Dec. 24, 1957 G. I. EKSTRÖM 2,817,316

IMPLEMENT RETAINING DEVICES FOR POWER OPERATED PERCUSSIVE TOOLS

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Fig. 1

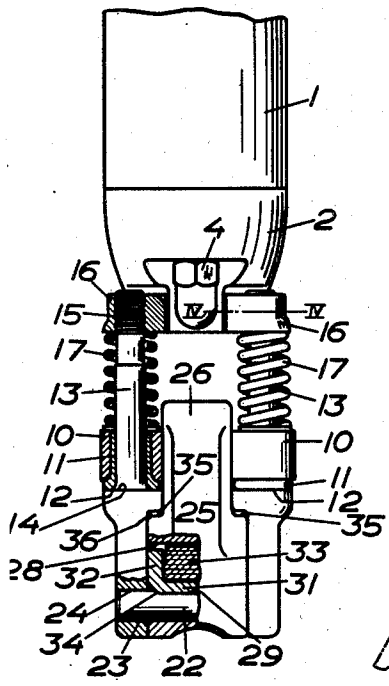



Fig. 2

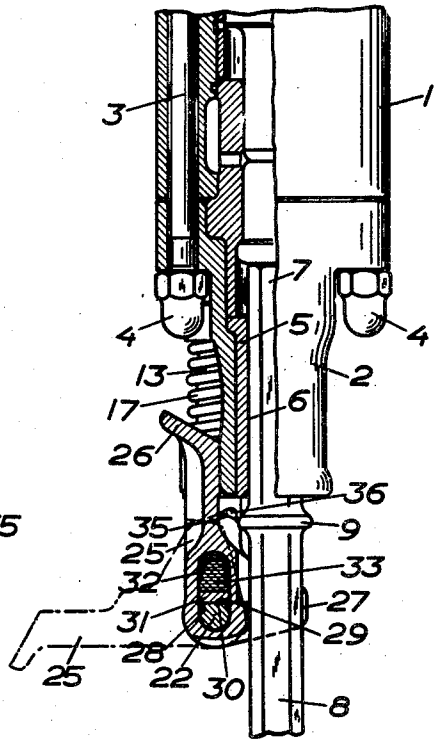



Fig. 3

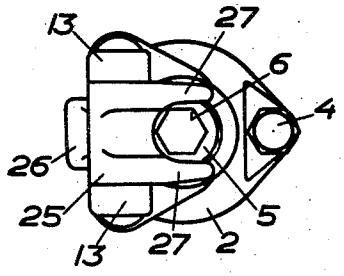
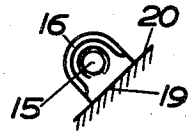



Fig. 4




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Fig. 5

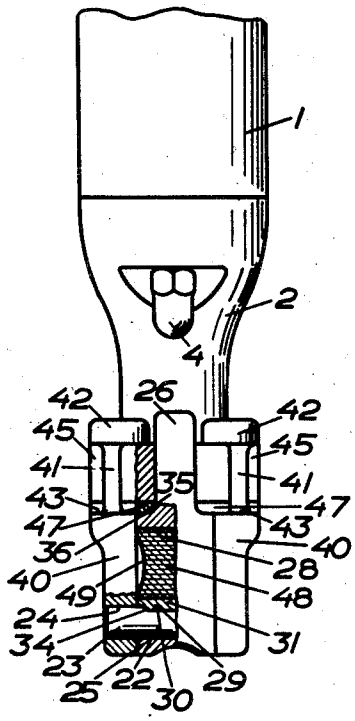



Fig. 6

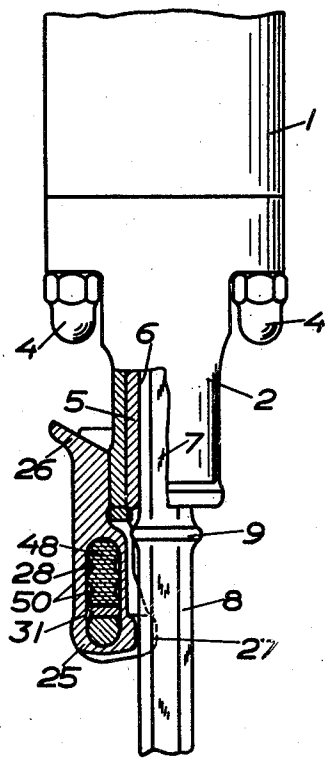
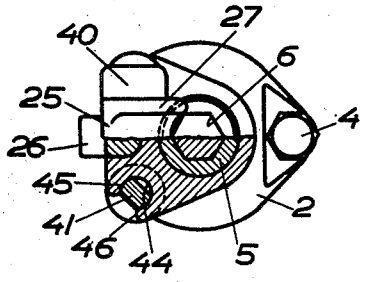



