July 28, 1936. R. H. POTT 2,049,273

IMPACT TOOL

Filed Oct. 6, 1932 2 Sheets-Sheet 1

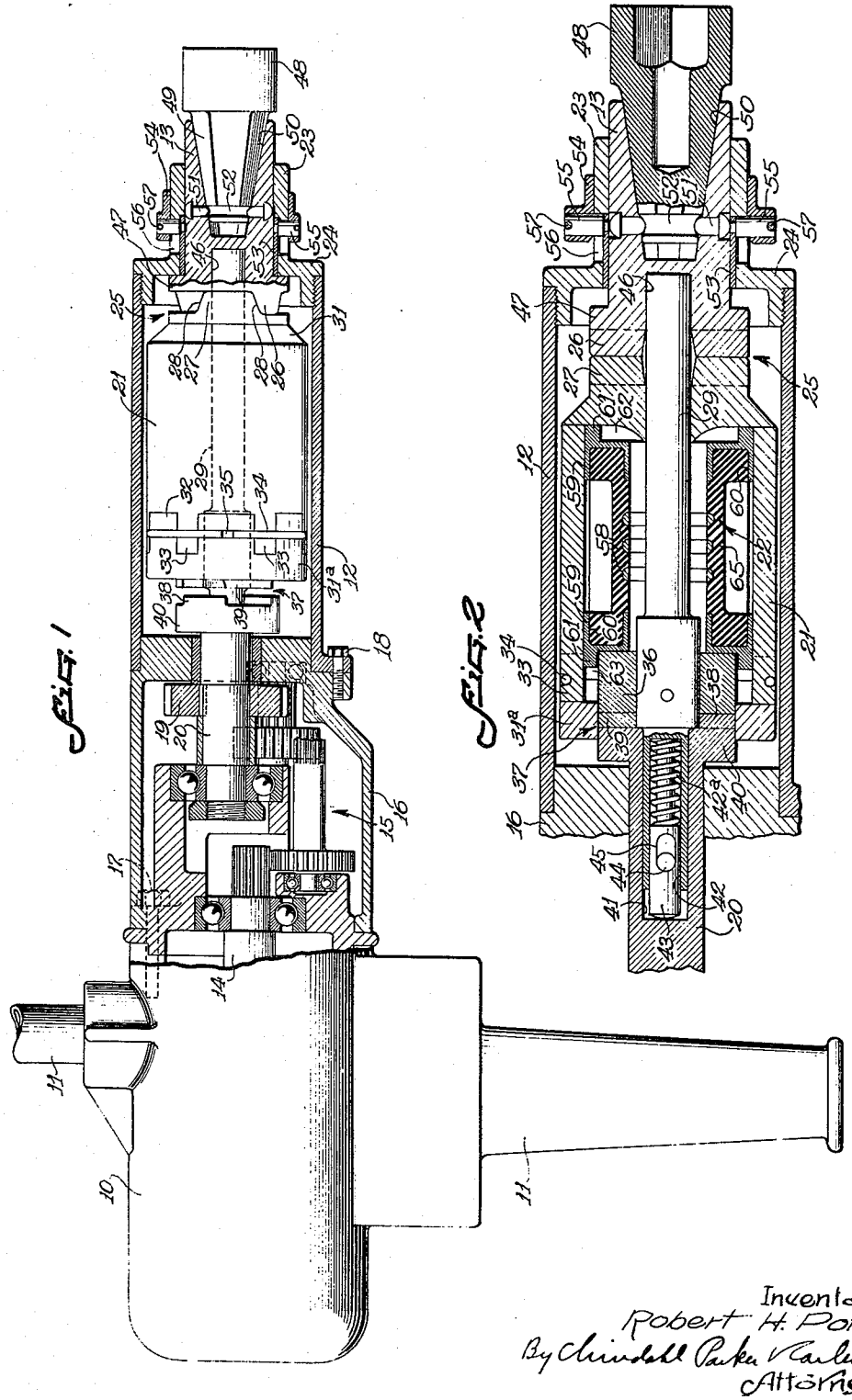


Fig. 1

Fig. 2

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IMPACT TOOL

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Fig. 3

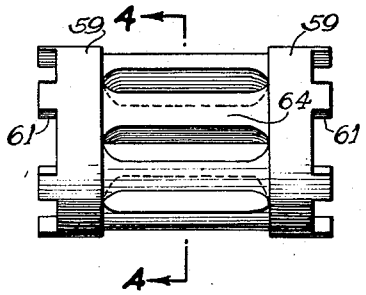


Fig. 4

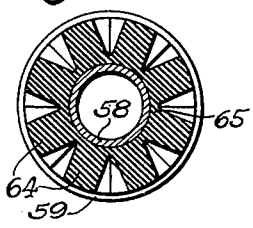


Fig. 5

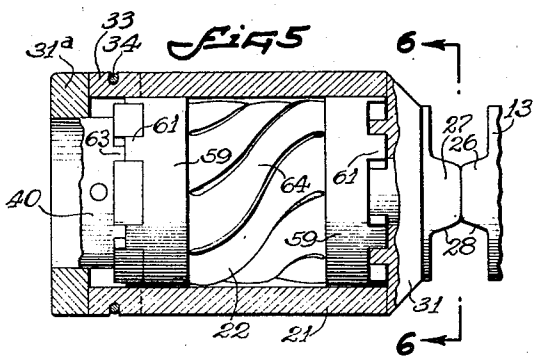


Fig. 6

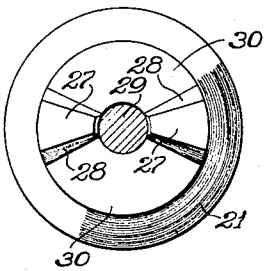
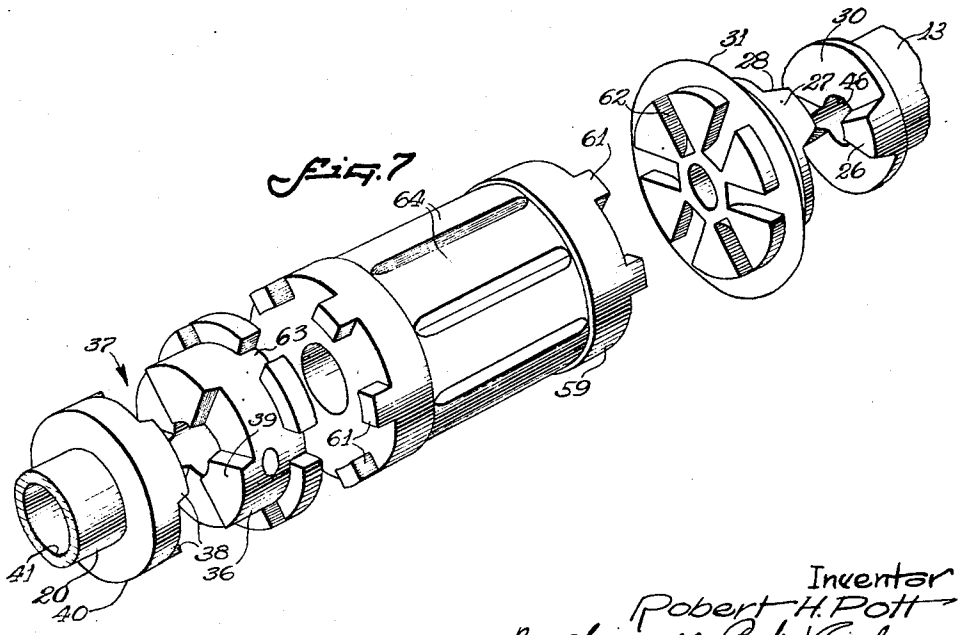


Fig. 7



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UNITED STATES PATENT OFFICE

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IMPACT TOOL

Robert H. Pott, Evansville, Ind.

Application October 6, 1932, Serial No. 636,522

22 Claims. (Cl. 81—54)

The invention relates generally to impact tools and more particularly to tools of this character for applying a torsional force.

An object of the invention is to provide a simple tool embodying a new and improved means for producing a rapid succession of impacts of great force.

A further object of the invention resides in the provision of an impact tool for imparting torsional force to a part engaged by the tool which embodies novel means for increasing the force of the impact over the force delivered directly by a driving member.

More specifically stated, an object is to provide, in a tool of this character, means for momentarily accumulating or storing up energy supplied by a constantly driven power source to be expended periodically in moving the hammer part of the tool rapidly and with a sudden impact against the driven part or tool head.

Another object is to provide a tool of this character having a normally inactive hammer adapted to be automatically connected with a constantly driven power source as an incident to the application of the tool to the work.

