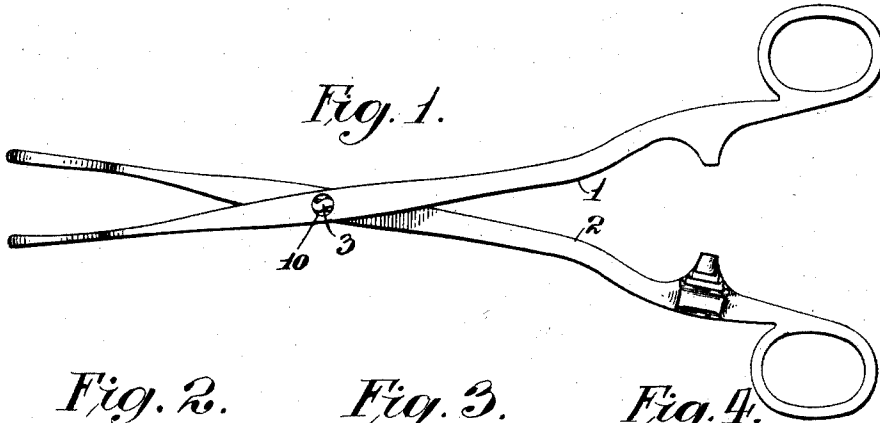
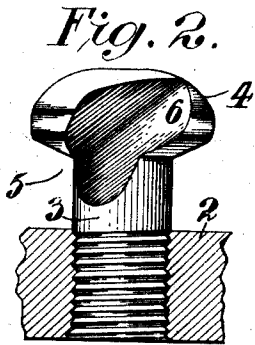
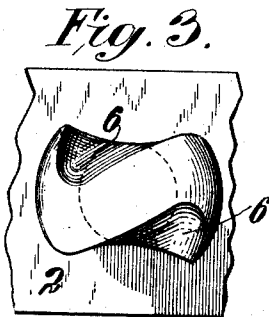
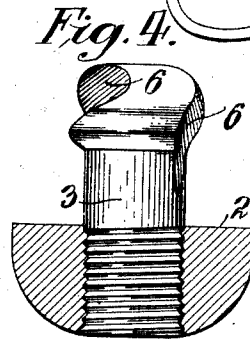
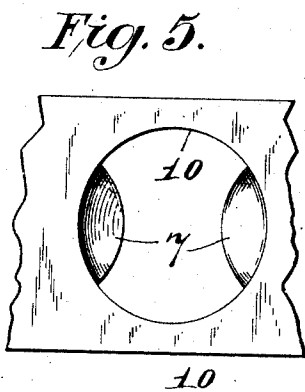
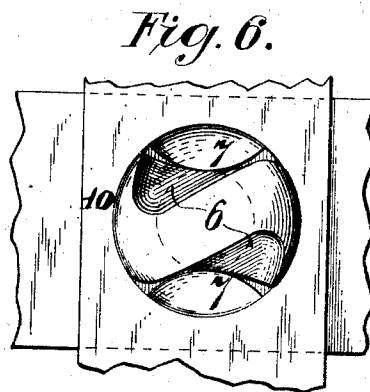


No. 864,558.

PATENTED AUG. 27, 1907.

G. F. RICHTER.
SEPARABLE PIVOT JOINT.
APPLICATION FILED AUG. 18, 1904.

2 SHEETS—SHEET 1.



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APPLICATION FILED AUG. 18, 1904.

2 SHEETS—SHEET 2.

Fig. 7.

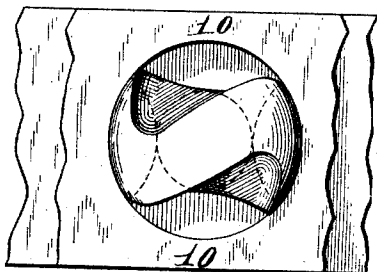


Fig. 8.

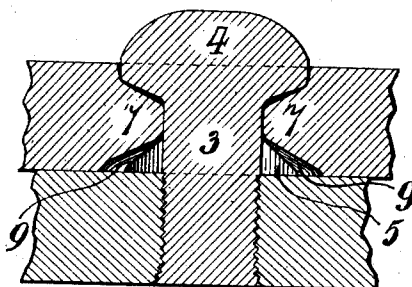


Fig. 9.