Fig. 7




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# IMPLEMENT RETAINING DEVICES FOR POWER OPERATED PERCUSSIVE TOOLS

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7 Claims. (Cl. 121—32)

This invention relates to implement retainers for percussive tools, and more particularly to implement retaining devices for preventing a working implement from becoming accidentally detached from the tool in which it is supported or from being ejected therefrom during operation. One object of the invention is to provide improved means for taking up the shocks to which a retainer for a collared working implement, such as a drill steel of a rock drill, a pick or a concrete breaker or other similar tool is subjected. Another object of the invention is to provide improved means for positively holding the retainer for the implement in retaining as well as in releasing position, respectively. A still further object of the invention is to provide an implement retaining device which may be assembled and disassembled without the use of tools which may not be available when it is desired to take the device apart or to assemble the device. A still further object of the invention is to provide a device in which all parts are positively locked against involuntary disassembly when the power tool is in operation. Another object of the invention is to provide a device which is simple in construction and inexpensive to manufacture and in which the parts subjected to wear or damage may easily be replaced.

Other objects and features of the invention will be disclosed by the following description and the appended claims.

In the accompanying drawings two embodiments of power operated percussive tools provided with implement retaining devices according to the invention are illustrated by way of example. Fig. 1 is an elevation and partial section of the front end of a power operated percussive tool, such as a concrete breaker, provided with an implement retaining device according to the invention. Fig. 2 is a side view and partial longitudinal section of the tool according to Fig. 1. Fig. 3 is an end view looking against the front end of the tool in Figs. 1 and 2. Fig. 4 is a detail section on line IV—IV in Fig. 1. Fig. 5 is an elevation and partial section of the front end of a further tool according to the invention. Fig. 6 is a side view and partial longitudinal section of the tool according to Fig. 5, and Fig. 7 is an end view and partial section looking against the front end of the tool in Figs. 5 and 6.

Referring to Figs. 1 and 2, 1 designates a cylinder casing of a conventional concrete breaker and 2 indicates a front head of said breaker, the casing and the front head being kept together by the usual side bolts 3 and nuts 4. The front head 2 accommodates the usual bushing 5 which is provided with a polygonal axially extending opening 6 in which a shank 7 of a breaker steel 8 having a collar 9 fits.

The front head 2 is provided with two lugs 10 bored to receive bushings 11 forming abutment surfaces 12 at the front ends of the bushings. Two side members such as bolts 13 are inserted in the bushings 11 said bolts having shoulders 14 adapted to rest on the abutment surfaces 12. In the illustrated embodiment the bolts 13 are disposed parallel to the axial opening 6 in the bushing 5 but naturally if desired they may be arranged at a small angle to said opening. The bolts 13 are screw threaded at 15 and screwed into nuts 16, and helical springs 17 are fitted around the bolts between the nuts 16 and the lugs 10, said springs serving to take up shocks to which the implement retainer may be subjected in operation of the tool. The nuts 16 are provided with a flat side surface 19, Fig. 4, cooperating with corresponding flats 20 on the front head to prevent the nuts from turning as long as the nuts engage the surfaces 20, the nuts being free to move axially from the illustrated position of Fig. 1 towards the front end of the tool.



The bolts 13 at their extreme front ends carry a transverse shaft 22 provided with trunnions 23 at the ends of the shaft mounted to turn in openings 24 in the bolts 13 which form bearings for the trunnions 23.

