PATENT SPECIFICATION

Application Date: July 28, 1928. No. 21,903/28. **310,723**

Complete Left: March 26, 1929.

Complete Accepted: May 2, 1929.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Vices.

We, C. & J. HAMPTON LIMITED, a British Company, and CHARLES WILLIAM HAMPTON, a British subject, both of Record Works, Ouse Road, Attercliffe, in the City of Sheffield, do hereby declare the nature of this invention to be as follows:—

This invention relates to vices of the type comprising a fixed jaw, adapted to be secured to a bench, and a movable jaw operated by a screw engaging a nut or half nut carried by the fixed jaw, its object being to provide an improved combination vice which is particularly adapted for use in the maintenance and repair of motor cars and motor cycles.

A vice according to the present invention is provided with means for bending a tube or rod and may also be formed with one or more holes to support a valve stem or for use in straightening bolts or rods.

In addition to the usual jaw faces a pipe grip may be provided between the jaws. In order to facilitate holding articles which depend below the vice jaws the jaws are preferably off-set on one side to a greater extent than on the other.

A hardened steel anvil may be provided at the rear of the fixed jaw and a levelling surface on the other jaw. Soft faced protectors may be provided for the jaws to enable articles to be held without damage.

In a convenient construction the vice is preferably arranged to swivel about a vertical axis and to be locked in the desired position, for which purpose the fixed jaw may be provided with a spindle engaging a hole or socket fitted to the bench, the spindle having a screwed portion and a clamping nut being provided. Preferably a circular rack is provided on the fixed jaw or on a mounting table adapted to be fitted to the bench and providing a socket for the spindle, one or more lugs or the like being provided to engage with the rack. Instead of a rack a circular series of holes or recesses may be provided.

Conveniently the fixed jaw is carried by a substantially vertical standard on a rimmed base, the rim of which may be formed with the rack or with the lug or lugs engaging a rack on the mounting table.

The tube bending device may comprise a vertically grooved lug on the fixed jaw and a rounded lug on the movable jaw having a groove in its surface. In operation a tube to be bent is gripped between the grooves of the two lugs by operation of the vice and may then be bent around the curved lug in the groove therein. If desired this groove may be continued as a helix. Conveniently the lugs are off-set from the adjacent surfaces of the vice so that the tube when bent may be shifted to continue the bending operation if required.

The valve stem holes are preferably formed transversely through the vertical standard at the rear of the fixed jaw and the upper portion of this standard may carry a hardened steel anvil. This anvil is conveniently provided with a studlike projection entering a hole in the upper surface of the standard and adapted to be gripped by a set screw on one side of the standard. The upper surface of the fixed jaw standard may be shaped to provide an anvil beak.

The pipe grip is preferably situated between the vice jaws and the operating screw and may comprise a V-shaped jaw which is preferably of hardened steel suitably serrated or toothed and secured by a set screw in a slot in the movable jaw of the vice. This V-shaped jaw cooperates with a part of, or carried by, the fixed jaw of the vice, preferably by entering a slot therein between suitable faces which may also be V-shaped (with or without serrations) to support a pipe pressed against them by the other member of the pipe grip. The slot enables the pipe gripping space to be closed to zero and prevents the pipe grip from interfering with the normal working of the vice jaws proper.

The upper portion of the movable jaw is usually rounded, but according to a feature of the invention a flat surface is provided on the upper portion of this jaw, preferably at an inclination from adjacent to the operating screw to a rounded

[*Price* 1/-]

portion immediately adjacent to the gripping face. This flat surface may be used for straightening or levelling sheet material and will also be found useful for other purposes when working with metals. If desired it may be provided by a hardened steel plate let into the upper surface of the fixed jaw.

The protectors for the vice jaws may be made of spring material to enable them to be readily placed in position on, or removed from, the jaws of the vice. They may be provided with a soft face of felt, fibre, soft metal or the like to enable articles to be gripped without damage. The soft facing material of the protectors may be attached thereto by rivets or by ears or lugs formed on the spring material bent over to hold the facing in place.

Dated this 27th day of July, 1928.

ARTHUR H. GREENWOOD,
Chartered Patent Agent,
39, Bank Street, Sheffield.

COMPLETE SPECIFICATION.

Improvements in or relating to Vices.