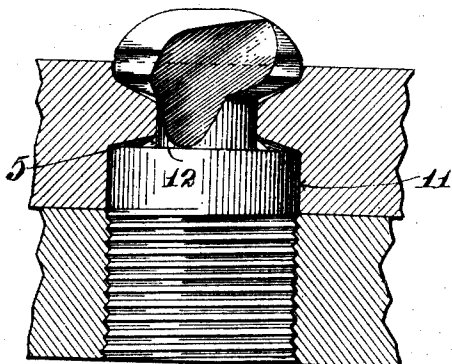


Fig. 10.

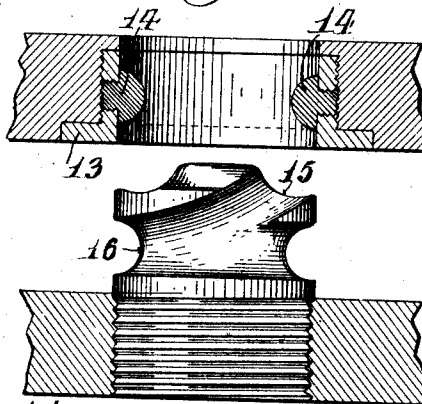


Fig. 11.

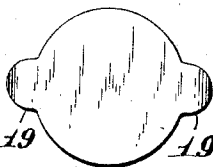


Fig. 12.

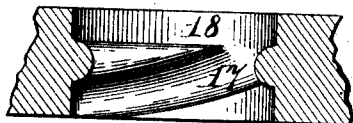
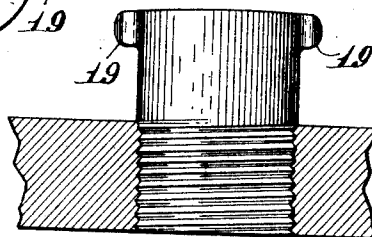


Fig. 13.



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UNITED STATES PATENT OFFICE.

GUSTAV F. RICHTER, OF NEW YORK, N. Y.

SEPARABLE PIVOT-JOINT.

No. 864,558.

Specification of Letters Patent.

Patented Aug. 27, 1907.

Application filed August 18, 1904. Serial No. 221,231.

To all whom it may concern:

Be it known that I, GUSTAV F. RICHTER, a citizen of the United States, and a resident of the borough of Brooklyn, city and State of New York, have invented certain new and useful Improvements in Separable Pivot-Joints, of which the following is a full, clear, and true specification.

This invention relates to improvements in tong-like instruments such as scissors, forceps, surgical and other pivoted instruments, and more particularly to a construction of separable pivot joint therefor which is pre-eminently durable and strong and not likely to become damaged or injured by severe or prolonged usage.

The invention also involves certain other advantages and features of importance hereinafter fully described and pointed out in the accompanying claims.

Referring to the two sheets of drawings forming a part of this specification, and in which like reference characters refer to like parts, Figure 1 is a view in plan of a scissor-like instrument embodying a form of this invention, Fig. 2 is a side elevation of a male member, Fig. 3 a plan of Fig. 2, Fig. 4 a side elevation at right angles to the view of Fig. 2, Fig. 5 a top plan of a female member corresponding to Figs. 2—4, Fig. 6 a plan of male and female members in the preliminary stage of interlocking, Fig. 7 a plan of the same after interlocking, Fig. 8 a longitudinal section of Fig. 7, Fig. 9 a view partly in longitudinal section of a modified form, Fig. 10 a view of male and female members of a further modification, and Figs. 11, 12 and 13 are respectively plan and cross-sections of a still further modification.

In Fig. 1 is shown a tong-like instrument comprised of the lever members 1 and 2 pivotally united by a separable joint embodying this invention, whereby said members are securely interlocked with freedom for relative rotary movement at all normal operating angles but may be readily separated one from the other by opening the said members to an angle approxi-

40 mating 90°.

