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PATENT SPECIFICATION



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PROVISIONAL SPECIFICATION

Improvements in or relating to Hand-operated Tools for Shearing, Bending or Punching Metal

I, OTTO RUDOLPH OPPERMAN, a British Subject, of 3, Albemarle Street, Clerkenwell Road, London, E.C.1, do hereby declare the nature of this invention to be as follows:—

This invention relates to hand tools for shearing, bending or punching metal and has for its object to provide an improved hand-operated tool or appliance of compact construction by means of which metal strip or rod may readily be sheared or bent, or the metal strip may be perforated, and which shall be suitable for use in producing the parts required for constructional toys of the type employing perforated metal strips adapted to be bolted or otherwise secured together.

According to the invention, the improved tool or appliance comprises an oscillatable plate adapted to co-operate with various parts of a frame in which it is mounted to constitute shearing, bending and punching devices, and a hand-operated lever adapted to oscillate said plate through the intermediary of means, such as a cam, eccentric or the like, for giving a high mechanical advantage.

In order that the nature of the invention may be readily understood, there will now be described one example of a hand tool or appliance constructed in accordance therewith.

On a suitable base of wood or the like is secured an upstanding frame composed of a pair of spaced parallel cheeks between the upper ends of which is snugly disposed a plate of substantially segmental shape. This plate is pivoted at its lower edge on a pin or bolt extending between the cheeks of the frame and has its arcuate edge formed with a pair of upstanding lugs adapted to embrace between them an eccentric boss of small diameter formed or secured on the pivoted end of a comparatively long lever mounted on a pin or bolt extending between the cheeks of the frame.

At one side of the pivot for the plate referred to above the cheeks of the frame are shaped to constitute an anvil portion of V-shape having upper edges contained in the horizontal plane passing through the axis of the pivot and adapted to

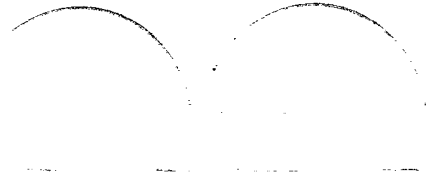
co-operate with an extension on the plate which is formed to V-shape at its lower edge. This extension is also convexly rounded transversely of its upper edge to co-operate with extensions of the cheeks of the frame the lower edges of which are disposed above, but spaced from, the upper edges of the anvil portion and are concavely curved transversely of their width.

On the side remote from the anvil portion, the cheeks of the frame are slotted horizontally from the edge to accommodate, in the lower part of the gap thus formed, a flat horizontal bridge member which is secured on one of the cheeks and extends laterally beyond the other cheek for a suitable distance. Centrally of the two cheeks the bridge member is formed with a vertical aperture into which is adapted to penetrate a cylindrical punch projection formed on the lower edge of the segmental plate. The laterally projecting portion of the bridge member is also perforated, at regular intervals, the distances of the perforations from each other corresponding to the spacing of the perforations it is desired to form in the metal strip to be worked.

At points disposed between the bridge member and the pivot for the operating lever the one cheek of the frame is formed both with an aperture and with a slot extending inwards from its edge, the other cheek being cut away over a corresponding portion of its upper edge and the segmental plate being formed with an aperture and slot adapted to register with those in the first-mentioned cheek when the plate is in a mean position.

The cheeks of the frame are apertured at a suitable position, preferably beneath the pivot for the segmental plate, to accommodate slidably a rod having one end bent upwardly at right-angles to constitute a stop or gauge. Between the two cheeks the rod passes through the eye of an eye-bolt having its screw-threaded shank disposed horizontally and extending beyond an edge of the frame to receive a roughened washer and a wing nut by means of which the rod referred to can be clamped in any desired position. It is

[Price



preferred to groove the rod circumferentially at regular intervals to permit of exact adjustment thereof.

In the operation of the appliance described, a rotation of the lever about its pivot in the one or other direction causes the eccentric boss thereon to oscillate the segmental plate about its pivot in a corresponding direction, the dimensions of the parts being such that a movement of the lever through an angle of about 120° produces a movement of the segmental plate through an angle of about 7°.