A latching member 25 is mounted between the bolts 13 to swing on the shaft 22. The latching member is provided with a lip 26 which may be engaged by the foot of the operator, for instance, for swinging the latching member, and the latching member furthermore is provided with a fork 27 adapted to engage the collar 9 of the steel 8 when the latching member is in implement retaining position, as illustrated in Fig. 2. When the latching member is in implement releasing position, as indicated in chain dotted lines in Fig. 2 the fork 27 is swung free from the path of the collar 9 so that the steel 8 may be removed from the breaker. The latching member has a transverse opening 28 of oval cross section which in the lower part accommodates an intermediate portion of the transverse shaft 22. Said portion has a recessed flat 29 which is engaged by a corresponding flat 30 on a shoe 31 inserted in the opening 28. The shoe 31 is provided with two end walls 32 and a body 33 of yieldable material, such as soft rubber, is provided in the opening 28 between the back of the shoe 31 and the rear wall of the opening 28 and between the end walls 32, said body being slightly compressed to force the flat 30 of the shoe against the flat 29 of the transverse shaft. The shaft and the shoe are chamfered as indicated at 34 to permit easy removal and insertion of the shaft.

In assembling the retaining device the bolts 13 are first inserted in the bushings 11 and fitted with the springs 17 and then the bolts are screwed into the nuts 16 so that the correct tension of the springs 17 is obtained. The body 33 and the shoe 31 are then inserted in the opening 28 in the latching member whereupon the latching member is inserted between the bolts 13 in the position illustrated in Fig. 2. The shaft 22 is then pushed through the opening 24 of one of the bolts 13 into the opening 28 in the latching member and into the opening 24 of the other bolt in such a position that the shoe 31 will engage the flat 29 of the shaft as soon as the shaft has been moved completely into the position illustrated in Fig. 1. It is obvious that these assembly operations may be carried out without tools or with the aid of, for instance, a hammer only.

The latching member 25 has cam surfaces 35 adapted to cooperate with cam surfaces 36 on the bolts 13 in order to hold the member in implement retaining position, as illustrated in full lines in Figs. 1 and 2, or in implement releasing position, as illustrated in chain dotted lines in Fig. 2. It is obvious that the point of contact between the cam surfaces 35 and 36 is so remote from the axis of the shaft 22 that the springiness of the rubber body 33 will be sufficient to hold the latching member in position and that the operability of the coaction of the cam surfaces 35 and 36 is not much effected by wear so that an efficient and safe holding of the latching member in both positions is guaranteed for a long time. It is also obvious that the shocks received by the latching member from the collar 9 in operation

of the tool are transmitted by the latching member to the springs **17** which may be of high grade material. It is observed that a short travel of the latching member **25** will compress the body **33** so that the latching member contacts the rear face of the walls **32** and through them transmits the shock to the bolts **13**.

The tool illustrated in Figs. 5–7 is of the same type and general design as the tool illustrated in Figs. 1–4. Equivalent parts have therefor been designated with the same reference numerals and are not described again. The difference concerns mainly the side members which carry the transverse shaft **22** for the latching member **25**. In Figs. 5–7 the side members are provided with openings **24** as above described for mounting the trunnions **23** at the ends of the transverse shaft **22**. However, the rear ends of the side members **40** are formed with a bolt portion **41** having a head **42** at the rear end integral with the bolt portion, and a shoulder at **43**. The bolt portion **41** has a reduced diameter in one direction, as obvious from Fig. 7 to enable the bolt portions to be inserted in openings **44** in lugs **45** on the front head **2**. A gap **46** extends over the full axial length of the lugs **45** so that the bolts may be inserted in the openings **44** through said gaps after turning 90° relative to the position of Fig. 7. Washers **47** are provided at the forward end of the lugs and the shoulders **43** of the side members **40** rest on said washers, which also form the cam surfaces **36** with which the corresponding cam surfaces **35** of the latching member cooperate.

The opening **28** in the latching member is in this case axially longer than in the embodiment of Figs. 1–4 to accommodate a large rubber body **48** which is disposed between the shoe **31** and the rear wall of the opening **28**. The body **48** has recesses at **49** and **50** to permit the body to be compressed axially without being jammed in the opening **28** when the body takes up the shocks from the collar **9** on the fork **27** of the latching member **25**.

Various modifications of the implement retaining devices according to the invention above described may be made within the scope of the claims without departing from the present invention.

