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POWER OPERATED PICK HAMMER FOR SHEET METAL WORK

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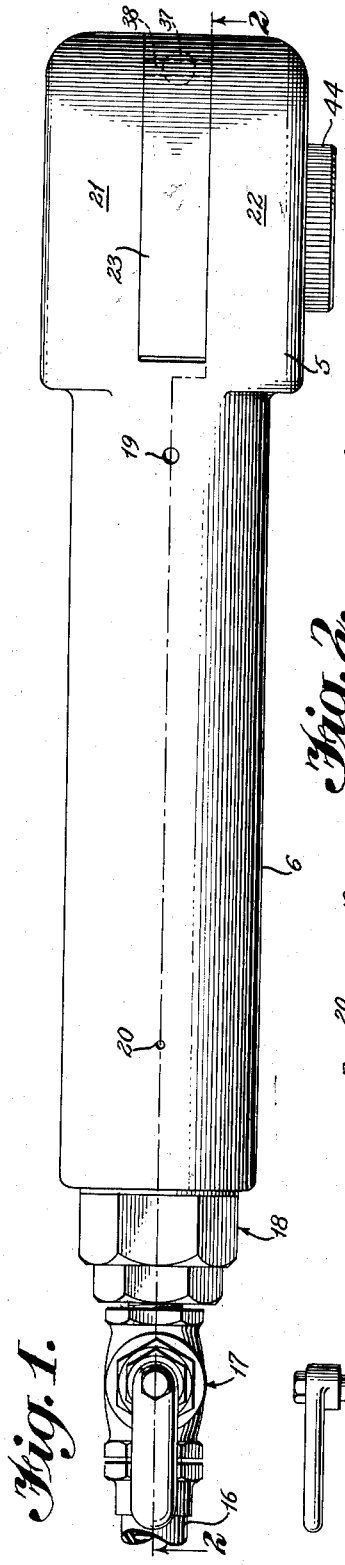

Fig. 1.

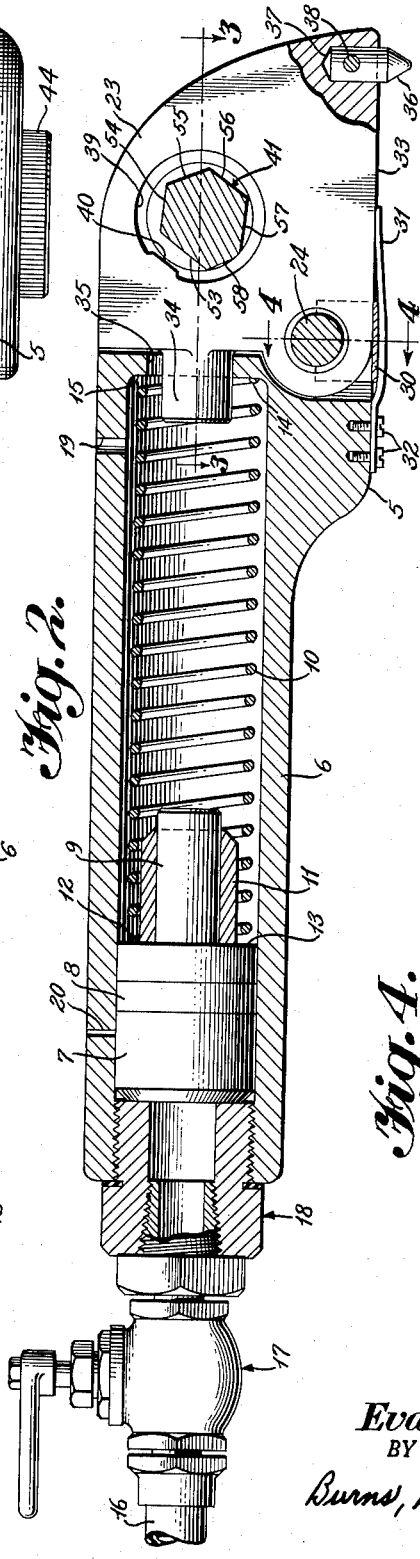

Fig. 2.

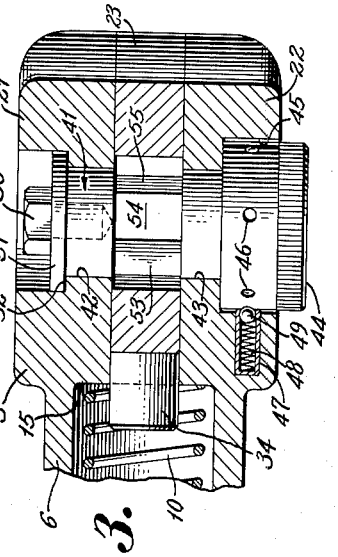

Fig. 3.

