Feb. 28, 1939. F. J. HAUSCHILD 2,148,619

HAMMER ADJUSTING MEANS FOR PNEUMATIC SHEET METAL FLATTENERS

Filed July 21, 1936

FIG. 1

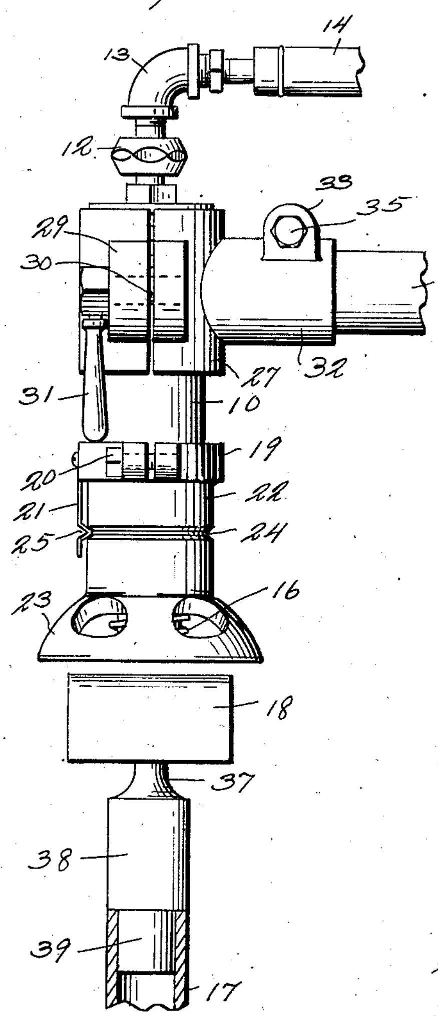


FIG. 2

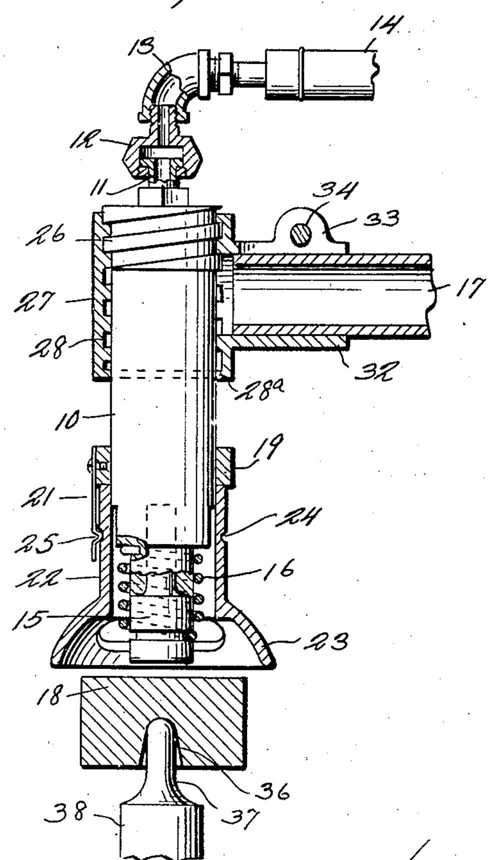


FIG. 4

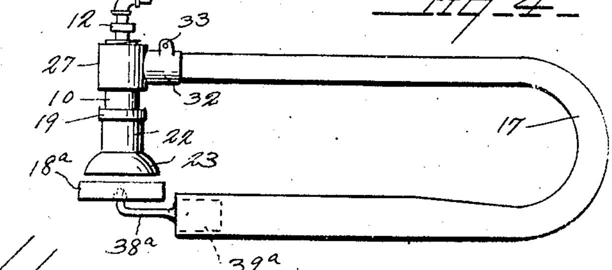
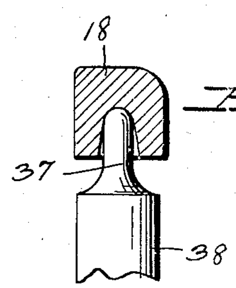


FIG. 3



Inventor

F. J. Hauschild

By Frederic B. Wright

Attorney

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HAMMER ADJUSTING MEANS FOR PNEUMATIC SHEET METAL FLATTENERS

Frederick J. Hauschild, Oneonta, N. Y.

