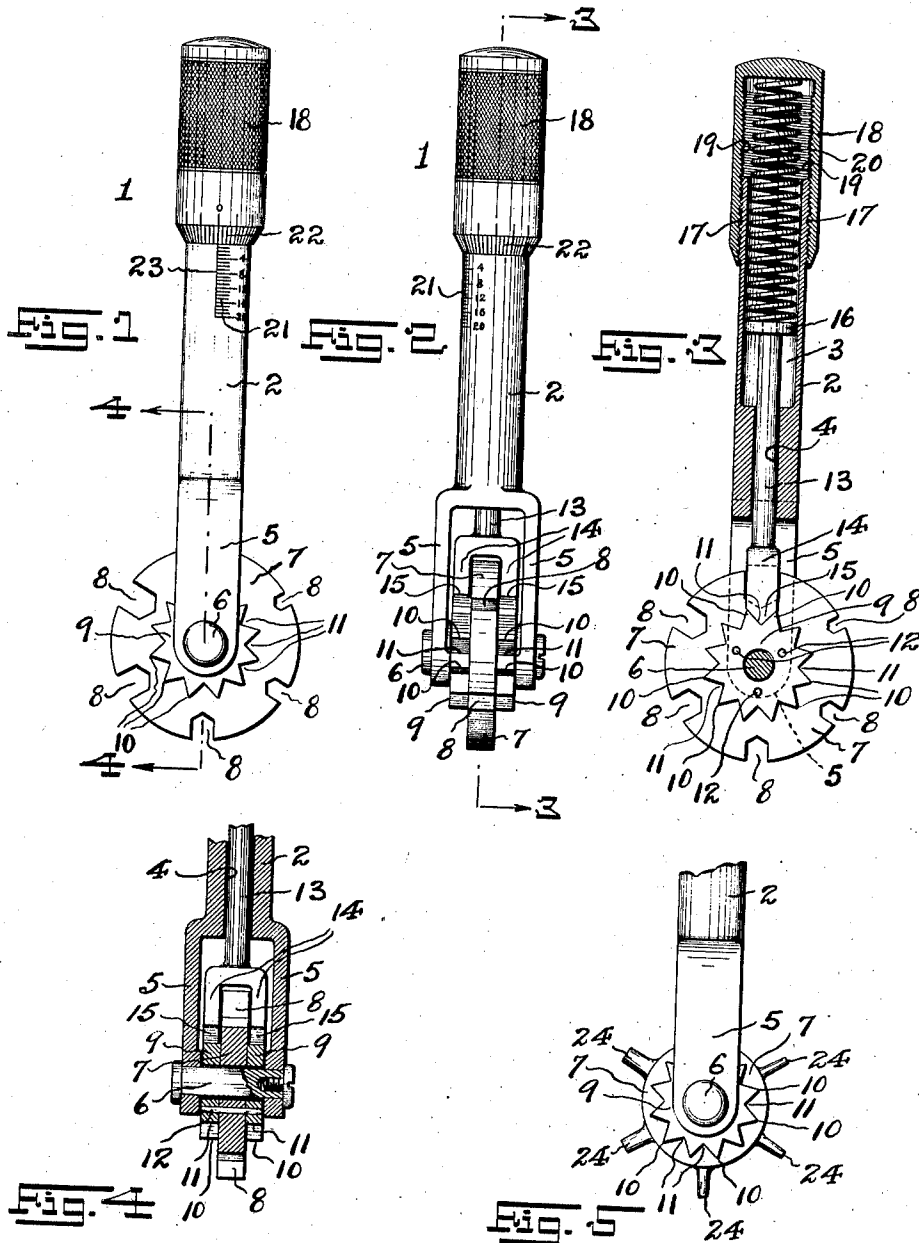


1,303,595.

G. RIFFLARD.
WRENCH.
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WRENCH.

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To all whom it may concern:

Be it known that I, GEORGES RIFFLARD, a citizen of the Republic of France, residing at New York, in the county of Bronx and State of New York, have invented certain new and useful Improvements in Wrenches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

The present invention has reference, generally, to improvements in wrenches; and the invention relates more particularly to a novel construction of wrench adapted to be used for screwing up nuts, turn-buckles and the like to a desired predetermined pressure or tension.

