** of the dolly, and the point of connection of the hammer **36** to its separate tapered shank element **38** is such that said circular extension **42** is held tight against the forward end of the plunger **20**.

By the aforesaid arrangement, the force which the reciprocating plunger **20** imparts to the hammer **36** on each of its working strokes is applied directly against the hammer proper via its circular extension **42**, rather than being applied through an integral tapered shank as in the prior design, and the pin **40** which secures the hammer to its separate tapered shank according to the present design serves only to pull the hammer back to its retracted position under tool recoil action, plus that of the plunger retracting spring **30**.

As previously forecast, the oppositely disposed working or striking faces of the hammer **36** and anvil portion **50** of the dolly **46** are disposed normal to the path of reciprocatory motion of the plunger **20** and hammer **36**. Moreover, said working or striking faces **36***f* and **50***f* are complementally stepped as at **36***s* and **50***s*, thus to form a running offset in the edge portion of a metal sheet or panel interposed between said striking faces as the tool, after being placed in operation, is progressively moved by hand along said edge portion, all as explained in the aforesaid Chandler application Ser. No. 302,746.

Preferably, and as will appear by reference to FIGS. 4 and 5 in particular, it is a further feature of the invention that, rather than the aforesaid striking faces **36***f*, **50***f* extending across the full width of the opposed hammer and anvil surfaces as heretofore, said working or striking faces **36***f*, **50***f* extend across only the central width portion of said full-width surfaces, with the outer end portions of said surfaces being cut away by divergent angles so as to provide clearance spaces to both sides of the relatively small-width striking surfaces **36***f* and **50***f*. Such an arrangement provides that the force imparted by the plunger to the hammer and by the hammer to the sheet or panel edge is relatively concentrated throughout a small-width area rather than being distributed over the entire area of the opposed surfaces of hammer and anvil.

Of course, the width and configuration of the hammer and anvil striking surfaces may be varied widely from that shown, depending on the type of offsetting desired. Accordingly, while one form of complemental striking face has been shown for purpose of disclosure, it is to be understood that such is exemplary only of many other forms with which the hammer and anvil may be provided.

FIGS. 2–5 taken together illustrate yet a further practical feature of the tool according to the present invention. More particularly, the body portion of the hammer **36** is configured so that at least its relatively under surface designated **36***g* is wide and flat. The inside surface **46***g* of the dolly arm **46***a* (which latter connects the anvil and attaching collar portions of said dolly **46**) is also formed wide and flat. By design, the dimensioning of the hammer body is such that its wide flat under surface **36***g* bears on the inside wide flat surface **46***g* of the dolly arm. Accordingly, the hammer is effectively guided during the course of its reciprocatory movement by bearing engagement of its surface **36***g* on the dolly arm surface **46***g*.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A metal sheet or panel edge-offsetting tool adapted for attachment to and operation by a percussive-type power hammer comprising, in combination, a barrel having means at its relatively rearward end for attaching same to the power hammer, a plunger reciprocable in the bore of the barrel and being driven on its working strokes by the percussive element of said power hammer, means for effecting retraction of the plunger following each working stroke thereof, cooperatively and axially related hammer and anvil members and means connecting said members to the forward ends of said plunger and barrel, respectively, the hammer-to-plunger connecting means comprising a shank member separate from said plunger and having one end tapered and being received with friction fit in a complementally tapered bore in the plunger and its other end received in a blind-end bore in the hammer and being connected to said hammer by a transverse connecting pin positioned to hold the rear-end face of the hammer tight against the forward-end face of said plunger whereby the plunger in partaking of its working strokes transmits force directly to said hammer, said hammer and anvil members having oppositely disposed, complementally offset working faces adapted to impart an offset to the edge portion of a metal sheet or panel interposed between said faces upon the tool being placed in operation and moved progressively along said edge portion.

2. A tool according to claim **1**, wherein said complementally offset hammer and anvil working faces are disposed at a right angle in the path of reciprocation of said plunger and hammer.

3. A tool according to claim **1**, wherein the anvil-to-barrel connecting means comprises an arm mounting an internally threaded collar at its forward end which is screw-threaded onto the forward end of the barrel, said arm being disposed laterally of the path of reciprocatory motion of the hammer, said hammer having sliding engagement on the relatively inner face of said arm whereby said arm guides the hammer throughout its reciprocatory movement.

4. A tool according to claim **1**, wherein the anvil-to-hammer connecting means comprises an arm extending rearwardly from said anvil to an internally threaded collar which is screw-threaded onto the the threaded forward end of the barrel, and said hammer has a rearward extension which, in the retracted position of the plunger and hammer, extends axially through said collar to said plunger.

5. A tool according to claim 1, wherein the rearward-end portion of said hammer has a collar formation and said formation has a sliding fit in the forward end of the bore of said barrel.

6. A tool according to claim 1, wherein only the central width-portions of the opposite surfaces of said hammer and anvil members comprise said working faces and the remaining width portions of said surfaces disposed to each of both sides of said central width-portions diverge in opposite directions from one another.

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