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L. O. BECKER

2,407,468

RATCHET MECHANISM

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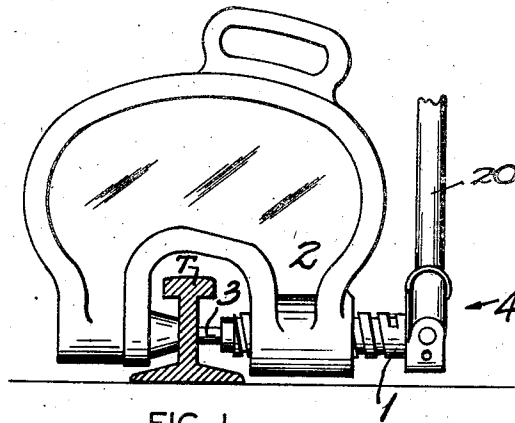


FIG. 1.

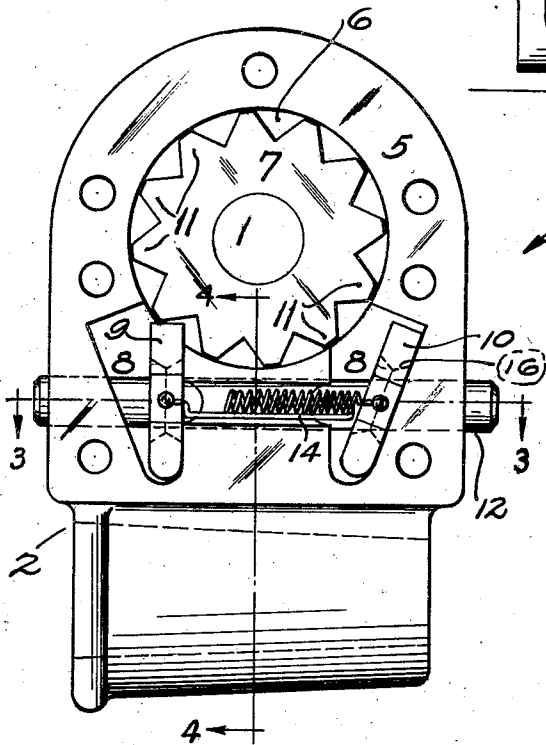


FIG. 2.

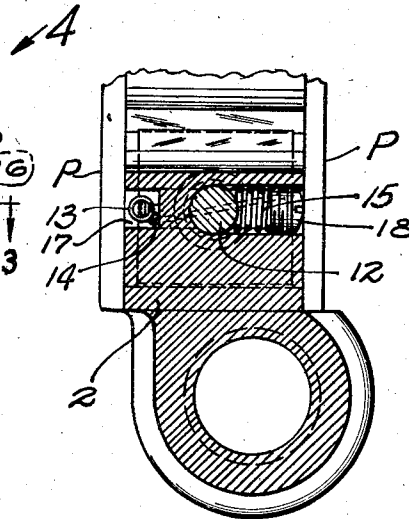


FIG. 4.

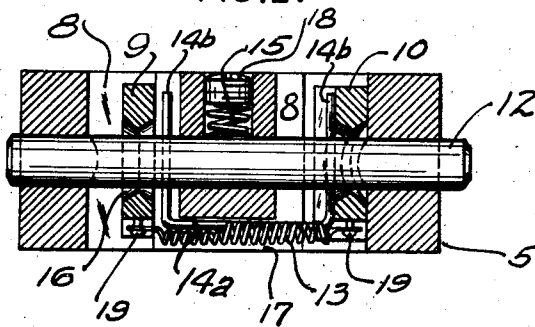


FIG. 3

INVENTOR
LESTER O. BECKER

BY *Raymond B. Bickel*
ATTORNEY

UNITED STATES PATENT OFFICE

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RATCHET MECHANISM

Lester O. Becker, St. Louis, Mo., assignor to
Joseph Pavelka, St. Louis, Mo.

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4 Claims. (Cl. 74-157)

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The invention relates to ratchet devices of the type shown in applicant's Patent No. 2,233,091, issued February 25, 1941, and the invention comprises improvements upon the structure illustrated in the earlier patent. The structure of the earlier patent includes spaced pawls, with openings extending through them diagonally of their length, and a pawl operating pin having portions of restricted length reduced in diameter to permit the tilting of one pawl relative to the pin to accommodate spring pressed movement of the pawl into engagement with the ratchet wheel and the positive engagement of the other pawl by the pin to move the pawl out of engagement with the ratchet wheel according to the position of the pin. This arrangement has required fairly close machining of the parts to insure their functioning as intended and has required substantial aptitude in assembling the parts.

The main object of the present invention is to simplify the formation and assembly of the parts and thereby render the complete structure more economical and durable.

In the accompanying drawing illustrating the preferred embodiment of the invention—

Figure 1 is an elevational view of a rail punch including a punch driving ratchet structure embodying the invention.

Figure 2 is an elevational view of one side of the ratchet structure with a detachable cover plate removed, and with a part of the spring broken away to better illustrate the construction.

Figure 3 is a horizontal section taken on the line 3—3 of Figure 2.

Figure 4 is a vertical section taken on the line 4—4 of Figure 2.

As will be well understood from Figure 1, it is desirable to apply heavy thrusts in one direction to a screw 1 threaded through a frame 2 to force a punch 3 through a rail T and, when the punching operation is completed, to apply thrusts to the screw in the opposite direction to withdraw the punch from the rail. The ratchet structure indicated generally at 4 includes a housing body 5 with detachable side plates P and having a bore 6 for receiving a toothed wheel 7, rigid with screw 1. The housing is provided with V-shaped recesses 8 opening into bore 6 and receiving pawls 9 and 10 adapted to pivot or tilt about their lower ends so as to be moved into and out of engagement with the ratchet teeth 11.