The invention has for its principal object to provide a simple, novel and efficient construction of wrench which may be regulated to apply a tightening pressure or tension to nuts, turn-buckles and the like up to a predetermined and desired amount, the wrench automatically yielding to stop the turning or screwing up of the nut, turn-buckle or the like immediately the desired pressure or tension has been applied to the latter. For this purpose the tool is of peculiar value in tightening up the stays and bracing wires in aeroplane structures, wherein it is always desirable that the same be accurately tightened up to a desired tension within reasonable limits, and no more or no less.

Other objects of the present invention, not at this time more particularly enumerated, will be clearly understood from the following detailed description of the same.

With the various objects of the present invention in view, the same consists primarily in the novel construction of wrench hereinafter set forth; and, the invention consists, furthermore, in the several novel arrangements and combinations of the various devices and parts, as well as in the details of the construction thereof, all of which will be hereinafter more fully described, and then finally embodied in the claims which are appended hereto.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of the novel

construction of wrench, made according to and embodying the principles of my present invention; Fig. 2 is an edge elevation of the same; Fig. 3 is a vertical longitudinal section of the same, taken on line 3—3 in said Fig. 2; Fig. 4 is a detail transverse vertical section of the lower end of the same, taken on line 4—4 in said Fig. 1; and Fig. 5 is a detail side elevation of the lower end of a slightly modified construction of my novel wrench device.

Similar characters of reference are employed in all of the hereinabove described views, to indicate corresponding parts.

Referring now to the said drawings, the reference character 1 indicates the complete novel construction of wrench, made according to and embodying the principles of my present invention, the same comprising a main barrel or handle portion 2, having in its upper end a tubular chamber 3, and in its lower end a central axially alined guideway 4 extending upwardly into communication with the lower end of said chamber 3. Connected with the lower end of said barrel or handle portion 2, preferably as an integral part thereof, is a bifurcated fork or yoke 5, the ends of which are perforated to receive and support a cross-pin or axle member 6. Mounted upon said cross-pin or axle member 6, so as to be capable of turning thereon, is a wrench disk or plate 7, preferably circular in form. Formed in the marginal edge or periphery of said disk or plate 7 are a plurality of wrench-sockets 8 of various sizes, and preferably spaced equidistant apart about the said periphery of said disk or plate 7. Arranged upon each side of said disk or plate 7 are star-wheels 9, of smaller diameter, the radial teeth of which provide intermediate sockets or notches 11 disposed about the peripheries of said star-wheels. Said star-wheels are fixed to said disk or plate 7, so as to move therewith, by means of transverse fastening pins 12.

The reference character 13 indicates a plunger-rod which is slidably disposed in said guideway 4 of said barrel or handle portion 2, so that its upper end projects upwardly into the chamber 3 of the latter. Connected integrally with the lower end of said plunger-rod 13 is a bifurcated fork 14, the arms of which straddle the said disk or plate 7. Formed at the free end of each arm of said fork 14 is a nosing 15 shaped to

conform to the sockets or notches 11 of said star-wheels 9. Said nosings 15 are respectively engaged in a socket or notch of each star-wheel 9 by the downward thrust of said
 5 plunger-rod 13. Connected with the upper end of said plunger-rod 13 is a head-piece 16 which slides in said chamber 3 of said barrel or handle-portion 2.

The upper end of said barrel or handle-portion 2 is provided on its exterior surface with an exterior or male micrometer screw-thread 17 of desired pitch and size.

The reference character 18 indicates a micrometer head or cap provided with an
 15 internal or female micrometer screw-thread 19 operatively engaged with said exterior or male micrometer screw-thread 17 of said barrel or handle-portion 2. Arranged within said chamber 3 of said barrel or handle-portion 2, so as to be seated upon and so as
 20 to thrust upon said head-piece 16 of the plunger rod 13 is a governor compression spring 20, the upper end of which enters said micrometer head or cap 18 so as to thrust
 25 downward of said micrometer head or cap 18 increases the compression of said spring 20, and consequently increases the tension or weight of its thrust upon said plunger-rod
 30 13. Inscribed upon the outer surface of said barrel or handle-portion 2 below said micrometer head or cap 18 is a graduated scale 21 for indicating pounds or other denominations of weight, pressure or tension, so that
 35 as the micrometer head or cap is turned down upon the barrel or handle-portion 2 an indication of the tension which the spring 20 will exert in a given case will be thus indicated by the position of said head or cap 18
 40 relative to the said scale. The lower end or skirt of said micrometer head or cap 18 is chamfered or beveled and inscribed with a graduated scale or vernier 22, which cooperating with a meridian line 23 provided in
 45 connection with the scale 21 of the barrel or handle portion 2, may be utilized to indicate fractions of a pound, as for example, ounces. Of course, while I have mentioned pounds
 50 as the weight factor or unit of measure by which the tool may be set, I do not limit myself to the use of such a factor or unit, but may, if it is desirable, utilize a factor or unit based on the metric system of measure, such for example as the kilogram.

