No. 855,292. PATENTED MAY 28, 1907.

R. C. ELLRICH.

RATCHET MECHANISM.

APPLICATION FILED NOV. 16, 1904.

Fig. 1.

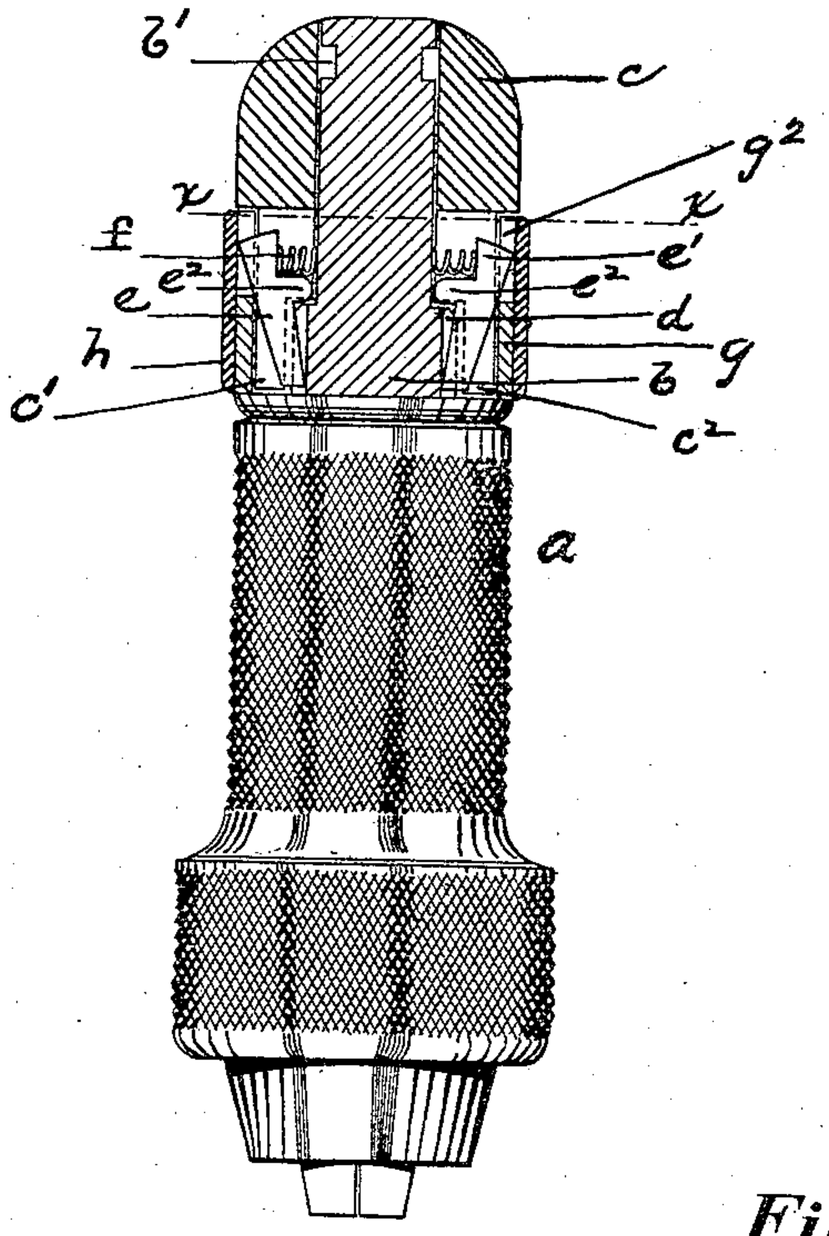


Fig. 3.