We, C. & J. HAMPTON LIMITED, a British Company, and CHARLES WILLIAM HAMPTON, a British subject, both of Record Works, Ouse Road, Attercliffe, in the City of Sheffield, 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 vices of the type comprising a fixed jaw, adapted to be secured to a bench, and a movable jaw operated by a screw engaging a nut or half-nut carried by the fixed jaw, its object being to provide an improved combination vice which is particularly adapted for use in the maintenance and repair of motor cars and motor cycles.

A vice according to the present invention is provided with means for bending a tube or rod, such means comprising a grooved gripping surface on one jaw coacting with a gripping surface on the other jaw and one of the gripping surfaces is continued as a convex curve on or around which a tube or rod may be bent after it has been secured between the gripping surfaces by manipulation of the vice jaws.

Preferably both these gripping surfaces for the tube or rod whilst being bent are of a grooved formation, the groove preventing or limiting lateral movement of the work during the bending operation. The curved gripping and bending surface may be off-set from the adjacent surface of the vice jaw to facilitate the bending and so that the tube when bent may be shifted to continue the bending operation. If desired this gripping and bending surface may be in the form of a helical groove on which the tube or rod may be bent into a coiled formation.

The curved gripping and bending surface may be formed on a part which is detachable from the vice jaw carrying it in order to facilitate the formation of the desired type of bend by fitting the corresponding shape of surface.

The gripping surface which co-acts with the curved one around which the tube or rod is bent may be concaved to approximately the same curvature in order that the initial bending operation may be performed by the vice screw, whilst the tube or rod is being gripped.

It is known to arrange a vice to swivel about a vertical axis and to lock it in the desired position and in applying this feature to a vice according to the present invention a cylindrical boss may be formed on the base of the fixed jaw fitting a socket in a mounting table and a circular rack be provided concentric with the boss and socket, a pawl lug engaging the rack and means being furnished for adjustably clamping the vice jaw to the mounting table. Preferably the fixed jaw is provided with a rimmed base bearing on the mounting table and encircling the rack which may be formed on either the base or the mounting table, so that by loosening the clamping means the vice may be turned about the axis of the socket, the pawl lug over-riding the teeth of the rack.

A vice according to the present invention may be provided with a lateral hole or holes to support a valve stem, or with any or all of the following features, each of which it has been known to apply to a vice:—(a) A pipe grip between the jaws, (b) vice jaws off-set on one side to a greater extent than on the other, (c) soft-faced protectors for the vice jaws, (d) a hardened steed anvil detachably secured at the rear of the fixed jaw. and (e) a levelling surface on the other jaw.

Each of the protectors for the vice jaws is preferably of spring material having end lugs adapted to clamp the vice jaw ends and a flange to rest on the jaw top, a facing of soft material being fitted to provide a gripping surface.

A bar or rod having a number of parallel longitudinal faces may be provided, having a screwed end or ends corresponding to the screwed portion of sparking plugs so that when the cylinder head of an engine has been removed it may be easily and accessibly held in the vice by means of this bar for which purpose one of the bar ends is screwed into a sparking plug hole of the head.

In the accompanying drawings:—

Figure 1 is an elevation partly in section on the line 1—1 of Figure 2, which is a plan of a vice according to the present invention.

Figure 3 is an end view of Figure 1.

Figure 4 is an elevation of part of the vice shown in Figure 1 illustrating a modified form of the tube bending device.

Figure 5 is a plan of Figure 4.

Figure 6 is an elevation of a detail and Figure 7 is an end view of Figure 6.

Like reference numerals indicate like parts throughout the drawings.

The vice illustrated comprises a fixed jaw 10 adapted to be secured to a bench and a movable jaw 11 operated by a screw 12 engaging a nut portion 13 of the fixed jaw 10 and operated by a handle 14.

According to the present invention the vice is fitted with means for bending a tube or rod and in the construction illustrated in Figures 1, 2 and 3 such means comprise a grooved gripping surface 15 on the fixed jaw 10 co-acting with another gripping surface 16, which is preferably also grooved as illustrated, on the movable jaw 11. The gripping surface 16 is continued as a convex curve 17 so that when a tube or rod is gripped between the grooved surfaces 15 and 16 by manipulation of the vice jaws it may easily be bent around the curved portion 17. The grooved formation of either or both the gripping surfaces 15 and 16 prevents or limits lateral movement of the tube or rod whilst being bent, and the groove is preferably continued in the curved portion 17, although if desired it may only be formed in the part 15 or only in the part 16. By forming the gripping surfaces 15 and 16 in lugs which are off-set from the adjacent surface of the vice jaw it will be appreciated that the tube when bent may be shifted to continue the bending operation.