Another object is to provide such a tool adapted by a series of impacts to apply torsional force in either direction.

Another object is to provide a novel power accumulator for such a tool capable of delivering substantial impacts in rapid succession.

Other objects and advantages will become apparent in the following description and from the accompanying drawings, in which:

Figure 1 is a longitudinal central sectional view of a tool embodying the features of the invention.

Fig. 2 is an enlarged fragmental portion of Fig. 1 showing other portions of the tool in cross section.

Fig. 3 is a side elevational view of the power accumulator in its normal form.

Fig. 4 is a cross sectional view of the accumulator taken along the line 4—4 of Fig. 3.

Fig. 5 is a fragmental portion of Fig. 2 showing the power accumulator in its twisted relation.

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 5.

Fig. 7 is a perspective view showing the power accumulator and the associated parts of the drive in an axially separated alined relation generally similar to their relationship in the assembled tool.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the appended claims.

In the form illustrated the invention is embodied in a portable tool comprising a motor housing 10 adapted to be supported by opposed radial handles 11, and carrying at one end of the housing an elongated extension or casing 12 at the remote end of which a rotatable driven element or head 13 is located for operative engagement with the work.

The motor (not shown) mounted within the housing 10 is preferably reversible in a conventional manner and may be of any preferred type, as, for example, an electric or pneumatic motor, with its rotor shaft 14 in constant driving relation to a speed reduction gearing 15. The gearing 15 is disposed within a gear box 16 interposed between the housing 10 and the extending casing 12, the gear box 16 being secured to the housing 10 by bolts 17, while bolts 18 serve to fix the casing 12 to the gear box.

The reduction gearing 15 terminates in a gear 19 fixed on a shaft 20 which projects from the gear box 16 axially into the casing 12 and constitutes the constantly driven element of a driving connection housed within the casing 12 and through which the head 13 is actuated. This driving connection includes a hollow cylindrically shaped impact element or hammer 21 mounted for rotation about the axis of the casing and driven from the shaft 20. The driving connection between the shaft 20 and the hammer 21 comprises a flexible device and power accumulator 22 preferably mounted within the hammer 21 and capable of accumulating or storing up energy supplied by the shaft 20 for intermittently moving the hammer 21 rapidly and with a great impact against a part of the head 13 to rotate the same.

The head 13, as shown in Fig. 1, is mounted for rotation about the axis of the casing 12 in a bearing sleeve 23 projecting from an end wall 24 which is screw-threaded into the end of the casing 12. Between the inner end of the head 13 and the hammer 21 an impact clutch 25 is provided comprising clutch elements or teeth 26 and 27 formed respectively on the head 13 and the hammer 21. The clutch elements 26 and 27 have sloping cam shoulders or faces 28 on each side surface thereof as shown in Fig. 1, and so that resistance of the head 13 to turning tends to cause a conjoint camming action of these shoul-

ders, resulting in endwise separation of the opposed clutch elements, such separation being permitted by shifting of the hammer 21 along a central shaft 29 upon which it is mounted for relative rotative and longitudinal movement.

When rotation of the head 13 is resisted by a predetermined force, the continued rotation of the shaft 20 causes twisting of the accumulator 22, as shown in Fig. 5 of the drawings, and as an incident to the twisting a simultaneous and proportional shortening of the accumulator so that the shoulders 28 cam out of engagement.

Upon separation of the clutch teeth 26 and 27 the hammer 21 is free to be rotated through 180° by the accumulator 22, during which rotation the hammer is shifted longitudinally by the device 22 so as to again engage the opposed faces 28 of clutch teeth with a substantial rotative impact. The extent of such free rotation of the hammer is of course determined by the number and form of the clutch teeth 26 and 27, two diametrically opposite pairs of these teeth being provided in the present tool. The clutch teeth 26 and 27 are preferably relatively narrow in a circumferential direction as shown in Fig. 6 and are spaced 180° from each other, thereby providing relatively large spaces 30 between the teeth. Thus the return longitudinal movement of the hammer 21 and its clutch teeth 27 toward engaging relation to the teeth 26 may commence in the initial portion of the free rotative movement of the hammer, regardless of the direction of such rotation, whereby to insure completion of such return movement and an effective torque-transmitting engagement of the clutch elements.