Application July 21, 1936, Serial No. 91,743

6 Claims. (Cl. 153—32)

This invention relates to certain improvements in the sheet metal flattening mechanism which is described and illustrated in my application for patent, Serial No. 759,984, filed December 31, 1934, on Pneumatic metal straighteners.

In the above named application I have illustrated a C-shaped yoke carrying at the end of one arm a dolly and at the end of the other arm a pneumatic hammer supporting at its lower end an impact element struck by the hammer and projected against the work being flattened, the hammer casing carrying at its lower end a bell adapted to contact with the work and acting to support the weight of the hammer casing on the work, instead of requiring the operator to exert his own strength to support the device and preventing or impeding any tendency of the hammer to tip laterally, thus again eliminating the strain on the operator due to an attempt to hold the hammer at all times at right angles to the work. The advantages of this structure are fully set forth in the specification of the said application and need not be more specifically adverted to herein.

In this prior embodiment of my invention, it was the dolly which was adjustable by means of a dolly supporting screw threaded shank and by rotating this shank, the dolly was adjustable toward or from the work. This is objectionable for two reasons; the shock of the blow on the sheet metal being flattened was received by the relatively light screw threads of the dolly shank which in course of time would tend to batter these threads somewhat and, in case the machine was operating on a relatively deep transversely curved fender or mudguard, the dolly could not be seen by the operator and it was difficult to adjust the dolly or keep it in proper adjustment. The operator, under these circumstances, had to reach down beneath the fender and operate the screw of the dolly without actually seeing the dolly.

One object of the present invention, therefore, is to provide means whereby the hammer of this mechanism with the bell attached thereto may be quickly adjusted toward or from the work and the dolly and locked in its adjusted position, this construction permitting the use of relatively heavy threads on the hammer casing coacting with a relatively heavy screw threaded head mounted upon the corresponding arm on the yoke and permitting the operator at all times to see the adjustment of the hammer and note that the work is held directly against the under face of the bell.

A further object of my invention is to provide means, by the adjustment of the hammer, whereby a greater or less tension may be placed on the resilient yoke which supports the hammer at one end and the dolly at the other, and in this connection to provide for the adjustment of the hammer in accordance with the amount of air pressure used so that the hammer may be screwed down until the yoke is under such tension as will hold the hammer to the work and under such tension that there shall be no "kick-back" or chatter.

A further object is to provide an internally threaded clamp which may be tightened on the screw-threaded portion of the hammer to prevent the hammer working upward under the rapid vibrations to which it is subjected. This is particularly necessary as any slight fraction of a turn will put the hammer out of adjustment.

Still another object is to provide means which will permit the hammer to be adjusted while the machine is in operation.

A further object is to mount the dolly, not directly on the end of the yoke arm, as is shown in my prior application, but provide an extension plug removably disposed in the dolly supporting yoke arm and upon which the dolly itself is removably mounted so that with the plug and dolly removed, there will be a relatively wide space between the extremity of the arm which would ordinarily support the dolly and the bell so that the dolly supporting arm may be passed over door posts and the like structures where the metal of the door is to be flattened out and then the extension plug and the dolly be inserted or disposed in place on the dolly supporting arm of the yoke.

A further object is to provide means whereby a relatively elongated yoke may be used with its arms spaced relatively close together for use in taking out the dents in fender well skirts where the ordinary yoke is impossible to use.

A further object is to provide means whereby the head with which the hammer casing has screw threaded engagement may be readily removed from or applied to the hammer supporting arm of the yoke.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawing wherein:

Figure 1 is a side elevation of a hammer casing and dolly constructed in accordance with my invention and mounted upon the two arms of a yoke, the complete yoke, however, not being illustrated in this figure.