In the modification illustrated in Figures 4 and 5 the curved gripping and bending surface 16, 17 is in the form of a helical groove so that a tube or rod gripped between the surfaces 15 and 16 may easily be coiled into a helix around the bending surface 17. Although only one turn is illustrated it will be understood that the helical groove 17 may be continued to any desired length.

The curved gripping and bending surfaces 16, 17 may be formed on a part which is detachable from the jaw 11 as indicated in Figures 4 and 5, for which purpose a square boss 18 may be formed on the side of the vice to fit a similarly shaped recess in the part 19 on which the surfaces 16 and 17 are formed, the part 19 being secured in place by a set screw 20. It will be understood that the part 19 may thus easily be removed from the vice and another part fitted having a different size or shape of curved bending surface 17.

In the drawings the gripping surface 15 on the fixed jaw is shown as a vertically grooved lug. If desired, however, it may be made concave to approximately the same curvature as the surface 16 so that a tube or rod placed between these surfaces may be bent by tightening the vice screw 12.

In order that the whole vice may be turned about a vertical axis, to facilitate access to work held thereby, the base of the fixed jaw 10 is formed with a circular rim 21 and a concentric cylindrical boss 22. A mounting table 23 is provided and is formed with a socket 24 into which the boss 22 fits, the rim 21 bearing on the mounting table 23 and encircling a rack 25 which is provided on the mounting table concentric with the socket 24. The base of the fixed jaw 10 is also formed with one or more pawl lugs 26 engaging the rack 25, both the rack 25 and the pawl lugs 26 having preferably a rounded formation as indicated in Figure 1. The engagement of the boss 22 with the socket 24 is of a greater axial length than that of the pawl lugs 26 with the rack 25 and it will thus be understood that the vice may be turned in relation to the mounting table 23 about the axis of the socket 24, the pawl lugs 26 over-riding the rack 25 during such turning and holding the vice in the adjusted position. In order to secure the vice more firmly in the adjusted position a stud 27 is screwed into the boss 22 and is intended to extend through a hole in the bench on which the vice is to be mounted. On the under-side of the bench the stud 27 is fitted with a clamping plate 28 and a clamping nut 29 so that the vice may easily be rigidly clamped in the desired position. The mounting table 23 is intended to be secured to the bench top in the usual manner for which purpose it is provided with screwing holes 30 formed in suitable lugs on the mounting table.

As a modification the rack 25 may be formed on the base of the fixed jaw 10 and the pawl lugs 26 on the mounting table 23 and if desired the rack may be provided

by a circular series of holes or recesses.

The rear portion of the fixed jaw 10 of the vice is preferably shaped to form an anvil as indicated at 31 and this part of the vice, which is conveniently carried on a substantially vertical standard 32 extending from the rim 21, may also be provided with lateral holes 33 adapted to support a valve stem of an internal combustion engine or for use in straightening bolts or rods.

The upper portion of the vertical standard 32 situated between the fixed jaw 10 and anvil 31 may carry a detachable hardened steel anvil 34. This anvil 34 is conveniently provided with a stud-like projection 35 entering a hole in the upper surface of the standard 32 and adapted to be gripped by a set screw 36 or riveted peg on one side of the standard 32.

The vice may be provided with a pipe grip which in the construction illustrated is situated between the vice jaws 10, 11 and the operating screw 12. This pipe grip comprises a V-shaped jaw 37 which is preferably of hardened steel suitably serrated or toothed and secured by a set screw 50 in a slot in the movable jaw 11. The V-shaped jaw 37 co-operates with another V-shaped jaw 38 which is provided as a part of, or is carried by, the fixed jaw 10 of the vice. The co-operation of the jaws 37 and 38 is preferably effected by the jaw 37 entering a slot 39 between two jaw faces 38 in the fixed jaw 10. The jaw faces 38 may be serrated if desired and the parts are preferably so arranged that as the main vice jaws 10 and 11 are closed the rectangular space between the V-shaped jaws 37 and 38 is gradually reduced to zero when the main vice jaws are in contact with one another, the jaw 37 having then entered into the slot 39.