The joint is composed of male and female members which have complementary formations in the form of a quick pitch screw thread engagement in such manner that an initial partial relative rotation will draw the two parts together and further rotation will take place with the parts in a securely interlocked condition.

The complementary elements of the interlocking engagement may be formed upon either the male or the female member and either or both of the latter may assume various formations and constructions, as will presently appear. In Figs. 1—8 the male member consists of a headed stud 3 screw threaded and also upset into one lever member so as to be permanently held therein. The end of the stud or the head 4 is larger

than that portion of the stud immediately below it so as to form in conjunction therewith an annular recess 5 around the shank of the stud in which a suitable projection of the female member is adapted to be retained when the parts are assembled in interlocked condition. 60 Leading out of the retaining recess 5 on opposite sides of the head 4 are two inclined passages or grooves 6 which run spirally around the stud intersecting the head of the same, these grooves being in principle two ordinary quick pitch screw thread grooves which terminate at their inner ends in grooves of no pitch whatever, *i. e.* the annular recess 5 which surrounds the stud in a plane at right angles to its axis. The female member consists simply of a socket or aperture in its lever member 1, having two oppositely disposed projections 7, the diameter of the socket being such as to form a snug fit over the head 4, and the two projections being shaped to ride freely in the grooves 6 and recess 5. The projections are also shaped in vertical dimension to fit snugly against the upper wall of said recess 5 and also against the shank of the stud (Fig. 8), and they are provided with the bevels 9 on their bottom or inner sides to facilitate the registry of male and female parts when the parts are brought together.

The relative positions of male and female members with respect to the lever members may of course be varied as desired to suit special requirements, but, in any event, the relative position of projections and grooves is preferably such that when the two lever members are placed at right angles to each other, as shown in Fig. 6, 85 or nearly so, the projections 7 will easily settle in registry with the grooves 6 aided by the bevels 9 above mentioned, so that a slight relative closing movement of the two lever members will cause the projections to ride down the incline of the grooves into the recess 5, or portion of no incline, where they will manifestly be retained by the overhanging head 4, as shown in Figs. 7 and 8, and be confined snugly therein to afford a compact and close fitting pivotal joint.

It should be observed at this point that the retaining recess is not required to extend all the way around the stud and that the number of grooves 6 as well as their pitch or inclination are matters of degree which may be varied within wide limits without departing from this invention. 100

An important advantage of the construction just described lies in the fact that the closing rotary movement of male and female parts tends to draw them together without liability of the two becoming cramped or jammed in open position and the stud's becoming twisted or loosened by a premature attempt to close them. Furthermore, this advantage is secured with a socket for the female member which is not open at its side, that is to say, the socket is bored centrally in the said member, leaving the side pieces, indicated by 10, 110

intact on both sides, thereby preserving great strength in this member.

For instruments requiring extra strength in their pivotal joints, it is possible to increase the bearing surface of the above described joint without altering the operation of the separable and interlocking features. Thus, as shown in Fig. 9, the female member is provided with a comparatively deep recess 11 below its inward projections and the shank of the stud is enlarged to form a shoulder 12 fitting said recess, the parts being otherwise formed as above described. The bearing surface afforded between this shoulder and recess may obviously be made larger, if desired, either by increasing their respective height and depth or by increasing their diameters, and various other possible changes of the proportions of the stud and socket members will be manifest. The inward projections 7 are preferably disposed intermediate the ends of the socket or a little below the outer surface, so as to provide a countersink for the head 4, although they may be disposed entirely above said surface, if so desired. The top of the head as well as the other parts are preferably rounded to give freedom of action as clearly indicated in the drawing.

In Fig. 10 I have shown a constructional variation in the formation of the female member. The socket is provided with a flanged threaded bushing 13, screwed into the same and permanently brazed or welded in position, forming flush joints with the edges of the socket, but before insertion in the socket, the two rounded or semi-spherical headed pins 14 are screwed into the walls of the bushing and also permanently fastened therein, as shown. These pins may be formed of special highly tempered steel more durable than the metal of either the bushing or lever member, and the inclined grooves 15 and retaining recess 16 with which the pins cooperate are correspondingly shaped, but the stud member is otherwise similar in principle to that of the preceding figures and capable of the same variations.

