July 24, 1951 H. E. SLOAN 2,562,067

CHUCK-UNIT WITH REPLACEABLE JAW-INSERT

Filed May 18, 1949

Fig. 1.

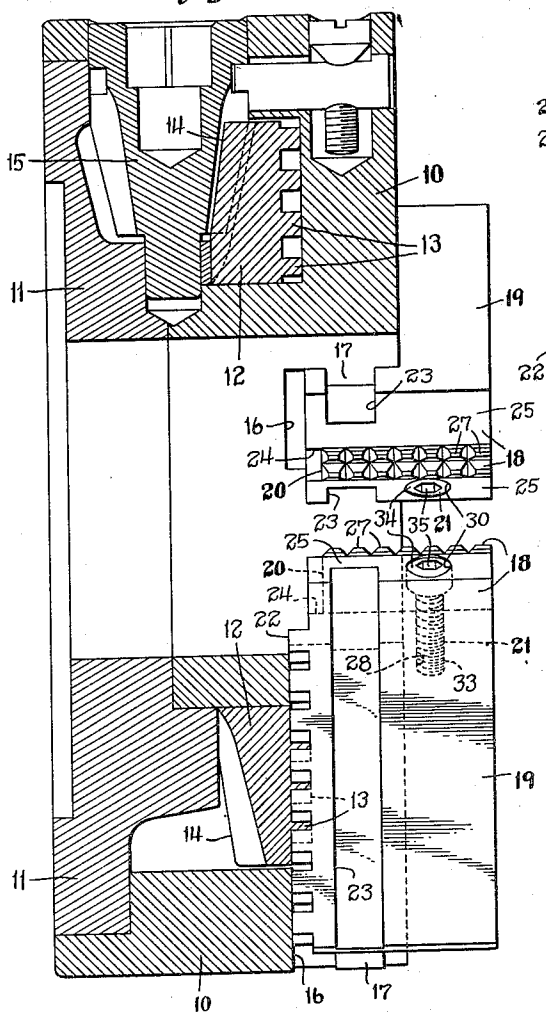


Fig. 2.

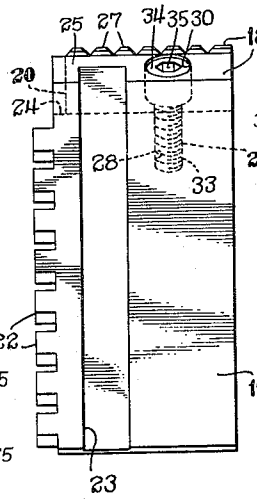


Fig. 3.

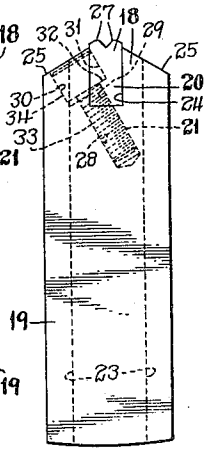


Fig. 4.

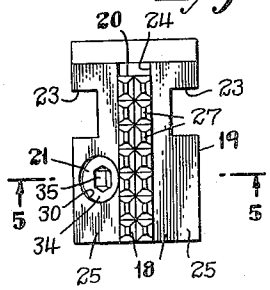


Fig. 5.

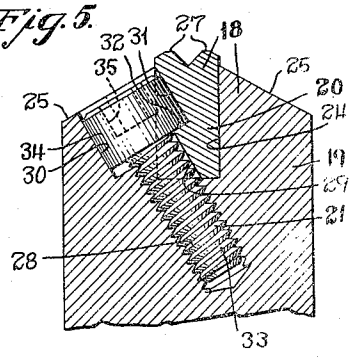


Fig. 6.

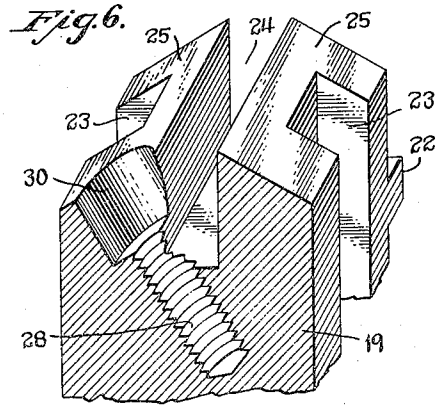
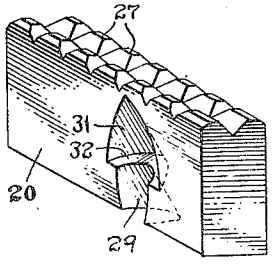


Fig. 7.