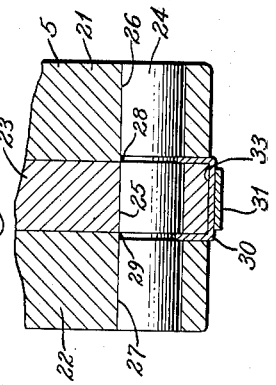

Fig. 4.

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POWER OPERATED PICK HAMMER FOR SHEET METAL WORK

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5 Claims. (Cl. 153—48)

The present invention relates to a power operated pick hammer for sheet metal work, such as automobile body work.

Automobile body work requires that dents or depressions be eliminated from the sheet metal. Large dents or depressions can be partially eliminated by the use of heavy or powerful tools, but the final steps of eliminating such dents or depressions require the use of smaller and lighter tools which can be used in a manner to more accurately control the extent of deformation of the sheet metal. Small dents or depressions are also eliminated by the use of small and light tools. Small pointed tools are used to form closely spaced conical peaks which extend somewhat above the desired surface of the finished work. This results in the metal between the closely spaced peaks being raised to approximately the level of the desired surface of the finished work. The peaks are then eliminated by filing and there results a smooth surface which can be sanded and painted. The proper height of the peaks is of the utmost importance in securing the desired results and in reducing the amount of filing which is necessary. Considerable skill has been required in the past in using available tools to produce peaks of the proper height. The sheet metal must be struck smart blows in order to deform the metal to form the peaks, but the blows must be struck in such a manner that peaks of the proper height are formed.

It is a primary object of the present invention to provide a power operated pick hammer which can be used to form peaks of the desired height in sheet metal work, such as automobile body work. A further object of the invention is to provide a tool for work of this type which requires considerably less skill on the part of the operator than has heretofore been the case. A further object of the invention is to provide a tool which permits less experienced operators to perform work of a quality which heretofore could be done only by men of long experience. Another object of the invention is to provide a power actuated pick hammer which is capable of striking a smart blow to the sheet metal and which is provided with adjustable means for limiting the extent of deformation of the metal and the height of the peaks produced therein. A related object of the invention is to provide a power operated pick hammer capable of striking a smart blow to the sheet metal in combination with means for limiting the extent of movement or "follow-through" of the striker element. A further object of the invention is to provide a pneumatically operated pick hammer which can be operated from the compressed air sources conventionally available in automobile body shops. Still another object of the invention is to provide a power operated pick hammer which is small and compact and which can be used inside automobile doors and in other places which would be inaccessible to large and cumbersome tools and in which manually operated hammers could not be used efficiently.

The foregoing and other objects and advantages of the invention can be understood from the following detailed

description of an exemplary form of the invention illustrated in the accompanying drawing, wherein:

Figure 1 is a top plan view of a power operated pick hammer embodying the invention;

Figure 2 is a longitudinal sectional view taken generally in the direction of the arrows along the line 2—2 of Figure 1;

Figure 3 is a sectional view taken in the direction of the arrows along the line 3—3 of Figure 2; and

Figure 4 is a sectional view taken in the direction of are arrows along the line 4—4 of Figure 2.

The pick hammer includes a body member which is designated by the reference numeral 5. Formed integrally with the body member 5 is a cylinder 6. A piston 7 is reciprocable within the cylinder 6. The piston 7 may be provided with a piston ring or other suitable sealing element 8 to minimize leakage of the fluid past the piston. An impact element 9 extends axially from the forward end of the piston 7. A compression spring member 10 serves to urge the piston 7 toward the rearward position illustrated in Figure 2. The rearward end 12 of the spring member 10 surrounds the impact element 9. A spacer sleeve 11 may be interposed between the impact element and the spring member if desired. The rearward end 12 of the spring member 10 bears against the forward face 13 of the piston 7. The forward end 14 of the spring member 10 bears against the apertured forward wall 15 of the cylinder.