Figure 2 is a vertical sectional view of the structure shown in Figure 1.

Figure 3 is a fragmentary transverse section through one form of dolly to show its connection with the supporting plug.

Figure 4 is a side elevation of a metal flattener constructed in accordance with my invention and the yoke which is particularly designed to be used for operating on fender wells.

Referring particularly now to Figures 1 and 2, 10 designates the outer casing of a pneumatic hammer having therein a hammer (not shown) which is reciprocated by pneumatic pressure. The upper end of this casing is shown as having a nipple 11 having swivelled engagement with a coupling 12, the coupling having screw threaded engagement with an elbow 13 in turn operatively connected to the flexible air hose 14 which in turn is connected to a source of air under pressure, the passage of the air to the hammer being controlled by a foot valve, as shown in my prior application.

At the lower end of the hammer casing 10, there is disposed an impact element 15, as shown in my prior application, which is retracted by means of a spring 16. The impact element 15, as shown in dotted lines in Fig. 2, has an upwardly extending stem which extends into the hammer casing 10, and is struck by the hammer therein.

The spring 16 is a contractile spring engaged at its upper end with the hammer casing 10, and with its lower end coil engaged in a circumferential groove in the impact element 15. The hammer when it is projected strikes this impact element, drives it downward against the force of the spring 16, and the spring then immediately retracts the impact element 15 to its initial position which is that shown in Figure 2. Carried on the lower arm of the yoke 17 is a dolly 18 which confronts the impact member 15. Adjustably mounted upon the smooth exterior face of the hammer casing 10 is a split collar 19 which may be clamped upon the hammer casing at any desired position by means of the clamp screw 20. This collar carries a resilient finger 21. Below the collar and free for rotation upon the lower end of the hammer casing 10 is the tubular shank 22 of a bell 23. The tubular shank is cylindrical in form but the portion 23 which flares downwardly and outwardly may be either annular in cross-section or semi-circular in cross-section. I have shown it in the illustration as annular in cross-section. This bell extends outward in all directions sufficiently far from the impact element as to form a firm support for the hammer on the work and not only support the hammer so that the whole weight of the machine rests upon the work itself but also sufficiently to prevent the hammer from any tendency to tilt, thus taking the strain off the workman who otherwise would have to exert manual strength to hold the hammer in a position at right angles to the work. The tubular shank 22 is formed with an annular groove 24 and the resilient finger 21 has a depression 25 engaging in this groove. This holds the bell from downward movement while permitting the bell to rotate freely in both directions. The collar 19, after its adjustment, prevents the bell from moving upward at all. By adjusting the collar 19, therefore, the bell may be adjusted relative to the impact member 15 and should be so adjusted that there is a slight space between the lower end of the impact element and the lower edge of the bell as illustrated in Figure 2. If the machine is operating on a crowned or upwardly curved portion as, for instance, upon a transversely and longitudinally curved fender, the bell should be adjusted slightly lower than it is in Figure 2, so that the impacting element will at all times be held a predetermined distance as, for instance, ⅛" or $\frac{1}{16}$" above the work until it is struck by the hammer and driven downward.