Metal strip may readily be bent at an angle by placing the strip on the upper edges of the anvil portion of the frame beneath the V-shaped lower edge of the extension on the segmental plate and forcing the said edge downwardly into the base of the V of the anvil portion. If the strip is to be curved, however, the rounded upper surface of the extension is employed to force the strip upwardly against the lower edges of the extensions on the cheeks of the frame.

The metal strip is sheared by inserting it in the slots formed in the one cheek of the frame and in the segmental plate, respectively, while the slots are in register, and forcing the segmental plate to oscillate in the appropriate direction.

Similarly, metal rods can be sheared by means of the co-operating apertures formed in the said cheek and plate.

When a strip is to be perforated it is placed on the bridge member and the segmental plate is oscillated to force its punch projection through the strip. Owing to the provision of the perforations in the projecting portion of the bridge member, a series of apertures may be punched in the strip at predetermined distances apart, an aperture in the strip being brought into register with an aperture in the bridge member and maintained in this position by a pin or the like during the punching of the next aperture in the series.

Use is made of the stop or gauge rod when pieces of strip or rod are to be sheared off in predetermined lengths, the strip or rod being butted against the stop during the shearing operation. The free-end of the bent up portion of the gauge rod is preferably formed to disc shape so that it is effective as a stop, without further adjustment, for both strip and rod.

Dated this 16th day of November, 1934.
WHEATLEY & MACKENZIE,
40, Chancery Lane, London, W.C.2,
Agents.

COMPLETE SPECIFICATION

Improvements in or relating to Hand-operated Tools for Shearing, Bending or Punching Metal

I, OTTO RUDOLPH OFFERMAN, a British Subject, of 3, Albemarle Street, Clerkenwell Road, London, E.C.1, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to hand tools for shearing, bending or punching metal and has for its object to provide an improved hand-operated tool or appliance of compact construction by means of which metal strip or rod may readily be sheared or bent, or the metal strip may be perforated, and which shall be suitable for use in producing the parts required for constructional toys of the type employing perforated metal strips adapted to be bolted or otherwise secured together.

According to the invention, the improved tool or appliance comprises an oscillatable plate adapted to co-operate with various parts of a frame in which it is mounted to constitute shearing, bending and punching devices, and a hand-

operated lever adapted to oscillate said plate through the intermediary of means, such as a cam, eccentric or the like, for giving a high mechanical advantage.

In order that the nature of the invention may be readily understood, there will now be described with reference to the drawings one example of a hand tool or appliance constructed in accordance therewith.

Fig. 1 is a side elevation of the hand tool mounted on its base.

Fig. 2 is a plan view of the hand tool.

Fig. 3 is an end elevation.

Fig. 4 is a sectional elevation of part of the tool on the line 4, 4 of Fig. 2.

Fig. 5 is a similar view to Fig. 4 showing the hand lever in the opposite position.

Fig. 6 is a detail section taken on the line 6, 6 of Fig. 4 with a piece of metal shown being bent.

Fig. 7 is a detail section taken on the line 7, 7 of Fig. 5 showing another way of bending the metal.

On a suitable base 1 of wood or the like

is secured an upstanding frame 2 composed mainly of a pair of spaced parallel cheeks between the upper ends of which is snugly disposed a plate 3 of substantially segmental shape. This plate is pivoted at its lower edge on a pin or bolt 4 extending between the cheeks of the frame and has its arcuate edge formed with a pair of upstanding lugs 5 adapted to embrace between them an eccentric boss or cam 6 of small diameter formed or secured on the pivoted end of a comparatively long lever 7 mounted on a pin or bolt 8 extending between the cheeks of the frame 2.