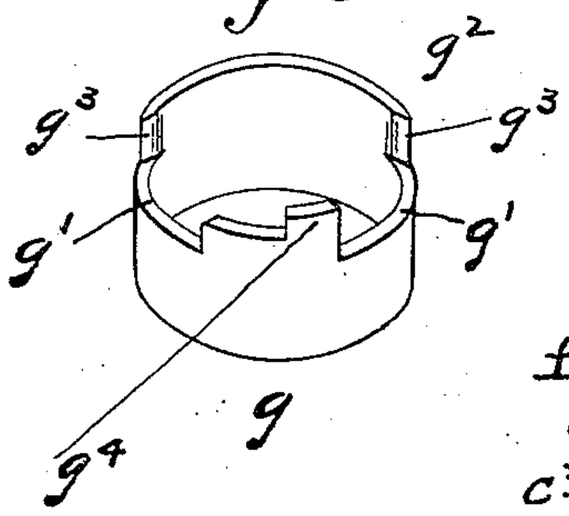
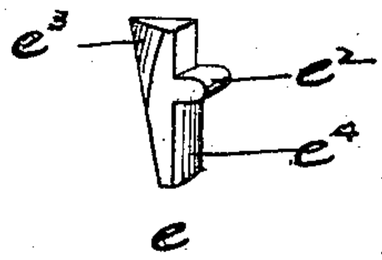


Fig. 4.



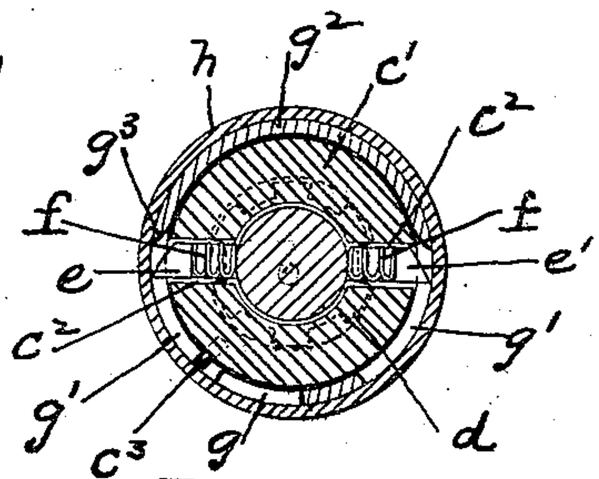


Fig. 2.

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UNITED STATES PATENT OFFICE.

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RATCHET MECHANISM.

No. 855,292. Specification of Letters Patent. Patented May 28, 1907.

Application filed November 16, 1904. Serial No. 232,960.

To all whom it may concern:

Be it known that I, ROBERT COSMOS ELLRICH, a citizen of the United States of America, residing at Southington, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Ratchet Mechanism, of which the following is a specification.

My invention relates to ratchet mechanism specially adapted for screw drivers and other tools, such as braces, drills, and boring tools in general.

The object of my invention is to produce a device of the class specified having features of novelty and advantage with especial reference to simplicity of construction and operation and compactness.

One embodiment of the invention is illustrated in the drawings, in which—

Figure 1 is an elevation view partly in section. Fig. 2 is a plan view in section on the line x—x of Fig. 1. Fig. 3 is a detail perspective view of the pawl operating ring. Fig. 4 is a detail perspective view of one of the pawls.

Referring to the drawings a denotes in general the tool holding device, such as a chuck used in connection with braces. This chuck carries the spindle b which has means for securing it rotatably to the driving member, as the circumferential groove b' adapted to be engaged by the end of the screw which is not shown but which is carried by the driving member.

c denotes the driving member, which, in the embodiment of the invention illustrated, is the head of the brace sweep, and it carries the screw which engages the groove b' in the spindle. The spindle is provided with a ratchet d, the teeth being preferably rounded off at the upper ends as indicated to provide a clearance so that the ratchet may turn under the pawls.

The head c has a hub c' fitting rather closely about the spindle and the ratchet, and slotted as at c^2. In these slots are located pawls e e' provided with projections e^2 e^2 which bear upon the spindle just above the ratchet. Springs f f are located between the spindle and the upper ends of the pawls, tending to throw said upper ends outwardly and the lower ends inwardly into engagement with the ratchet. The upper ends of the pawls are beveled as at e^3 to co-operate with the pawl operating ring hereinafter described, and the lower ends of the pawls are beveled as at e^4 to allow the ratchet to move under them. As seen in Fig. 2 these pawls are oppositely faced.

g is the pawl operating ring which fits rather closely on the hub c'. This ring is cut away at g' g' so that it will contact with the pawls at a point about opposite the projections e^2 e^2, thus forming a fulcrum on which the pawls rock when their upper ends are pressed outwardly by the springs. The upstanding ledge g^2, having beveled ends g^3 g^3, is adapted to engage the upper ends of the pawls, when the ring is turned on the hub, to throw one or the other of said pawls out of engagement with the ratchet. The upstanding projection g^4 co-operates with the pin c^3 in the hub c' to limit the movement of the ring in one direction, the pin being engaged by one end of the upstanding ledge g^2 to limit the movement of the ring in the opposite direction.

h is a knurled sleeve into which the pawl operating ring is tightly fitted so that it may be operated thereby.