To so move and hold the pawls, there is provided a pin or rod 12, a spring 13, a wire-like element 14 and a friction device 15. Pin 12 is slidable through suitable openings provided

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therefor in housing 5 and in pawls 9 and 10. The openings in housing 5 fit fairly closely around the rod. The openings in pawls 9 and 10 are substantially larger than the rod, as indicated at 16, to freely accommodate inclination of the pawls relative to the rod. Spring 13 has its ends connected to the respective pawls by pins 19 and tends to pull the pawls towards each other and into engagement with the ratchet teeth.

The wire-like element 14 is U-shaped and includes a cross bar 14a, extending alongside of spring 13, and legs 14b, extending transversely through rod 12 and adapted to engage the opposing faces of pawls 9 and 10 so that when the rod is moved to the right, as indicated in Figures 2 and 3, the right hand leg of element 14 will engage pawl 10 and move it away from the ratchet wheel. At the same time, the left hand leg of element 14 will move away from pawl 9 and permit spring 13 to pull the latter towards the ratchet wheel. Spring 13 and cross bar 14a of the U-shaped element are received in a relatively narrow recess 17 extending inwardly from one side of the housing and connecting recesses 8.

Rod 12, and the pawls, are yieldingly retained in the position shown by spring 15 received in an aperture at the side of the housing opposite to recess 17 and compressed by a screw 18 threaded into the aperture.

When rod 12 is moved to the left, the left hand leg of element 14 will move pawl 9 away from the ratchet wheel and spring 13 will draw pawl 10 towards the ratchet wheel so that the reciprocation of the ratchet handle 20 will rotate screw 1 in the opposite direction from that in which it is rotated when the pawls are in the position shown.

With this arrangement, rod 12 is of uniform diameter and contour substantially from end to end and requires no machining to provide restricted portions of reduced diameter or peculiar configuration, as is necessary for the corresponding elements shown in Patent No. 2,233,091. The apertures in pawls 9 and 10 do not need to be disposed at a predetermined angle to the face of the pawl, nor at a definite distance from the end of the pawl, nor do they need to fit snugly about any portion of the rod, as is required of the pawls in the structure shown in the said patent. The parts are more readily assembled than the parts shown in said patented structure because the pawls may be placed in recesses 8 and rod 12 inserted through the housing and the pawls, irrespective of the positions of the pawls in the recesses, whereas in the patented structure the

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pawls must be inclined relative to the rod to permit its insertion through the pawls.

The details of the improvement described and illustrated may be varied without departing from the spirit of the invention, and the exclusive use of those modifications coming within the scope of the claims is contemplated.

What is claimed is:

1. In a ratchet structure, a driven member having a series of teeth, a driving member including a pawl shiftable therein to engage and disengage said teeth, spring means normally thrusting said pawl into engagement with said teeth, there being a passage through said driving member and pawl, an element shiftable manually in said passage to different selected positions and a device yieldingly retaining the element in a selected position, there being a part on said element engaging a face of said pawl to hold the pawl, against said spring means, out of engagement with said teeth when the element is in one of the selected positions.

2. In a ratchet structure, a circular driven member having a series of teeth, a relatively rotatable driving member having spring-pressed pawls disposed to respectively engage teeth at opposite sides of said driven member whereby said driven member may be moved selectively in opposite directions, there being passages through said driving member and said pawls, and an element movable in opposite directions through said passage in said driving member, parts projecting from the element and respectively opposing the sides of the pawls nearest to the ratchet wheel and arranged to hold either one of the pawls away from the driving member according to the direction in which the element is moved.

3. In a ratchet structure of the class described, a driven member having peripheral teeth, an oscillatable drive member surrounding said driven member and having spaced recesses facing said teeth and having a passageway extending transversely of said recesses, pawls loosely seated in

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said recesses and having transverse openings aligned with said passageway, spring means thrusting said pawls towards said teeth, an elongated rod of uniform diameter and contour substantially throughout its length slidable through said passageway and openings independently of the inclination of the pawls, a tension spring with its opposite ends secured to said pawls respectively to draw them towards each other and into engagement with the teeth of said driven member, a U-shaped device having a cross bar extending alongside said spring and having legs extending transversely of the cross bar through said rod and arranged to engage the faces of said pawls as the rod is slid in opposite directions through said passageway and openings to move the engaged pawl away from said teeth, and a yielding device in contact with said rod and frictionally retaining it in a selected position.

4. In a ratchet structure, a toothed ratchet wheel, a housing having a bore surrounding the wheel and having recesses substantially parallel to the axis of the wheel and disposed near opposite sides of the wheel and opening into said bore, a pawl received in each of said recesses and adapted to pivot therein to engage and disengage the wheel teeth, there being a relatively shallow recess in one side of the housing and connecting said first-mentioned recesses, a tension spring received therein with its ends connected to the pawls, a rod slidable through the housing and pawls parallel with and at the rear of said relatively shallow recess, an element slidable in said shallow recess alongside said spring with its ends extending transversely of and seated in said rod and disposed to engage the opposing faces of the pawls respectively to move them on their pivots away from the ratchet wheel when the rod is shifted in the housing, and means frictionally engaging the rod in a selected pawl holding position.

LESTER O. BECKER.