In mounting the hammer 21 on the central shaft 29 an end wall 31 is provided on the hammer adjacent to the head 13 so as to carry the clutch elements 27 and define a central bearing opening slidingly and rotatably engaging the shaft 29. At the other end of the hammer 21 an end wall 31a is removably mounted with longitudinally extending lugs 32 (Fig. 1) about its edge extending between longitudinally extending lugs 33 forming a continuation of the wall of the hammer. A split resilient ring 34 surrounding the lugs 32 and 33 and engaging alined grooves 35 therein holds the end wall 31 in position as a part of the hammer 21.

To rotatably and slidably support the end wall 31a on the shaft 29, a hub 36 pinned on the shaft 29 is positioned within a central bearing opening defined by the end wall 31a. The hub 36 is driven from the shaft 20, as will presently be described, and opposite ends of the accumulator device 22 are provided with rotation transmitting connections with the hub 36 and the end wall 31 of the hammer so as to form an operating connection between the motor and the hammer.

In the operation of the tool the motor may be allowed to operate continuously and actuation of the head 13 is controlled by a disengageable connection between the hub 36 and the shaft 20, the operation of the disengageable connection preferably being controlled automatically as an incident to the application of the head to or its withdrawal from the work. To this end a control clutch 37 is interposed between the shaft 20 and the hub 36, the clutch comprising opposed teeth 38 and 39 formed respectively on the hub 36 and a member 40 fixed on the projecting end of the shaft 20 within the casing 12. Engagement and disengagement of the clutch 37 is effected by longitudinal shifting of the hub 36 which is in turn effected by longitudinal shifting of the head 13 and the shaft 29 to which the hub 36 is fixed.

The clutch 37 is normally disengaged by spring means mounted within an axial bore 41 in the end of the shaft 20 within which bore the end of the shaft 29 is rotatably journaled. Within the bore 41, the shaft 29 has an axial bore 42 housing an expansive coil spring 42a acting to project a slidable plunger 43 outwardly of the bore 42 and into contact with the closed inner end of the bore 41. The range of movement of the plunger 43 is limited by a transverse pin 44 fixed in the shaft 29 and extending through a longitudinally elongated slot 45 in the plunger 43. Thus the spring actuated plunger 43 tends to shift the shaft 29 outwardly of the casing 12 so as to open the control clutch 37. The other end of the shaft 29 is rotatably journaled in a bore 46 in the head 13, and in its outward shifting movement the shaft 29 shifts the head 13 outwardly in its bearing hub 23 as limited by an annular flange 47 on the inner end of the head.

The head 13 is adapted to receive an operating member or tool such as a removable socket 48 adapted to fit about a nut or bolt head. On the socket 48 a tapered shank 49 of angular cross-section is formed, adapted to fit into a complemental axial opening 50 in the head, and to be held in place in the head 13 by transversely slidable locking pins 51 mounted in the head and engageable with an annular groove 52 formed in the shank 49. To releasably hold the pins 51 in their active positions a sleeve 53 surrounds the head 13 within the bearing hub 23 and when in its forward position, as illustrated in Fig. 1, the sleeve 53 forms a continuation of the inner bearing surface of the hub 23 whereby to prevent outward unlocking movement of the pins 51. When it is desired to release the socket 48 the sleeve 53 is slipped longitudinally of the head 13 in a rearward direction to provide clearance for outward shifting of the pins 51, such shifting of the pins being effected by the rounded character of the groove 52. To shift the sleeve 53 an outer sleeve 54 slidably surrounds the hub 23 and is connected to the sleeve 53 by pins 55 extending through slots 56 in the hub to engage the sleeve 53. A split resilient ring 57 surrounding the sleeve 54 holds the pins 55 in position.

To produce rapid rotative acceleration as well as rapid and complete longitudinal return movement of the hammer 21 in the reengagement of the impact clutch 25, the power accumulating device 22 is preferably constructed of relatively great strength and is arranged to move the hammer 21 longitudinally toward the clutch element 26 in direct proportion to the rotative movement which it imparts to the hammer. In its preferred embodiment, the accumulator 22 is cylindrical, so as to surround the shaft 29 within the hammer 21, and is formed from resilient rubber so as to yield or twist under torsional force and compress longitudinally when endwise force is applied thereto.