At one side of the pivot for the plate referred to above, the cheeks of the frame 2 are shaped to constitute an anvil portion 9 of a V-shape having upper edges contained in the horizontal plane passing through the axis of the pivot and adapted to co-operate with an extension 10 on the plate which is formed to V-shape at its lower edge. This extension is also convexly rounded transversely of its upper edge to co-operate with extensions 11 of the cheeks of the frame the lower edges of which are disposed above, but spaced from, the upper edges of the anvil portion and are concavely curved transversely of their width.

On the side remote from the anvil portion, the cheeks of the frame are slotted at 12 horizontally from the edge to accommodate, in the lower part of the gap thus formed, a flat horizontal bridge member 13 which is secured on one of the cheeks and extends laterally beyond the other cheek for a suitable distance. Centrally of the two cheeks the bridge member is formed with a vertical aperture 14 into which is adapted to penetrate a cylindrical punch projection 15 formed on the lower edge of the segmental plate. The laterally projecting portion of the bridge member is also perforated, at regular intervals, 14a the distances of the perforations from each other corresponding to the spacing of the perforations it is desired to form in the metal strip to be worked.

At points disposed between the bridge member and the pivot for the operating lever the one cheek of the frame is formed both with an aperture 16 and with a slot 17 extending inwards from its edge, the other cheeks being cut away over a corresponding portion of its upper edge and the segmental plate being formed with an aperture 16a and slot 17a adapted to register with those in the first-mentioned cheek when the plate is in a mean position.

The cheeks of the frame are apertured at a suitable position, preferably beneath

the pivot for the segmental plate, to accommodate slidably a rod 18 having one end 19 bent upwardly at right-angles to constitute a stop or gauge. Between the two cheeks the rod passes through the eye 21 of an eye-bolt 22 having its screw-threaded shank disposed horizontally and extending beyond an edge of the frame to receive a roughened washer 23 and a wing nut 24 by means of which the rod referred to can be clamped in any desired position. It is preferred to groove the rod circumferentially at regular intervals to permit of exact adjustment thereof.

In the operation of the appliance described, a rotation of the lever 7 about its pivot 8 in the one or other direction causes the eccentric boss 6 thereon to oscillate the segmental plate 3 about its pivot 4 in a corresponding direction, the dimensions of the parts being such that a movement of the lever through an angle of about 120° produces a movement of the segmental plate through an angle of about 7°.

As shown in Fig. 7 metal strip may be readily bent at an angle by placing the strip 20 on the upper edges of the anvil portion 9 of the frame beneath the V-shaped lower edge of the extension 10 on the segmental plate and forcing the said edge downwardly into the base of the V of the anvil portion. If the strip is to be curved, (Fig. 6) the rounded upper surface of the extension 10 is employed to force the strip 20 upwardly against the lower edges of the extensions 11 on the cheeks of the frame.

The metal strip is sheared by inserting it in the slots 17, 17a, formed in the one cheek of the frame and in the segmental plate, respectively, while the slots 17, 17a are in register, and forcing the segmental plate to oscillate in the appropriate direction. Similarly, metal rods can be sheared by means of the co-operating apertures 16, 16a formed in the said cheek and plate.

When a strip is to be perforated it is placed on the bridge member 13 and the segmental plate 3 is oscillated to force its punch projection 15 through the strip. Owing to the provision of the perforations 14, 14a in the projecting portion of the bridge member, a series of apertures may be punched in the strip at predetermined distances apart, an aperture in the strip being brought into register with an aperture 14a in the bridge member and maintained in this position by a pin or the like during the punching of the next aperture in the series.