What I claim is:

1. In a power operated percussive tool having a front head provided with an axially extending opening for receiving a shank of a working implement, two side members carried by said front head to move forward relative to the head substantially parallel to said axial opening, spring means arranged to counteract said forward movement, a transverse shaft carried by said side members, a latching member mounted on an intermediate portion of said shaft between the side members to swing from an implement retaining position to an implement releasing position and vice versa, a transverse opening in said latching member accommodating said intermediate portion of the shaft, means in said opening for yieldably retaining the intermediate portion in the opening, and means for retaining the latching member in implement retaining position and in implement releasing position, respectively.

2. An implement retaining device according to claim 1 in which said side members are formed as bolts, two lugs on said front head provided with guide openings for said bolts for guiding the bolts in said movement substantially parallel to the axial opening in the front head, abutment surfaces at the front end of said guide openings, shoulders on the bolts for engaging said abutment surfaces, springs encircling the bolts at the opposite side of the lugs to said shoulders, and nuts screw threaded on the bolts to retain said springs and compress the springs between the nuts and the lugs.

3. An implement retaining device according to claim 2, in which a non-circular guide surface is provided on each one of said nuts, a corresponding guide surface on the front head, said surfaces being so arranged as to prevent turning of the nuts when the surfaces are in engagement but to permit axial movement of the nuts forward of the tool from a position in which said shoulders of the bolts engage said abutments on the lugs and against the pressure of the springs.



4. An implement retaining device according to claim 1, in which a first cam surface is provided on said side members, a second cam surface on said latching member actuated to cooperate with said first cam surface by said spring means to retain the latching member in implement retaining position or in implement releasing position, respectively, said cam surfaces riding one over the other upon swinging of the latching member from one of said positions to the other and capable of passing each other only upon displacement of the latching member relative to the side member and simultaneous compression of said yieldable member.

5. In a power operated percussive tool having a front head provided with an axially extending opening for receiving a shank of a working implement, two side members carried by said front head and extending substantially parallel to said axial opening, a latching member mounted between said side members to swing relatively to the side members from an implement retaining position to an implement releasing position and vice versa, a transverse opening in said latching member, a transverse shaft carried by said side members and extending through said transverse opening, a shoe engaging said shaft in the opening, a yieldable member in the opening forcing said shoe towards said shaft, a first cam surface in fixed position on said front head, a second cam surface on said latching member cooperating with said first cam surface to retain the latching member in implement retaining position or in implement releasing position, respectively, said cam surfaces riding one over the other upon swinging of the latching member from one of said positions to the other and capable of passing each other only upon displacement of the latching member relative to the side member and simultaneous compression of said yieldable member.

6. In a power operated percussive tool having a front head provided with an axially extending opening for receiving a shank of a working implement, two side members carried by said front head, two lugs on the front head provided with openings in which said side members are fitted, a latching member mounted between said side members to swing relatively to the side members from an implement retaining position to an implement releasing position and vice versa, a transverse oval opening in said latching member, a transverse shaft mounted to turn in said side members and having an intermediate portion extending through the front portion of said oval opening, a reduced portion on said intermediate portion of said transverse shaft, a shoe in the oval opening fitting said reduced portion to retain the transverse shaft in the latching member, a yieldable member in the rear portion of the oval opening forcing said shoe toward the transverse shaft, a first cam surface in fixed position on said front head, a second cam surface on said latching member cooperating with said first cam surface to retain the latching member in implement retaining position or in implement releasing position, respectively, said cam surfaces riding on over the other upon swinging of the latching member from one of said positions to the other and capable of passing each other only upon displacement of the latching member relative to the side member and simultaneous compression of said yieldable member.

7. An implement retaining device according to claim 6, in which the side members have a rear portion formed as bolt with a head at the rear end and a shoulder at the front end, and in which the openings in the lugs are substantially cylindrical extending substantially parallel to the opening in the front head, a longitudinal gap in the

lugs merging into said openings in the lugs and formed to permit insertion of the bolts sideways through said gaps into the openings in the lugs, said bolts having a reduced diameter in one direction permitting such insertion of the bolts and locking of the bolts upon turning a suitable angle in the openings in the lugs, and said head and shoulder on the bolts locking them in axial direction.



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