A flexible hose 16 is provided for connecting the tool to a source of fluid pressure, such as an air compressor or a compressed air storage tank. A manually actuated valve of any suitable type is provided in the flexible hose 16, this valve being designated generally by the reference numeral 17. The valve 17 may be positioned in any convenient place along the length of the flexible hose 16, and it is shown adjacent the rearward end of the cylinder 6 solely for convenience of illustration. Suitable coupling means, designated generally by the reference numeral 18, are provided in the rearward end of the cylinder 6. An aperture 19 is provided in the wall of the cylinder 6 near the forward end thereof to permit rapid escape of air which would otherwise be trapped within the cylinder between the forward end 13 of the piston and the forward wall 15 of the cylinder. The presence of this aperture 19 permits rapid forward movement of the piston 7. A smaller aperture 20 is provided in the wall of the cylinder 6 adjacent the rearward end thereof to permit escape of fluid pressure from the cylinder after the piston 7 has moved to its forward position. The aperture 20 permits the spring member 10 to return the piston 7 to the position illustrated in Figure 2 when the valve 17 has been closed. There will be some escape of air through the aperture 20 during the forward power stroke of the piston 7, but the size of the aperture 20 is such that this escape of air is negligible, particularly when it is considered that the valve 17 need remain open for only a brief interval to accomplish the power stroke of the piston.

The body member 5 is provided with longitudinally extending parallel walls 21 and 22 which define a slot which is in longitudinal alignment with the cylinder 6. A striker element 23 is positioned within the slot defined by the walls 21 and 22. The striker element is pivotally mounted on a pivot pin 24. The pivot pin 24 extends through an aperture 25 in the striker element 23 and also extends through aligned apertures 26 and 27 in the walls 21 and 22. The pivot pin 24 has axially spaced circumferential grooves 28 and 29 therein which occupy positions adjacent recessed portions of the walls 21 and 22. A U-shaped clip 30 is provided with bifurcated ends which fit into the grooves 28 and 29 to retain the pivot pin 24 in place. The U-shaped clip 30 is retained

in place by means of a cantilever leaf spring member **31** which has one of its ends secured to the body member **5** by means of screws **32**. The free end of the leaf spring member **31** bears against the lower edge **33** of the striker element **23** and serves to resiliently urge or bias the striker element toward the retracted position illustrated in the drawings.

The striker element **23** is provided with an anvil stud **34** which extends into the interior of the cylinder **6** through a slight vertically elongated opening **35** in the forward wall **15** of the cylinder. The anvil stud **34** is positioned to be struck by the impact element **9** when the piston **7** nears the end of its forward or power stroke. The striker element **23** is provided with a pick point **36** which is removably retained within a cavity **37** by means of a retaining pin **38**. The pick point **36** illustrated in the drawing has a sharp point for making peaks of small diameter in the sheet metal. The pick point illustrated can be replaced by one having a more blunt point for making peaks of larger diameter. It is also possible to provide a pick point of substantial length when access is desired to positions on the automobile body which could not otherwise be reached.

When the valve **17** is closed, the elements of the apparatus will occupy the positions shown in the drawing. Opening of the valve **17** will cause the piston **7** to move very rapidly in a forward direction. The impact element **9** will strike the anvil stud **34** and will cause the striker element **23** to pivot forwardly and downwardly about its pivot pin **24**. The pick pin **36** will have been placed in engagement with the sheet metal prior to opening of the valve **17**. The pick point **36** will thus strike the sheet metal a very smart blow, causing a peak to be formed in the metal.

It is essential that the blow struck by the pick point **36** be a smart blow in order to deform the metal to form the peak. It is necessary, however, that the height or altitude of the peak be controlled for reasons heretofore described. The invention includes means for adjustably limiting the extent of movement of the striker element **23** and the pick point **36** in order to adjustably control the height of the peaks which are formed in the sheet metal. An opening **39** extends transversely through the striker element **23**. An abutment element **40** is provided on the wall of the opening **39**. A stop member, designated generally by the reference numeral **41**, extends through transversely aligned openings **42** and **43** in the walls **21** and **22** of the body member **5**, and also extends through the larger opening **39** in the striker element **23**. The stop member **41** is provided with a knurled knob **44** which extends into a circular recess **45** in the wall **22**. The knob **44** has in its peripheral surface a plurality of spaced cavities **46**. A body member **5** is provided with a cavity to accommodate a compression spring member **48** which bears against a ball **49** to urge the ball toward the surface of the knob **44**. The spring pressed ball **49** is adapted to enter a selected one of the cavities **46**, retaining the knob **44** and the stop member **41** in the desired position of angular adjustment. The stop member **41** is retained in the body member **5** by means of a cap screw **50** threadedly received in the end of a stop member **41** opposite the knob **44**. The cap screw **50** bears against a washer **51** which is positioned against a shoulder **52** in the wall **21** of the body member.