As will be seen from Figures 2 and 3 the vice jaws 10 and 11 are off-set on one side to a greater extent that on the other, thus facilitating the clamping of relatively long articles which depend below the vice jaws in a vertical or inclined position on one side of the vice.

Soft-faced protectors are preferably provided for the vice jaws 10 and 11 to enable articles to be held without damage. These protectors may be made of spring material 40 having end lugs 41 adapted to clamp the ends of the vice jaws and a flange 42 adapted to rest on the top of the jaw 10 or 11. A facing 43 of fibre, felt, soft metal or the like is secured to the spring material 40 by means of rivets or by means of ears or lugs which may be formed on the spring material and bent over to hold the facing 43 in place.

The upper portion of the movable jaw 11 is usually rounded, but according to a feature of the invention a flat surface 44 is provided on this portion of the movable jaw, preferably at an inclination from adjacent to the operating screw 12 to a rounded portion adjacent to the part on which the protector 40, 41, 42, 43 is fitted. This flat surface 44 may be used for straightening or levelling sheet material and will also be found useful for other purposes when working with metals. If desired it may be provided by a hardened steel plate let into the upper surface of the movable jaw 11.

The movable jaw 11 is preferably cast on to a steel slide 45 which is guided in a suitable slot formed in the standard portion 32 of the fixed jaw 10.

A cover 46 is preferably provided for the part of the operating screw 12 which projects through the fixed jaw 11 below the anvil 31. This cover 46 may be fitted in place by set screws 47 engaging suitable flanges of the cover as indicated in Figure 2.

Figures 6 and 7 illustrate a bar 48 having a number of parallel longitudinal faces and screwed ends 49. The pitch of the screwed ends 49 corresponds to the screwed portion of sparking plug so that when the cylinder head of an engine has been removed the bar 48 may be screwed into one of the sparking plug holes of the head and thus provides a device by means of which the head may be clamped in the vice. When so clamped the head will be readily accessible for cleaning purposes and to enable work to be performed on it whilst different parts of the head may be brought into position by swivelling the vice on the rack 25.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

(1) A vice of the type referred to provided with means for bending a tube or rod comprising a grooved gripping surface on one jaw co-acting with a gripping surface on the other jaw, one of the gripping surfaces being continued as a convex curve for the purpose described, with or without a grooved formation of both gripping surfaces.

(2) A vice according to Claim 1 in which the curved gripping and bending surface is off-set from the adjacent surface of the vice jaw for the purpose described.

(3) A vice according to Claim 1 or Claim 2 in which the curved gripping and bending surface is in the form of a helical groove, substantially as and for the purpose described.

(4) A vice according to any of the pre-

ceding claims in which the curved gripping and bending surface is formed on a part which is detachable from the vice jaw carrying it, substantially as described.

(5) A vice according to any of the preceding claims in which the gripping surface co-acting with the curved one is concaved to approximately the same curvature for the purpose described.

(6) In a vice according to any of the preceding claims the combination of a cylindrical boss on the base of the fixed jaw fitting a socket in a mounting table, a circular rack connectric with the boss and socket, a pawl lug engaging the rack and means for adjustably clamping the fixed jaw to the mounting table, substantially as described.

(7) A vice according to Claim 6 in which the fixed jaw is provided with a rimmed base bearing on the mounting table and encircling the rack, which may be formed on either the base or the mounting table, substantially as described.

(8) A vice according to any of the preceding claims having any one or all of the following features:—(a) a lateral hole or holes to support a valve stem, (b) a pipe grip between the jaws, (c) vice jaws off-set on one side to a greater extent than on the other, (d) soft-faced protectors for the vice jaws, (e) a hardened steel anvil detachably secured at the rear of the fixed jaw, and (f) a levelling surface on the other jaw, substantially as described.

(9) A vice according to Claim 8 in which each of the protectors is of spring material having end lugs adapted to clasp the vice jaw ends, and a flange to rest on the jaw top, with a facing of soft material to provide a gripping surface substantially as described.