Figs. 11—13, represent a construction in which the inclined grooves 17 and retaining recess 18 are on the female member, and the projections 19, adapted to engage with them, on the male member. The principle of operation, however, is the same as in the preceding figures, the parts being placed in registry so that the projections will engage the inclined or quick pitch grooves and ride therein upon a short relative rotary movement into the straight retaining recess 18. The relative sizes and disposition of the parts of this form of joint are manifestly capable of considerable variation to suit special requirements and to insure against jamming or cramping of the members.

In the various forms above described, the pitch of the screw thread grooves is such that a comparatively slight relative rotation of the lever members will draw them together and a very slight further rotation will put the projections underneath the overhanging portions of the head or part which bounds the retaining recess on its upper side thereby interlocking them, this being the most convenient disposition of the parts for ordinary instruments. It will be understood, however, that the inclination of the grooves may be reduced where the nature of the instrument will permit, so that a greater relative movement will be necessary to effect this interlocking, and at the same time the advantage of certain

and positive engagement without liability of cramping will be secured.

Having described my invention, what I claim and desire to secure by United States Letters Patent is:—

1. A tong-like instrument having a separable pivot joint formed of relatively rotatable male and female joint members, one of said members being provided with an inclined groove leading into a retaining recess which is disposed in a plane at right angles to the axis of rotation of said member, and a projection on the other member adapted to ride down the inclined groove into the retaining recess and travel therein as the said joint members are rotated within their normal operating angles.
2. A tong-like instrument having a separable pivot joint comprising a stud provided with an inclined groove of quick pitch at its outer end terminating, at its inner end, in a recess or groove disposed in a plane at right angles to said stud, in combination with a socket member adapted to fit over and turn upon said stud, and an interior projection in said socket member adapted to ride down said inclined groove and be retained in said recess.
3. A tong-like instrument having a separable pivot joint comprising relatively rotatable male and female members, one member having an annular retaining recess and a projection on the other member adapted to be received and held in said recess, in combination with an inclined groove leading out of said recess, whereby the members may be separated by relative rotary movement.
4. A tong-like instrument having a separable pivot joint comprising a male member having a head affording an annular retaining recess beneath it and a female member containing a socket to receive said head and an inward projection in said socket adapted to be received by said recess to hold the members together, in combination with a spiral groove leading from said recess through the head and providing an exit for said projection, whereby the members may be separated upon relative rotary movement.
5. A tong-like instrument having a separable pivot joint comprising male and female members, a pair of oppositely disposed spiral grooves on one member and a pair of projections on the other member adapted to engage said grooves, in combination with an annular retaining recess at the inner termination of said grooves adapted to receive said projections.
6. A tong-like instrument having a separable pivot joint comprising a socket member provided with inward projections disposed intermediate of the ends of the socket, and a stud member containing a retaining recess receiving said lugs, and a shoulder below said recess fitting said socket.
7. A tong-like instrument having a separable pivot joint comprising a socket member provided with oppositely disposed inward projections and bevels 9 on the bottom faces thereof, in combination with a headed stud having an annular retaining recess adapted to receive said projections.
8. A tong-like instrument having a separable pivot joint comprising male and female members having a screw-thread engagement, said engagement being effected by screw-thread grooves on one member of quick pitch at their outer extremities and terminated at their inner extremities in recesses which are transverse to the axis of the joint and suitable projections on the other member engaging said grooves, in combination with a bearing recess on the inner face of one of said members and a corresponding shoulder on the other member fitting said recess, whereby additional bearing surface is secured for pivotal movement of said members.
9. A tong-like instrument having a separable pivot joint comprising a female member having a socket, a bushing in said socket and inwardly projecting members or pins on said bushing, in combination with a male member provided with grooves engaging said projections.

In testimony whereof, I have signed by name to the specification in the presence of two subscribing witnesses.

GUSTAV F. RICHTER.

Witnesses:

G. A. TAYLOR,
H. G. KIMBALL.