Use is made of the stop or gauge rod 18 when pieces of strip or rod are to be

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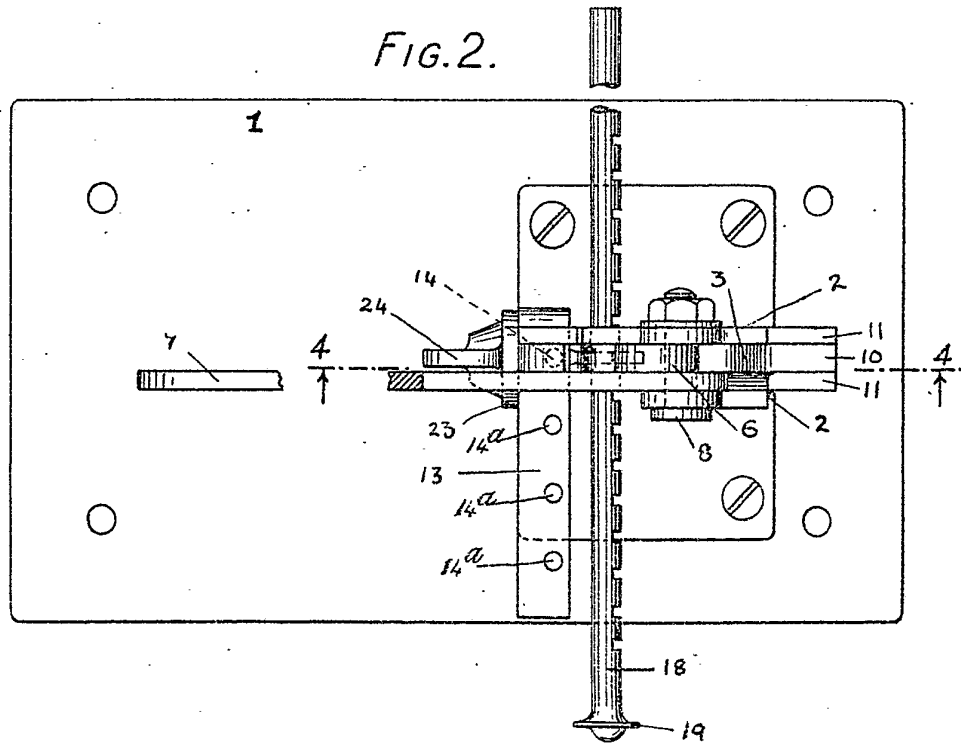
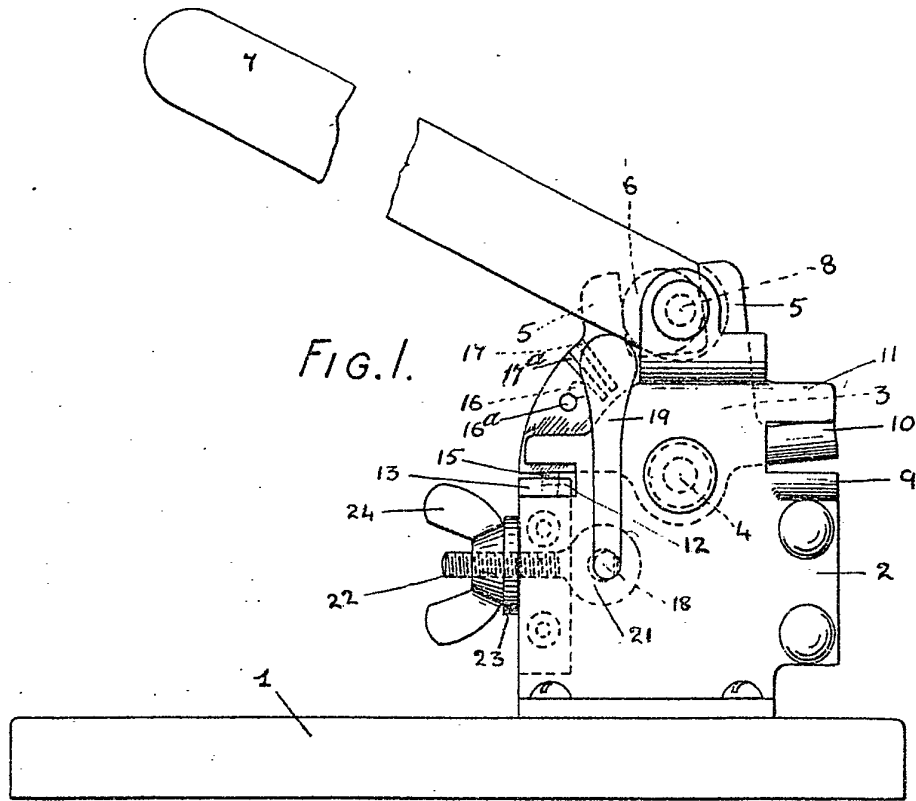
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- sheared off in predetermined lengths, the strip or rod being butted against the stop 19 during the shearing operation. The free-end of the bent up portion 19 of the gauge rod is preferably formed to disc 5 shape so that it is effective as a stop, without further adjustment, for both strip and rod.
- 10 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—
1. A improved hand-operated tool for 15 shearing, bending or punching metal wherein an oscillatable plate is adapted to co-operate with various parts of a frame in which it is mounted to constitute shearing, bending and punching devices, 20 and a hand operated lever is adapted to oscillate said plate through intermediary means such as a cam or eccentric.
2. The improved hand-operated tool as 25 claimed in claim 1 wherein the oscillatable plate is substantially of segmental shape and is pivoted at its lower edge on a pin or bolt extending between cheeks forming the main part of the frame.
3. The improved hand-operated tool as 30 claimed in claim 2 wherein the oscillatable plate is formed with upstanding lugs on its upper arcuate edge, said lugs being adapted to embrace between them an eccentric boss secured on the pivoted 35 end of the hand-operated lever.
4. The improved hand-operated tool as 40 claimed in claims 2 and 3 wherein the oscillatable plate is formed with an extension on one side substantially V-shaped at its lower edge and adapted to co-operate with the cheeks of the frame which are shaped to constitute an anvil of V-shape.
5. The improved hand-operated tool as 45 claimed in claim 4 wherein the extension on the oscillatable plate is convexly rounded transversely of its upper edge to co-operate with extensions of the cheeks of the frame the lower edges of 50 which are disposed above, but spaced from the upper edges of the anvil portion and are concavely curved transversely of their width.