(10) The combination with a vice according to any of the preceding claims of a bar or rod having a number of parallel longitudinal faces and a screwed end or ends corresponding to the screwed portion of sparking plugs, substantially as and for the purpose described.

(11) The combination and arrangement of parts constituting a vice substantially as described and illustrated in Figures 1, 2, 3, 6 and 7, or in Figures 4 and 5 of the accompanying drawings.

Dated this 25th day of March, 1929.

ARTHUR H. GREENWOOD,
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39, Bank Street, Sheffield.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1929.

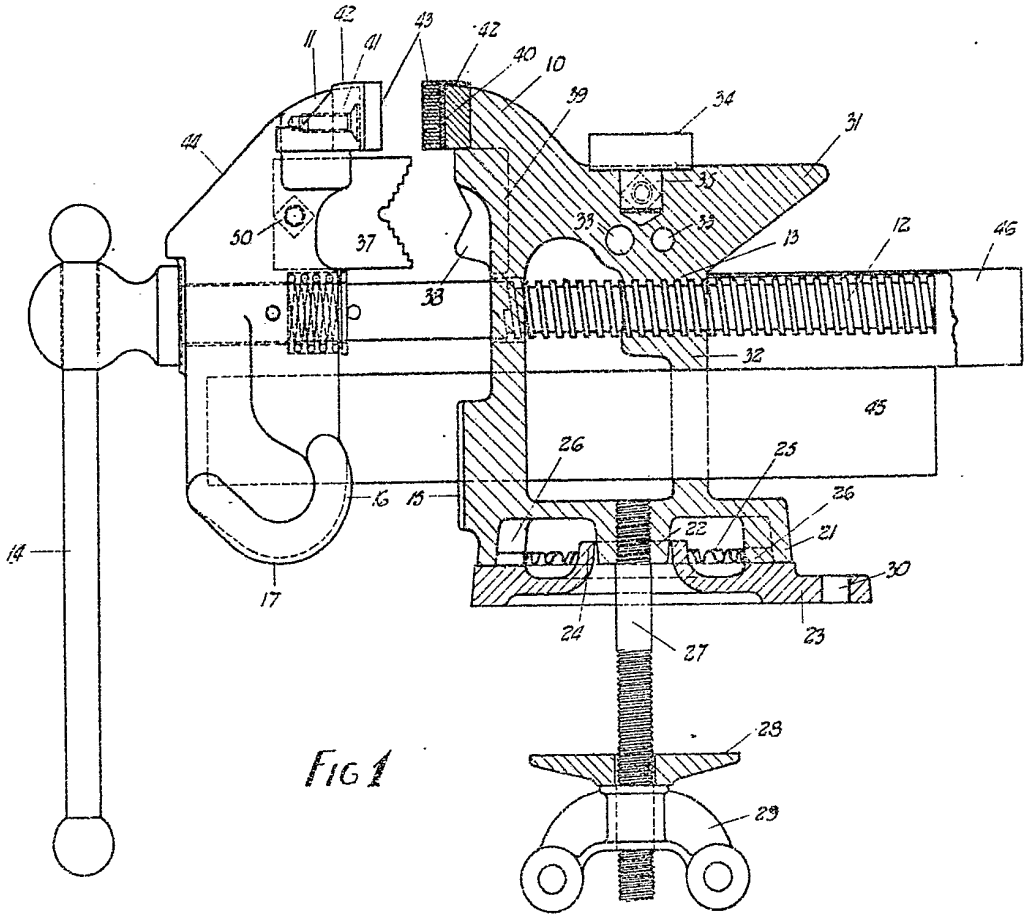


FIG 1

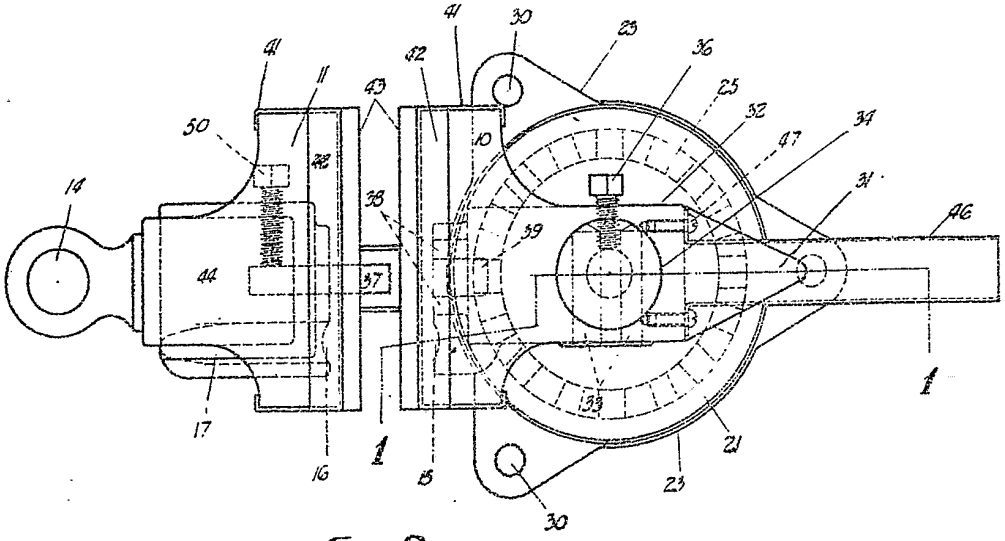
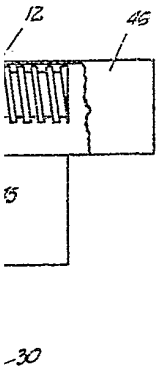


FIG 2.



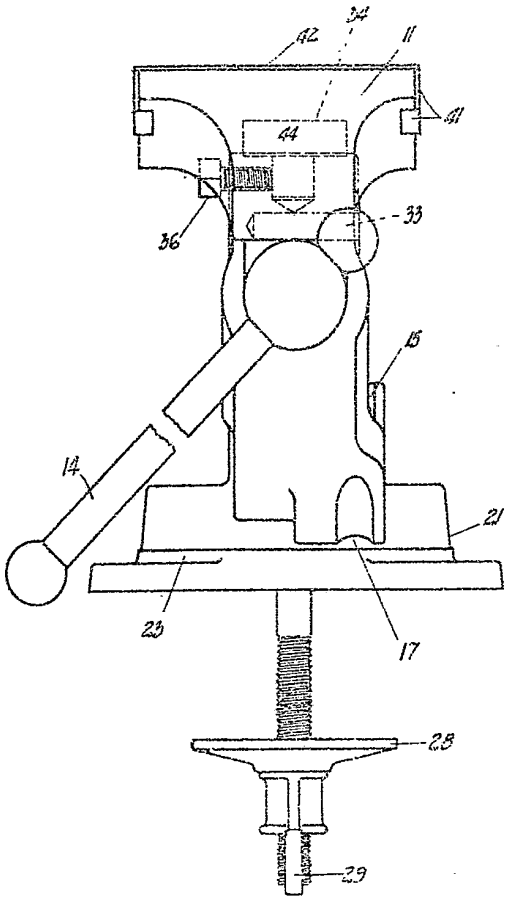


FIG 3

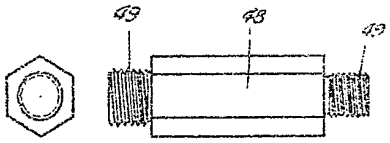


FIG 7 FIG 6

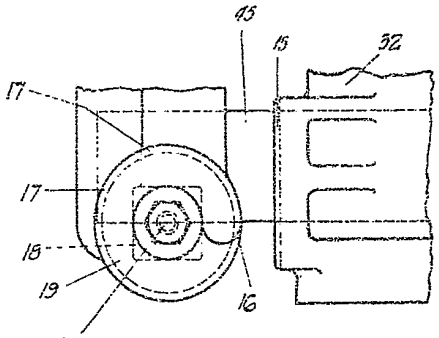
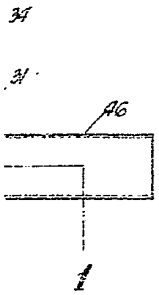