The intermediate portion of the stop member **41** is ground to provide a plurality of flat perimetric faces which are spaced at different distances from the longitudinal axis of the stop member. These flat perimetric faces are best illustrated in Figure 2 and are designated by the reference numerals **53**, **54**, **55**, **56**, **57**, and **58**. These perimetric faces are angularly positioned to correspond with the positioning of the cavities **46** in the knob **44** in such manner that one of the perimetric faces will lie squarely in the path of movement of the abutment member **40** when the corresponding cavity **46** is engaged by the spring pressed ball **49**. The perimetric face **53** is illustrated in this position in Figure 2. Although six perimetric faces are illustrated, it will be obvious that a greater or lesser number may be provided.

The striker element **23** is capable of its greatest movement toward projected position when the stop member **41** is in the position illustrated in Figure 2. It will be apparent from this figure that the striker element **23** will be capable of partaking of lesser movement in the projecting direction when one of the other perimetric faces is in position to be engaged by the abutment member **40**. In this manner the extent of projecting movement of the striker member **23** and the pick point **36** can be positively controlled for the purpose of controlling the height or altitude of the peaks formed in the sheet metal. The height of such peaks will of course be greatest when the stop member **41** is in the position illustrated in Figure 2. The height of the peaks will be least when the perimetric face **58** has been moved into position to be engaged by the abutment member **40**. The perimetric faces **54**, **55**, **56**, and **57** are used to obtain peaks of intermediate heights. The provision of the stop member **41** enables the sheet metal to be struck a smart blow to deform the metal in the form of peak and at the same time enables the operator to control the height of the peak. The stop member **41** absorbs the energy or force of the blow after the desired distortion of the metal has been obtained and before there has been distortion of the metal in excess of that desired. In other words, the stop member **41** prevents undesired "follow-through" of the striker element without detracting from the initial force of the blow.

The fact that the striker element **23** is pivotally mounted on the body member **5** enables the tool to be inserted in small spaces, such as the inside of vehicle doors. It is thus possible to use the tool in locations where its use would be impossible if the direction of the blow were parallel to the longitudinal axis of the tool.

I have illustrated and described what I now consider to be the preferred embodiment of my invention. It is to be understood, however, that the illustrated embodiment is exemplary only and that various modifications may be made without departing from the broader scope of the invention as defined by the following claims.

Having thus described my invention, I claim:

1. A pick hammer for sheet metal work comprising a body member, a striker element pivotally secured to said body member for movement from a retracted position to a projected position, yieldable means biasing said striker element toward retracted position, impact means for imparting a blow to said striker element in a direction to force said striker element toward projected position, an adjustable stop member mounted in said body member for rotation about an axis normal to the path of movement of said striker element, said stop member having a plurality of perimetric faces at different distances from such axis for adjustably limiting the extent of movement of said striker element toward projected position, and a pick point on said striker element.

2. A pick hammer for sheet metal work comprising a body member, a striker element movable between retracted and projected positions relative to said body member, yieldable means urging said striker element toward retracted position, impact means for striking said striker element to drive the same toward projected position, and an adjustable stop member mounted in said body member for rotation about an axis normal to the path of movement of said striker element toward projected position, said stop member having perimetric areas thereon at different distances from such axis to adjustably limit the extent of movement of said striker element toward projected position.

3. A pick hammer for sheet metal work comprising a body member having walls defining a slot therein, a striker element positioned in said slot and pivotally con-

nected to said body member for pivotal movement between retracted and projected positions relative to the body member, a spring member urging said striker element toward retracted position, impact means for imparting a blow to said striker element to drive the same toward projected position, a rotatable stop member extending across said slot in the path of movement of a portion of said striker element, said stop member having a plurality of perimetric faces at different distances from the longitudinal axis of the stop member whereby rotation of said stop member brings a selected perimetric face into position to engage said portion of said striker element to control the extent of projecting movement of the striker element.

4. A pick hammer for sheet metal work comprising a body member, a striker element pivotally secured to said body member for movement between retracted and projected positions relative to said body member, impact means for imparting a blow to said striker element in a direction to drive said striker element from retracted position toward projected position, and adjustable stop means mounted in said body member for rotation about an axis normal to the path of movement of said striker element, said stop means having perimetric faces thereon at different distances from such axis for limiting the

extent of movement of said striker element toward projected position.

5. A pick hammer for sheet metal work comprising a body member, a striker element pivotally mounted in said body member, a cylinder on said body member, a piston reciprocable in said cylinder, means for applying fluid pressure to said cylinder to move said piston in said cylinder toward said striker element, said piston having an impact head for striking said striker element to pivotally move the same, and an adjustable stop member mounted in said body member for rotation about an axis normal to the path of movement of said striker element, said stop member having perimetric surface areas thereon at different distances from such axis for adjustably limiting the extent of pivotal movement of said striker element.

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