55 The manner of using the novel wrench is as follows:

Assume that it is desired to tighten a bracing wire of an aeroplane structure to a tension of twelve pounds. Usually such bracing
 60 wires are tightened by means of some convenient form of turn-buckle, sometimes provided with hexagonal bodies, and sometimes with cylindrical bodies having openings for the insertion of a lever pin. If the
 65 turn-buckle is of the former type, the wrench

disk or plate 7 is turned to present a wrench socket 8 of proper size to embrace the same. The micrometer head or cap 18 is turned down until its lower end is registered with the graduation of the scale 21 indicating
 70 twelve pounds. This operation places the spring 20 under a tension or pressure which will not yield to a stress of less than twelve pounds, and consequently said spring 20
 75 presses the plunger-rod 13 downward to force the nosings 15 of the fork 14 into the engaged notches 11 of the star-wheels 9 with a pressure which will not permit dislodgment thereof under stresses of less than
 80 twelve pounds. The wrench socket is now engaged with the turn-buckle body, and leverage is thereby applied to the latter to turn the same, consequently the turning of the buckle body is continued until the resistance
 85 it offers to further turning reaches a pressure of twelve pounds. When this point is reached, any attempt to further lever over or turn the buckle body, results in causing the star-wheel teeth 10 to press upwardly
 90 the nosings 15 out of the sockets 11 of said star-wheels, and the wrench disk or plate 7 is not turned further under the impulse of the leverage applied through the barrel or handle-portion 2. In other words while the
 95 pressure or tension of the spring 20 holds down the plunger-rod 13 and maintains the nosings 15 in engagement with notches 11 of the star-wheels 9, so long as the resistance of the turning stress of the turn-buckle is under twelve pounds, and consequently main-
 100 tains the nosings 15 in position to transmit the swing of the barrel or handle-portion 2 to the star-wheels 9 and wrench disk or plate 7. When such resistance exceeds twelve pounds the spring 20 will yield, so that further
 105 levering movement of the barrel or handle-portion 2 will merely result in the nosings 15 riding out of the notches 11 of the star-wheels 9, without imparting any further movement to the latter or to the
 110 wrench disk or plate 7. It will thus be apparent that the novel wrench will, when properly adjusted, permit the tightening of a turn-buckle or nut up to a required tension, but will automatically yield to prevent
 115 further turning of the same after such required tension is reached. It will, therefore be apparent that with the aid of my novel wrench many delicate adjustments of tensions may be made in various departments of
 120 work, such as in aeroplane structures, by unskilled labor, and yet a proper result attained according to the setting of the wrench device for desired results.

Referring now to Fig. 5 of the drawings, I
 125 have illustrated therein a slightly modified form of wrench disk or plate 7, the periphery of which is provided with radiating pin levers 24 of various sizes, in place of the wrench sockets 8, so that the wrench is
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adapted to operate or turn nuts or turn-buckles provided with pin lever openings in place of polygonal sides, as will be clearly understood.

5 I am aware that some changes may be made in the several arrangements and combinations of the parts of my novel wrench device, as well as in the details of the construction of the same, without departing
10 from the scope of the present invention as above described, and as defined in the appended claims. Hence, I do not limit my invention to the exact arrangements and combinations of the said parts as hereinabove described, nor do I confine myself to the exact
15 details of the construction of said parts as illustrated in the accompanying drawings.

I claim:—

1. In a device of the kind described, a
20 handle-portion having a lower bifurcated end, an axle member mounted in said bifurcated end, a wrench plate having work engaging means connected with its periphery
25 mounted on said axle within said bifurcated end, a star-wheel connected with said wrench plate having notches in its periphery, a plunger-rod longitudinally slidable relative to said handle-portion, the lower end of said
30 plunger-rod having a nosing for engagement in a notch of said star-wheel, a spring tension means connected with said handle-portion for exerting downward pressure upon said plunger-rod, and means for varying the amount of pressure so exerted by
35 said spring tension means.