So far, except for the swivelled connection of the hammer to the air pipe 14, I have described and illustrated what is described and illustrated in my prior application. My particular improvement consists in the instant case in providing the upper end of the hammer casing 10 with the heavy and relatively quick screw threads 26 and providing a head 27 mounted upon the upper arm of the yoke 17, which head is interiorly screw threaded to engage the threads 26. The head is relatively long in comparison to the screw threads 26 and the screw threads in the head are designated 28. This head 27 is a split head as shown in Figure 1, and on each side of the split the head is formed with the two outwardly projecting lugs 29. A screw shown in dotted lines in Figure 1 and designated 30 engages the interior screw threads of one of these lugs 29 and when the clamp screw is turned, the lugs are drawn together to clamp the head upon the hammer casing 10. When the screw is turned in the other direction, it releases this clamping action and permits the hammer casing 10 to be rapidly rotated by hand to carry the casing toward the dolly or away from the dolly. Preferably the screw 30 is provided with a handle 31 whereby it may be quickly manipulated to clamp or unclamp the head from the casing. This head 27 is provided with a split socket 32, as shown in Figure 2, having the upwardly extending opposed lugs 33 through which a clamp screw 34 passes. The head of this screw is designated 35 and this head may be many-sided or may be provided with a handle like the handle 31. This socket 32 permits the ready removal of the head and hammer casing from the end of the yoke or the application of it thereto and permits the ready centering of the impact member relative to the axis of the shank which supports the dolly. The swivelled connection between the coupling 12 and the member 11, of course, permits the rotation of the hammer casing relative to the air pipe.

The dolly 18, as shown in Figure 2, is formed on its underface with a downwardly flaring socket 36 and the lower arm of the yoke 17 may be formed with a rounded reduced portion to engage loosely in this socket. Preferably, however, and as shown more in detail in Figure 1, I mount the dolly 18 upon the reduced portion 37 of an extension plug 38 whose lower end is reduced, as at 39, to fit within the tubular upper end of the lower arm of the yoke 17. By this construction the mechanism may be readily put in position so that the two arms of the yoke will embrace or be passed over on each side of a door post or like structure. If the dolly supporting arm of the yoke 17 directly engaged the dolly, there would be a relatively small space between the bell 23 and the extremity of the dolly supporting arm and force would have to be exerted to separate the two arms of the yokes sufficiently to permit the device to be passed over the door post. By my construction, however, ample space is provided for passing the two arms of the dolly around the door post and then after the yoke has been put in place, the extension plug 38 may be inserted within the corresponding arm of the dolly and the dolly be mounted in place upon the plug. Thus when the hammer casing 10 is turned up to its fullest extent and the dolly and extension plug are removed, there is a distance of at least 3½" between the lower edge of the bell and the upper end of the lower arm of the yoke.

In Figure 4, I have illustrated a yoke which is particularly fitted for use in operating on fender wells. The upper and lower arms of the yoke are relatively close together, it will be seen, and the lower arm has a horizontal socket in it for the reception of the plug 39ª which carries an outwardly projecting extension 38ª turned upward at its end to detachably engage with the socket in the dolly 18ª. Otherwise than this, the construction shown in Figure 4 is precisely what is shown in Figures 1 and 2. It will be seen that with the clamp socket 32 formed upon the head 27, that the hammer casing may be readily connected to any desired form of yoke or any yoke which may be necessary for a particular piece of work and that the yoke in turn may have mounted upon it any form of dolly, there being dollies of various different characters depending upon the character of the work to be done.

Preferably the head 27 will be provided with an annular flange 28ª at its lower end which will act as a stop limiting the inward movement of the hammer casing with reference to this head 27.

It is to be understood, of course, that many minor modifications might be made in the details of construction and arrangement of parts without departing from the spirit of the invention.

It is to be understood that the yoke is ordinarily made of malleable iron pipe and that as a consequence there is some resiliency in the yoke. In the operation of the device, by screwing down on the hammer casing 10, it places this yoke under tension and the tension presses the bell against the work, thus the tool does not chatter or jump over the work. By my construction, the amount of tension placed upon this yoke by screwing down on the hammer casing may be very delicately regulated. On light sheet metal, 30 or 35 pounds of air pressure is used and on the average fender about 50 or 60 pounds of air pressure is used and for medium heavy fenders, 120 or 125 pounds is used, and for truck fenders as high as 225 pounds of air pressure is used. The higher the air pressure used, the more tension must be placed upon the yoke by adjusting the hammer casing downward against the yoke to secure greater tension to hold the device upon the yoke.