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CHUCK-UNIT WITH REPLACEABLE JAW INSERT

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4 Claims. (Cl. 279—116)

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The present invention relates to improvements in chuck-jaw units and relates more particularly to improvements in chuck-jaw units having replaceable gripping-face members.

It has heretofore been proposed to provide chuck-jaw units with replaceable gripping-face members but all such prior structures have been open to such serious objections as not to have come into general use. Among the objections referred to may be mentioned bulkiness of the structure required under old designs to secure firm attachment of the parts, complexity and relative insecurity of the connections between such chuck-jaw units proper and their gripping-face members.

One of the main objects of the present invention is to provide a superior chuck-jaw unit having a replaceable gripping-face member and constructed and arranged so that the said gripping-face member is securely held against displacement under conditions of hard usage and vibration while being readily removable and replaceable when desired.

A further object of the present invention is to provide a superior chuck-jaw unit of the character above referred to and in which the connecting-means between the gripping-face member and the chuck-jaw proper is of such character as not only to be of adequate strength but to not require bulky structure, nor the dangerous weakening of its elements.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a central-longitudinal sectional view of a chuck equipped with chuck-jaw units embodying the present invention;

Fig. 2 is a view in side elevation of one of the chuck-jaw units detached;

Fig. 3 is a view looking toward the outer edge thereof;

Fig. 4 is a top or plan view of the chuck-jaw unit;

Fig. 5 is a broken detailed sectional view taken on the line 5—5 of Fig. 4 but on a larger scale;

Fig. 6 is a broken perspective sectional view of the chuck-jaw body taken on the same plane as Fig. 5 but omitting the gripping-face member and the locking-screw; and

Fig. 7 is a perspective view of the gripping-face member detached.

For the purpose of making clear the utility of one form of chuck-jaw unit embodying the present invention, there is illustrated in Fig. 1 a chuck which is capable of utilizing such units. The said

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chuck includes a body which comprises, in the main, a front member 10 and a complemental rear member 11 both of ring-like form and rigidly secured together in any suitable manner (not shown) common in the art. In the instance shown, there is accommodated within the front member 10 a rotatable operating-scroll 12 having the usual spiral-teeth 13 on its front face and having gear-teeth 14 on its rear face, all in a manner common in the art. Meshing into the gear-teeth 14 just referred to is a socketed pinion 15 rotatable about an axis substantially perpendicular to the central-longitudinal axis of the body and carried by the said body so as to be available for operation from the peripheral surface thereof as is indicated in Fig. 1.

It will be clear to those skilled in the art that the particular form of chuck forms, in itself, no part of the present invention and the form of chuck shown is chosen solely for purposes of illustrating the utility of the chuck-jaw units of the present invention.

In the instance shown, the front member 10 of the body is formed with a plurality of substantially-radial guideways 16 opening through the forward face of the said body and each formed intermediate its front and rear with guide-ribs such as 17 indicated in Fig. 1.

Mounted for reciprocation in each of the guideways 16 is one of the desired number of corresponding chuck-jaw units generally designated by the reference character 18. Each of the similar chuck-jaw units comprises, in the main, a chuck-jaw body 19, a gripping-face member or jaw-insert 20 and a locking-screw 21.

To enable the chuck-jaw units to be utilized in a scroll-type chuck, each chuck-jaw body 19 is formed on its rear face with a plurality of slightly-inclined transverse ribs 22 which interfit with the convolutions of the spiral rib 13 of the operating-scroll 12 to thereby enable each chuck-jaw unit 18 to be concurrently moved radially inwardly and outwardly by a turning movement of the said operating-scroll—all in a manner well known in the art. On each of its respective opposite side faces, each chuck-jaw body 19 is formed with longitudinal guide-grooves 23—23 adapted to cooperate with a smooth sliding fit with guide-ribs or their equivalent such as 17 before described.

Transversely intermediate its guide-grooves 23—23, each chuck-jaw body 19 is formed in its inner end with a holding-groove 24 extending completely through the said chuck-jaw body from its front edge to its rear edges and also opening through the inner end of the chuck-jaw body, as is especially well shown in Fig. 6.

The respective opposite side walls of the holding-groove 24 are substantially parallel with each other and with the respective opposite side

faces of the chuck-jaw body. Preferably and as shown, the inner end of the chuck-jaw body is beveled in opposite directions as at 25—25.

Mounted in the holding-groove 24 in the inner end of each chuck-jaw body 19 with a snug sliding fit, is the gripping-face member 20 before referred to of substantially-rectangular form in cross section and provided, in the present instance, on its outer face with gripping-teeth or -peaks 27 for gripping engagement with a pipe or other work-piece. In addition to closely fitting the respective opposite side walls of the holding-groove 24, the gripping-face member 20 has its inner surface firmly seated against the bottom of the said holding-groove, as is especially well shown in Fig. 5.