2. A wrench comprising a tubular handle-portion having a guideway in its lower end, a fork connected with the lower end of said handle-portion, an axle transversely supported between the free ends of said fork,
40 a wrench plate having work engaging means connected with its periphery mounted on said axle within said fork, a notched wheel secured to said wrench plate in concentric
45 relation thereto, a plunger-rod slidable in said guideway of said handle-portion, means on the lower end of said plunger-rod for engaging said notched wheel, a spring tension means within said handle-portion for
50 exerting a downward pressure upon the upper end of said plunger-rod, and means connected with the upper end of said handle-portion for varying the amount of pressure so exerted by said spring tension means.

3. A wrench comprising a tubular handle-portion having a guideway in its lower end, a fork connected with the lower end of said handle-portion, an axle transversely supported between the free ends of said fork, a
60 wrench plate having work engaging means connected with its periphery mounted on said axle within said fork, a notched wheel secured to said wrench plate in concentric relation thereto, a plunger-rod slidable in
65 said guide-way of said handle-portion,

means on the lower end of said plunger-rod for engaging said notched wheel, a micrometer head having a threaded connection with the upper end of said handle portion, and a coiled tension spring within said handle-
70 portion in engagement with the upper end of said plunger-rod, said spring being engaged by said micrometer head so that the turning of the latter up or down upon said handle-portion will govern the amount of
75 pressure exerted by said spring upon said plunger-rod.

4. A wrench comprising a tubular handle-portion having a guideway in its lower end, a fork connected with the lower end of said
80 handle-portion, an axle transversely supported between the free ends of said fork, a wrench plate having work engaging means connected with its periphery mounted on said axle within said fork, a notched wheel
85 secured to said wrench plate in concentric relation thereto, a plunger-rod slidable in said guideway of said handle-portion, means on the lower end of said plunger-rod for engaging said notched wheel, an external
90 micrometer screw-thread on the upper end of said handle-portion, a micrometer head, an internal micrometer screw-thread on said micrometer head for operative engagement with said external micrometer
95 screw-thread of said handle-portion, and a tension compression spring arranged within said handle-portion between said plunger-rod and said micrometer head so that the turning of the latter up or down upon said
100 handle-portion will govern the amount of pressure exerted by said spring upon said plunger-rod.

5. A wrench comprising a tubular handle-portion having a guideway in its lower end,
105 a fork connected with the lower end of said handle-portion, an axle transversely supported between the free ends of said fork, a wrench plate having work engaging means connected with its periphery mounted on
110 said axle within said fork, a notched wheel secured to said wrench plate in concentric relation thereto, a plunger-rod slidable in said guideway of said handle-portion means on the lower end of said plunger-rod for
115 engaging said notched wheel, an external micrometer screw-thread on the upper end of said handle-portion, a micrometer head, an internal micrometer screw-thread on said micrometer head for operative engagement
120 with said external micrometer screw-thread of said handle portion, a tension compression spring arranged within said handle-portion between said plunger-rod and said micrometer head so that the turning of the
125 latter up or down upon said handle-portion will govern the amount of pressure exerted by said spring upon said plunger-rod, and a graduated scale inscribed on the exterior surface of said handle portion with which
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said micrometer head coöperates to determine the variation of pressure to which said spring may be regulated.

5 6. A wrench comprising a tubular handle-portion having a forked lower end, an axle transversely supported between the free ends of said forked lower end, a wrench plate having work engaging means connected with its periphery mounted on said
10 axle within said forked lower end, means for holding said wrench plate against turning on said axle, a spring tensioning means controlling said holding means, means connected with said handle-portion for varying the amount of pressure exerted by
15 said spring tensioning means, comprising

a micrometer head having a threaded engagement with the upper end of said handle-portion from which said spring tensioning means thrusts, and a graduated scale 20 inscribed on the exterior surface of said handle-portion with which said micrometer head coöperates to determine the variation of pressure to which said spring tensioning means may be regulated. 25

In testimony, that I claim the invention set forth above I have hereunto set my hand this 25th day of October, 1918.

GEORGES RIFFLARD.

Witnesses:

GEORGE D. RICHARDS,
ADOLPH HANSEN.