6. The improved hand-operated tool as 55 claimed in claims 4 and 5 wherein on the side remote from the anvil portion, the cheeks of the frame are slotted horizontally from the edge to accommodate in the lower part of the gap thus formed a flat horizontal bridge member secured on 60 one of the cheeks and extending laterally beyond the other cheek for a suitable distance.
7. The improved hand-operated tool as 65 claimed in claim 6 wherein the bridge member is formed with a vertical aperture centrally of the two cheeks and the laterally disposed portion is also perforated at regular intervals.
8. The improved hand-operated tool as 70 claimed in claims 1 and 7 wherein a vertical punch projection formed on the lower edge of the oscillatable plate is adapted to penetrate the vertical aperture on the bridge member centrally of the 75 two cheeks, for the purpose described.
9. The improved hand-operated tool as 80 claimed in claims 1 and 7 wherein at points disposed between the bridge member and the pivot for the operating lever the one cheek of the frame is formed both with an aperture and a slot extending inwards from its edge the other cheek 85 being cut away over a corresponding portion of its upper edge and the oscillatable plate being formed with an aperture and slot adapted to register with those in the first mentioned cheek for the purpose described.
10. The improved hand-operated tool 90 as claimed in claim 1 wherein the cheeks of the frame are apertured to accommodate slidably a rod having one end bent at right angles to constitute a stop or gauge. 95
11. The improved hand-operated tool as 100 claimed in claim 10 wherein the horizontal part of the rod is grooved circumferentially at regular intervals to permit of exact adjustment thereof. 100
12. The improved hand-operated tool as 105 claimed in claims 10 and 11 wherein the rod is secured after adjustment by an eye-bolt having a washer and wing nut, the rod passing through the eye of the 105 eye-bolt which is disposed between the two cheeks of the frame.
13. The improved hand-operated tool substantially as herein described with reference to the accompanying drawings. 110
- Dated this 18th day of November, 1935.
WHEATLEY & MACKENZIE,
 40, Chancery Lane, London, W.C.2,
 Agents.