Referring to Figs. 1 and 2 it will be seen that the upstanding ledge g^2 is not in engagement with either one of the pawls and consequently that the springs f f throw the upper ends of the pawls outwardly and their lower ends into engagement with the ratchet, thus locking the driving member to the driven member against relative movement in either direction. Referring particularly to Fig. 2, if the sleeve and pawl ring be turned to the left it will be seen that the pawl e is thrown out of engagement with the ratchet, but that the pawl e' still remains in engagement with the ratchet, thus connecting the driving and driven members when the former is turned in a right hand direction, but allowing the driving member to be turned in a reversed direction independently of the driven member, the rounded off lower end of the pawl e' riding up over the teeth of the ratchet during this reversed movement of the driving member. If the sleeve and pawl ring be turned to the right until the upstanding projection g^4 is brought against the pin c^3 it will be seen that the pawl e' is thrown out of engagement with the ratchet but that the pawl

e still remains in engagement. This locks the driving and driven members together during the left hand turning movement of the driving member but allows of a turning of the driving member in the opposite direction independently of the driven member.

I claim as my invention:

1. In a ratchet mechanism for screw drivers and other tools, a driven member, a driving member, mechanism for connecting said driving and driven members comprising two independent oppositely faced floating pawls carried by one of said members and adapted to rock in a radial plane, means for normally holding said pawls in engagement with the other member, further means for disengaging said pawls from the other member and separate fulcrums on which said two means rock the pawls respectively.

2. In a ratchet mechanism for screw drivers and other tools a driving member vertically slotted, a driven member having a spindle, a ratchet on said spindle, oppositely faced floating pawls located in the slots in said driving member and adapted to engage said driven member, front and rear fulcrum bearings for said pawls, pawl operating mechanism, rocking said pawls on one fulcrum and yielding means operating in opposition to said mechanism, and rocking said pawls on the other fulcrum as and for the purposes specified.

3. In a ratchet mechanism for screw drivers and similar tools a driving member, a driven member, and mechanism for connecting said driving and driven members comprising one or more loosely mounted pawls carried by one member, front and rear fulcrums therefor, yielding means rocking said pawls on one fulcrum for normally holding said pawls in engagement with the other member, and devices operating in opposition to said yielding means rocking said pawls on the other fulcrum for disengaging said pawls one at a time from the last mentioned member.

4. In a ratchet mechanism for screw drivers and other tools, a driving member, a driven member having a spindle, a ratchet on said spindle, floating pawls carried by the driving member and fulcrumed front and rear, a spring tending to throw said pawls into engagement with the ratchet, and a pawl operating ring operative in opposition to said spring for disengaging said pawls from said ratchet one at a time said spring and ring rocking said pawls on separate fulcrums respectively.

5. In a ratchet mechanism for screw drivers and other tools, a driving member having pawl receiving slots, a driven member, a spindle and a ratchet carried thereby, pawls located in the slots in the driving member and having lateral projections bearing on said spindle above said ratchet, a ring surrounding said pawls and cut away to provide a fulcrum therefor at a point opposite said projections, an upstanding ledge on said ring co-operating with the upper ends of the pawls, and springs between the spindle and the upper ends of the pawls, substantially as described.

6. In a ratchet mechanism for screw drivers and other tools, in combination, a driven member comprising a tool holding body, a spindle, and a ratchet on the spindle immediately above said body, a driving member pierced to receive the spindle and having a slotted hub fitting about said ratchet, said hub, pawls located in said slots and having fulcrum bearing on the spindle, an operating ring fitting about said hub and cut away to form fulcrum bearings for said pawls, an upstanding ledge on said ring co-operating with said pawls, and springs normally exerting outward pressure on the upper ends of said pawls, substantially as described.