Extending diagonally in the inner portion of the chuck-jaw unit 18 is a screw-receiving recess which is formed partly in the chuck-jaw body 19 and partly in the gripping-face member 20 as will presently be described. The said screw-receiving recess comprises an inclined inner internally-threaded portion or bore 28 formed in the chuck-jaw body 19 and intersected and interrupted by the holding-groove 24. The upper portion of the said threaded portion 28 is complemented in its cylindrical cross-sectional form by an inclined clearance-notch 29 formed in the adjacent face of the gripping-face member 20 as is especially well shown in Figs. 5 and 7. At the outer end of its threaded portion 28, the chuck-jaw body is formed with an inclined head-clearance recess 30 which, in turn, is intersected and interrupted by the holding-groove 24, as is especially well shown in Fig. 6. The head-clearance recess 30 is of circularly-contoured form in cross section and is complemented by an inclined head-receiving notch 31 formed in the adjacent face of the gripping-jaw member, as is especially well shown in Figs. 5 and 7. The said head-receiving notch 31 is of a larger radius than the radius of the clearance-notch 29 to thus provide an arcuate clamping-shoulder 32 at the junction of the two said features 29 and 31, which clamping-shoulder faces generally toward the inner end of both the chuck-jaw body 19 and the gripping-face member 20 in substantial parallelism with the adjacent bevel 25 at the inner end of the chuck-jaw body 19.

As will be apparent from the foregoing considered in conjunction with the accompanying drawings, the inclined threaded portion 28 in the chuck-jaw body 19 and the inclined clearance-notch 29 in the gripping-face member 20 complement each other to form a cylindrical socket for the reception of the threaded stem 33 of the locking-screw 21. Preferably and as shown, the surface of the clearance-notch 29 in the gripping-face member 20 is left unthreaded, while preferably the threaded portion 28 in the chuck-jaw body 19 is threaded throughout substantially its entire length.

It will also be apparent from the foregoing that the head-clearance recess 30 in the chuck-jaw body 19 is complemented by the head-receiving notch 31 in the gripping-face member 20 to provide a substantially-cylindrical recess for the reception of the head 34 of the locking-screw 21, which latter is of cylindrical form as shown. In the instance shown, the head 34 is formed in its outer end with a polygonal wrench-receiving recess 35 adapted to receive a suitable "Allen" type wrench or other suitable tool, by means of which the entire locking-screw 21 may be rotated as desired.

By means of the present invention, the chuck-jaw body 19 or its equivalent may be produced from readily-fabricated metal such as machinery steel, while the smaller gripping-face member 20 or its equivalent may be formed of relatively-hard material such as hardened tool steel.

When the gripping-face member is positioned in the holding-groove 24, the inner face of the head 34 of the locking-screw 21 will seat against the clamping-shoulder 32 in the gripping-face member 20 and tightly bind the said member 20 in place against displacement in all directions by a clamping action which not only tends to move the said member 20 into tight engagement with the bottom of the holding-groove 24, but also to force the said member 20 against the face of the holding-groove 24 opposite to the face which is intersected by the head-clearance recess 30. It will be noted that the bottom of the head-clearance recess 30 is located below the normal position of the clamping-shoulder 32 in the gripping-face member 20 so as not to check the inward movement of the locking-screw 21 but to permit the same to seat the underface of its head 34 firmly against the said clamping-shoulder 32, as is indicated in Fig. 5.

By means of the features exemplified by the structure herein shown and described and in which the locking-screw 21 or its equivalent extends diagonally with respect to both the chuck-jaw body 19 and the gripping-face member 20, not only are the members last mentioned not appreciably weakened, but the clamping action of the said locking-screw is rendered most effective and least liable to be loosened by vibration and hard usage. Furthermore, in accordance with the present invention, it is not necessary to make the chuck-jaw unit bulky in order to accommodate suitable means for rigidly assembling a gripping-face member with a chuck-jaw body.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. A chuck-jaw unit including in combination: a chuck-jaw body constructed and arranged to be mounted in a chuck, said chuck-jaw body having a holding-groove in one end extending in substantial parallelism with its opposite side faces, the said chuck-jaw body being further provided with a threaded bore located laterally intermediate of and inclined with respect to the said side walls of the chuck-jaw body out of alignment with the transverse axis thereof and having one of its sides intersected and interrupted by an inner corner of the said holding-groove, the said chuck-jaw body also having a head-clearance recess formed in one side of its said holding-groove in axial alignment with the said threaded bore; a gripping-face member installed in the holding-groove of the said chuck-jaw body and in turn formed in an inner corner with an inclined clearance-notch registering with and complementing the outer portion of the threaded bore in the chuck-jaw body, the said gripping-face member also having an inclined head-receiving notch located outwardly of its said clearance-notch and registering with and complementing the head-clearance recess in the chuck-jaw body, the said