[This Drawing is a reproduction of the Original on a reduced scale.]



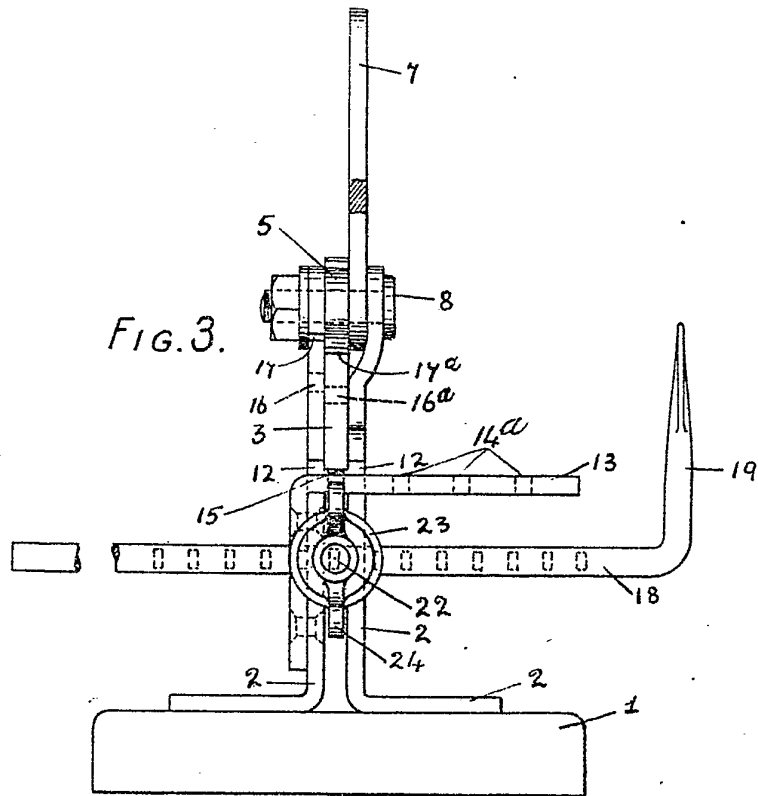


FIG. 3.

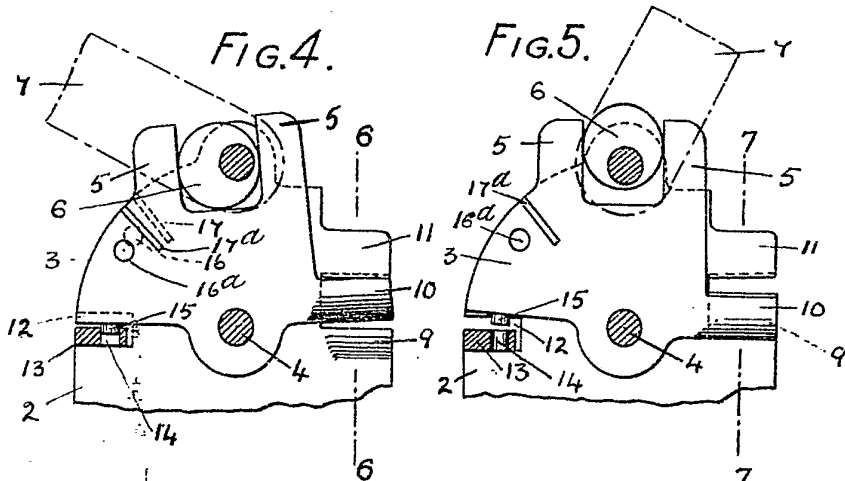


FIG. 4.

FIG. 5.

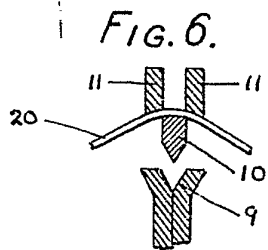


FIG. 6.