7. In a ratchet mechanism for screw drivers and other tools, a driven member, a spindle connected therewith, ratchet teeth formed on the spindle immediately above said body, a driving member pierced to receive said spindle, a hub on said driving member fitting closely about said spindle and ratchet, said hub being slotted, a ring fitting about said hub and cut away to form an upstanding ledge, pawls located in said slots in the hub and having fulcrum bearings on said spindle and on the edge of the ring where it is cut away, springs located between the spindle and the upper ends of the pawls, said upstanding ledge on said ring co-operating with the upper ends of the pawls, and a sleeve surrounding and secured to said ring, substantially as described.

8. A driven member having a ratchet, a driving member, oppositely faced rocking pawls carried thereby, front and rear fulcrums for said pawls springs operating on the upper ends of said pawls to normally throw the lower ends into engagement with said ratchet, and means acting on the upper ends of said pawls in opposition to said springs to disengage said pawls one at a time from said driven member said springs and means rocking said pawls on separate fulcrums.

9. A driven member having a ratchet, a driving member having a slotted hub, pawls loosely mounted in said slots, a pawl operating ring surrounding said hub, front and rear fulcrums for said pawls on said driven member and said ring, means for engaging said pawls with said ratchet, and other means for disengaging said pawls from said ratchet one at a time, said two means operating upon said pawls above said fulcrum points and rocking said pawls on separate fulcrums respectively.

10. A driven member having a ratchet, a driving member having a slotted hub, pawls loosely mounted in said slots, a pawl operat-

ing ring surrounding said hub, front and rear fulcrums for said pawls on said driven member and said ring, springs pressing against said pawls above said fulcrums but normally engaging their lower ends with said ratchet, said operating ring acting on the upper ends of said pawls above the fulcrums to disengage said pawls one at a time from said ratchet, said spring and ring rocking said pawls on separate fulcrums respectively.

11. A driven member having a spindle and a ratchet, a driving member having a slotted hub fitting closely about said spindle and ratchet, pawls freely mounted in said slots and adapted for rocking motion in a radial plane coincident with the axis of the said spindle, front and rear fulcrum points for said pawls, springs acting upon said pawls above the fulcrum point to cause their engagement with said ratchet, and means acting upon said pawls above their fulcrum points and in opposition to said springs to disengage said pawls one at a time from said ratchet, substantially as described.

12. In a ratchet mechanism, driving and driven parts, a hub carried by the driving part, the end of said hub being slotted through transversely, oppositely faced tilting pawls located in the slots in said hub, a spindle carried by the driven parts and rotatable relatively to the driving part, a ratchet carried by the driven part and having a plurality of teeth extending longitudinally of the axis thereof, an annular bearing shoulder on said driven part for said pawls and a controller for varying the permissive operative engagement between the pawls and the ratchet.

13. In a ratchet mechanism, driving and driven parts, a hub carried by one part and having recesses, oppositely faced pawls located in said recesses, a spindle carried by the other part and rotatable relative to the hub carrying part, a ratchet rotatable with said spindle and having teeth extending longitudinally of the axis thereof, an annular pawl fulcrum on said driven part, said pawls having their teeth portions movable in a direction away from the axis of said spindle and ratchet, a controller sleeve surrounding said pawls, and a cam carried by said sleeve for controlling the position of said pawls.

14. A ratchet mechanism, comprising driving and driven parts, a ratchet carried by one part having teeth facing outwardly from the axis thereof, tilting pawls carried by the driving part, supported by the driven part and adapted to engage said ratchet teeth, and a cam ring surrounding said pawls having portions with beveled edges adapted to engage and tilt said pawls for retracting them from engagement with said ratchet.

15. A ratchet mechanism, comprising driving and driven parts, a spindle carried by one part rotatable relative to the other, a ratchet carried by said spindle, and having teeth extending radially therefrom, and a pawl supporting shoulder, tilting pawls carried by the other part, each pawl having an angular projection engaging on said supporting shoulders between said spindle and the end of said ratchet, and a controller for said pawls.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT COSMOS ELLRICH.

Witnesses:

THOMAS F. WELCH,

EDWIN G. LEWIS.