head-receiving notch being larger in cross section than the said clearance-notch and the said gripping-face member having an outwardly-facing clamping-shoulder at the junction of its said head-receiving notch and clearance-notch; and a locking-screw having a threaded stem passing through the inclined clearance-notch in the said gripping-face member into threaded engagement with the inclined threaded bore of the chuck-jaw body, the said locking-screw also having a head fitting jointly into the inclined head-clearance recess in the chuck-jaw body and the inclined head-receiving notch in the said gripping-face member with the inner face of the said head seated against the said clamping-shoulder to lock the said gripping-face member in the aforesaid holding-groove of the chuck-jaw body.

2. A chuck-jaw unit including in combination: a chuck-jaw body constructed and arranged to be mounted in a chuck and having a holding-groove in one end located intermediate its opposite side faces and extending in substantial parallelism with the said side faces, the said chuck-jaw body being further provided with a threaded bore extending beneath the bottom of the said holding-grooves and inclined with respect to the side walls of the said holding-groove, the said bore having one of its sides intersected and interrupted by an inner corner of the said holding-groove, the said chuck-jaw body also having a head-clearance recess formed in one side of its said holding-groove in axial alignment with the said threaded bore; a gripping-face member installed in the holding-groove of the said chuck-jaw body and in turn formed in an inner corner with an inclined clearance-notch registering with and complementing the outer portion of the threaded bore in the chuck-jaw body, the said gripping-face member also having an inclined head-receiving notch located outwardly of its said clearance-notch and registering with and complementing the head-clearance recess in the chuck-jaw body, the said head-receiving notch being larger in cross section than the said clearance-notch and the said gripping-face member having an outwardly-facing clamping-shoulder at the junction of its said head-receiving notch and clearance-notch; and a locking-screw having a threaded stem passing through the inclined clearance-notch in the said gripping-face member into threaded engagement with the inclined threaded bore of the chuck-jaw body, the said locking-screw also having a head fitting jointly into the inclined head-clearance recess in the chuck-jaw body and the inclined head-receiving notch in the said gripping-face member with the inner face of the said head seated against the said clamping-shoulder to lock the said gripping-face member in the aforesaid holding-groove of the chuck-jaw body.

3. A chuck-jaw unit, comprising a jaw-body adapted for mounting in a chuck and having in one end thereof a groove extending depthwise longitudinally of said jaw-body; a jaw-insert removably received in said groove and having a work-gripping face outside said groove, said body and insert having recesses, respectively, which complement each other to form a bore extending from said one body-end on one side of said groove inwardly and inclined toward the longitudinal axis of said body to a depth beyond that of said groove, and being cross-sectionally enlarged at said one body-end to form shoulders in said body and insert, respectively, said bore being also tapped at least over that length thereof which extends inwardly beyond the depth of said groove; and a screw threadedly received in said bore and having a head seated against said shoulder in said insert for releasably locking the latter in said groove.

4. A chuck-jaw unit, comprising a jaw-body adapted for mounting in a chuck and having in one end thereof a groove extending depthwise longitudinally of said jaw-body; a jaw-insert removably received in said groove in fitted relation therewith and having a work-gripping face outside said groove, said body and insert having recesses, respectively, which complement each other to form a bore extending from said one body-end on one side of said groove inwardly and inclined toward the longitudinal axis of said body to a depth beyond that of said groove, and being cross-sectionally enlarged at said one body-end to form shoulders in said body and insert, respectively, of which said insert shoulder is closer to said one body-end than the other shoulder, said bore being also tapped at least over that length thereof which extends inwardly beyond the depth of said groove; and a screw threadedly received in said bore and having a head totally received in said enlarged bore portion and being seated against said insert shoulder for releasably locking said insert in said groove.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,071,289	Boder	Aug. 26, 1913
1,181,845	Church	May 2, 1916
1,454,148	Bisset	May 8, 1923
1,844,616	Whiton	Feb. 9, 1932
2,069,775	Rich	Feb. 9, 1937
2,158,490	Webster	May 16, 1939
2,213,653	Lisbon	Sept. 3, 1940
2,275,828	Sloan et al.	Mar. 10, 1942

FOREIGN PATENTS

Number	Country	Date
775,998	France	Oct. 22, 1934