FIG 4



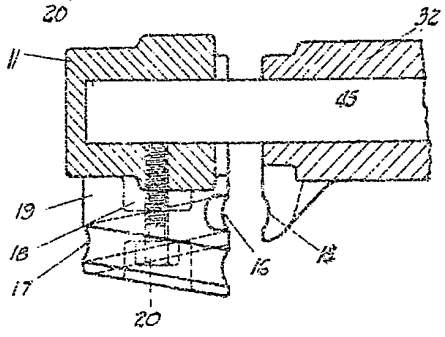


FIG 5

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2 SHEETS
SHEET 2

SHEET 1

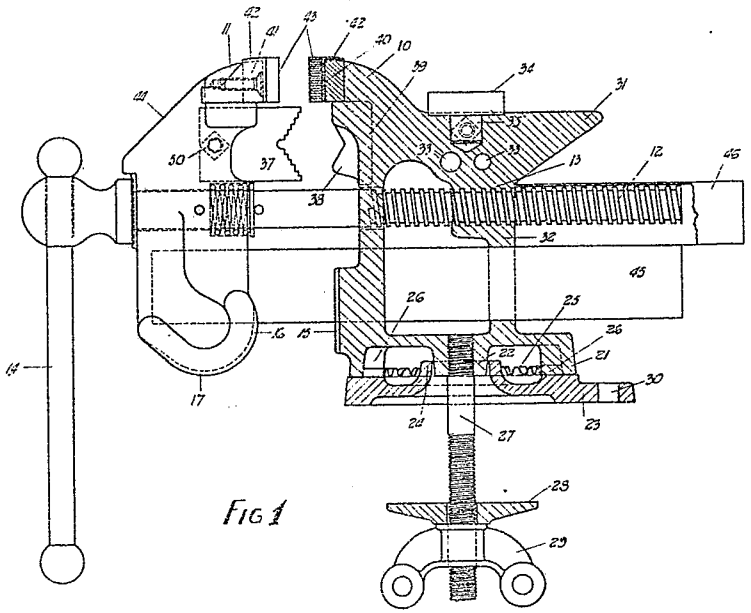

FIG 1

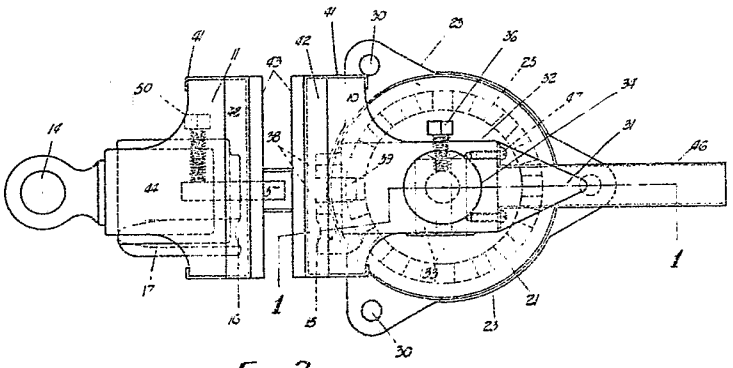

FIG 2

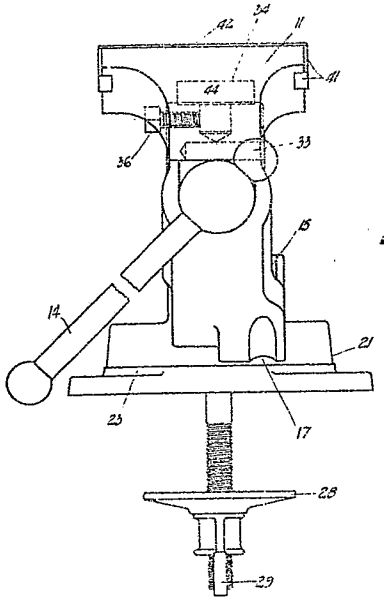

FIG 3

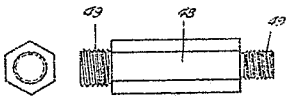

FIG 7 FIG 6

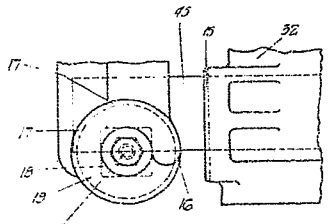

FIG 4

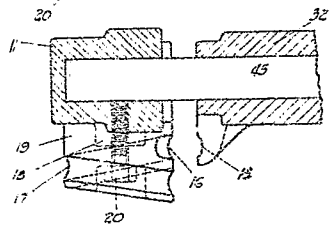

FIG 5

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

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