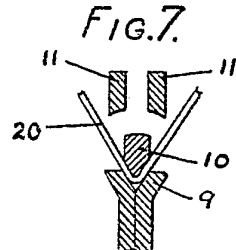
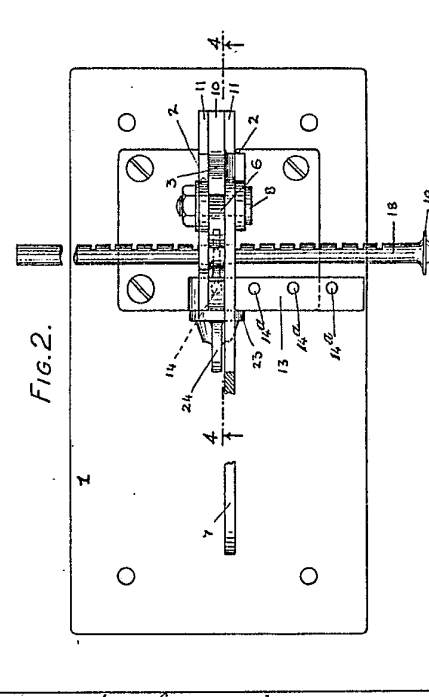
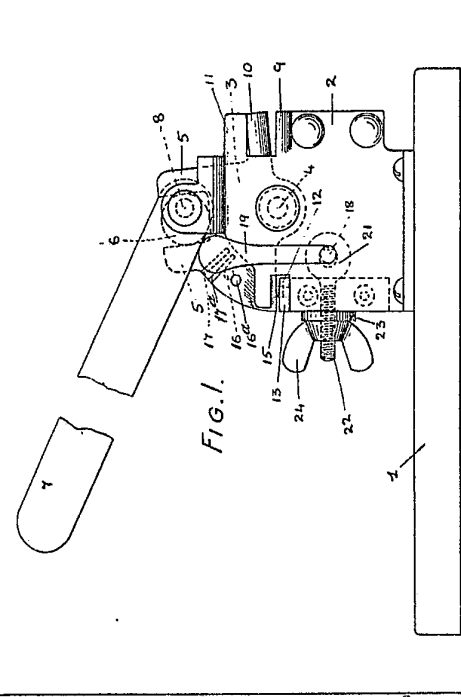
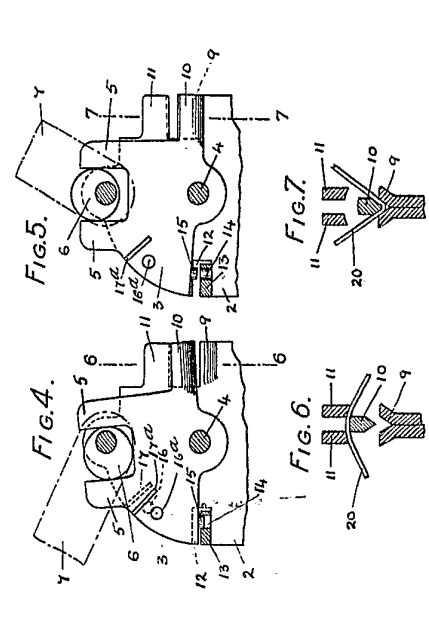
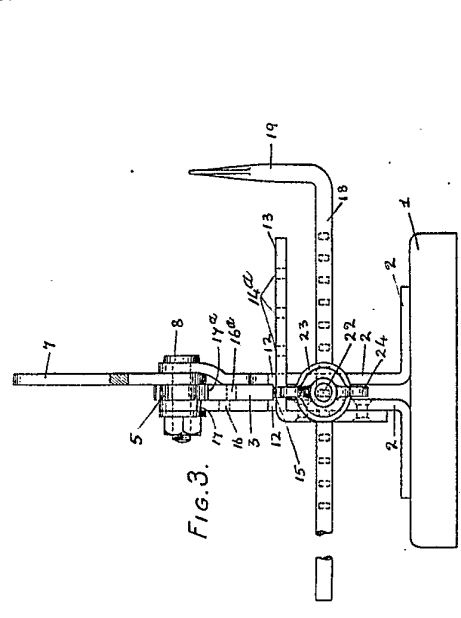


FIG. 7.



[This Drawing is a reproduction of the Original on a reduced scale.]