It is to be understood that in Figures 1 and 2, the hammer casing 10 is illustrated in position before pressure is applied upon the work and thus upon the dolly to take the slack out of the arms of the yoke 17. When the bell 23 is moved downward, it engages the work, but to operate the machine properly when air pressure is applied, the hammer casing 10 is to be screwed downwardly sufficiently to place the yoke under tension, as before stated.

Having described the structure and its advantages, what I claim is:—

1. In a sheet metal flattening mechanism, a hammer casing having a power hammer therein and a spring retracted impact member carried by the lower end of the hammer casing and adapted to be struck by the hammer and projected thereby, a downwardly flaring bell having a cylindrical shank embracing the hammer casing, the lower ends of the bell being normally disposed at a predetermined distance below the impact member, a yoke, a head mounted upon one end of the yoke, the head embracing the hammer casing, the head being interiorly screw threaded and the hammer casing having threads coacting therewith whereby the hammer casing may be adjusted bodily through the head, the other end of the yoke supporting a dolly confronting the impact member, and means for locking the head upon the hammer casing when the hammer casing has been adjusted.

2. In a sheet metal flattening mechanism, a hammer casing having a hammer therein, an impact member carried by the hammer casing and adapted to be struck by the hammer, a work engaging element carried by the hammer casing and extending normally below the impact member, a resilient yoke having one end engaged with the hammer casing, a dolly supported on the other end of the yoke and facing the hammer casing, an interiorly threaded head on the other end of the substantially U-shaped yoke, the threads being coarse and of relatively steep pitch, the hammer casing at its upper end having threads engaging the threads of the head, the lower portion of the casing being unthreaded, and means for clamping the casing in adjusted position within the head.

3. In a sheet metal flattening mechanism, a hammer casing having a hammer therein, an impact member carried by the casing and struck by the hammer, a work engaging element carried by the hammer casing and extending normally below the impact member and adapted to rest upon the work, a resilient substantially U-shaped yoke, an interiorly threaded longitudinally split head on one end of the yoke, the threads being coarse and of relatively steep pitch, the hammer casing at its upper end having threads engaging the threads of the head, the lower portion of the casing being smooth and unthreaded, the head on each side of the split therein having outwardly projecting lugs, a screw engaging said lugs to clamp the head upon the hammer casing and a dolly supported on the other end of the yoke.

4. In a sheet metal flattening mechanism, an approximately U-shaped resiliently yieldable yoke, a hammer casing, a work-engaging member carried by but extending below the hammer casing, a head mounted on one arm of the yoke and having relatively coarse screw threads of relatively steep pitch, the hammer casing having threads engaging the threads on the head whereby the hammer casing may be rotated to quickly adjust it toward or from the other arm of the yoke, means for locking the hammer casing in any adjusted position, and a dolly supported on the other arm of the yoke and facing the hammer casing.

5. A sheet metal flattening mechanism including an approximately U-shaped resiliently yieldable yoke, a hammer casing having an impact member, a work-engaging member carried by but extending below the hammer casing, an interiorly threaded split head carried upon one end of the yoke, the threads being relatively coarse and of steep pitch, the exterior of the hammer casing having threads engaging the threads of the head, means for clamping the split head tight upon the hammer casing to lock the casing against movement after adjustment, and a dolly carried by the other end of the yoke and facing the work-engaging member.

6. A sheet metal flattener, including a substan-

tially U-shaped resiliently yieldable yoke, a hammer casing, a head on the yoke embracing the hammer casing, means constructed and arranged for adjusting the hammer casing through the head, means for clamping the casing in adjusted position, the head having a laterally projecting tubular split socket detachably receiving one end of the yoke, and the socket having means whereby it may be clamped upon the yoke, a work-engaging member carried upon one end of the casing, and projecting below the latter and adjustable longitudinally of the casing, and a dolly on the other end of the yoke and confronting the work-engaging member.

FREDERICK J. HAUSCHILD.