In moulding the accumulator 22 a plurality of rigid metallic reinforcing rings 58 are positioned at spaced points intermediate the ends thereof to prevent lateral collapse of the accumulator and maintain it in its cylindrical form as it is twisted. Thus, reduction of the internal diameter of the accumulator is prevented and binding of the shaft 29 is avoided. Metallic anchor rings 59 are also fixed on the opposite ends of the accumulator in the moulding operation, the anchor rings each being grooved at 60

in one end surface so that the rubber wall of the accumulator may project into the groove. By copper plating and treating the rings 59 in a conventional manner, firm adherence of the rubber to the rings is insured so that substantial torsional forces may be impressed upon the rubber of the accumulator through the medium of the anchor rings.

Projecting longitudinally in opposite directions from the accumulator the anchor rings 59 each have a plurality of lugs 61 adapted to engage complemental recesses 62 and 63 formed respectively in the wall 31 of the hammer 21 and in the hub 36 so as to form rotation-transmitting connections at both ends of the accumulator.

It has been found that the effectiveness of the accumulator 22 in rotating the hammer as well as in forcing the hammer 21 longitudinally is materially increased by forming the rubber wall thereof with a series of parallel ribs 64 joined at their inner sides by a relatively thin portion 65 in which the stiffening rings 58 are moulded. The ribs 64 extend longitudinally of the accumulator between the anchor rings 59 and may, if desired, be normally straight and parallel to the central axis of the accumulator as in the form illustrated. The substantial spaces formed between the ribs 64 increase materially the range of the twisting movement of the accumulator whereby to permit greater momentum to be developed in the hammer 21.

As the accumulator 22 is twisted so as to store up the power supplied by the shaft 20, the ribs 64 assume a helical form with the grooves substantially closed as shown in Fig. 5, and at the same time the accumulator is materially shortened to release the engagement of the hammer 21 and the impact clutch 25. Immediately thereafter the accumulator 22 unwinds, the ribs 64 assume their normal positions with a corresponding or proportional lengthening of the accumulator, and the longitudinal return movement of the clutch element 27 is in each instance fully completed before the rotative movement of the hammer brings the teeth 27 thereof into contact with the clutch teeth 26 of the head 13. The full momentum of the hammer is therefore utilized and highly efficient operation of the tool is insured.

In the present tool the accumulator 22 when worn out may be readily replaced by a new one by removing the bolts 18 and separating the casing 12 from the gear box 16. In such separation the shaft 29 is withdrawn from the bore 41 of the shaft 20, the spring plunger 43 being held in position in the bore 42 by its retaining pin 44. The shaft 29 and the hammer 21 may then be withdrawn from the casing 12, thus withdrawing the other end of the shaft from its bearing in the head 13. By removing the split ring 34, the main body of the hammer 21 is released from the end wall 31a and may be removed endwise from the shaft 29. Thus the accumulator 22 is exposed and may be easily replaced. The engagement of the lugs of the anchor rings 59 with the recesses in the hub and the end wall 31a is easily accomplished, and the tool may be readily reassembled by a reversal of the procedure above outlined.

In the use of the tool, the head 13 and socket 48 are normally stationary, by reason of the normal disengagement of the control clutch 37, so as to facilitate engagement of the socket with a nut or bolt to be rotated. The body of the tool is then pressed toward the nut so as to cause shifting of the head 13 inwardly of the casing 12 and thereby engage the control clutch 37. In case the nut turns smoothly and easily as in the initial portion of a nut-tightening operation, the teeth 26 and 27 remain in the position shown in Fig. 1, and the head 13 is driven directly from the motor at the same rate as the shaft 20. As the nut becomes seated, resistance to turning increases and the accumulator is twisted and shortened as shown in Figs. 2 and 5 of the drawings. Due to the twisting of the accumulator 22 a marked shortening of the accumulator is effected by the action of the cam faces 28 of the impact clutch 25 and the hammer 21 and its clutch elements 27 are forced rearwardly so as to disengage the impact clutch as shown in Fig. 5. The camming action of the faces 28 may assist in shortening the accumulator. The hammer 21 may then be rotated freely through 180° by the energy stored in the accumulator 22 during the prior twisting thereof. During such free movement the hub 36 is being rotated by the motor and the total rate of movement of the hammer materially exceeds the rate of movement of the hub 36 due to the sudden and additive action of the accumulator 22. In its unwinding action, the accumulator 22 lengthens in direct proportion to the unwinding action so that positive reengagement of the impact clutch 25 is insured.

Since the motor is running constantly, the driving force of the accumulator is coupled with or added to the momentum of the motor, and the clutch elements on the hammer will, therefore, strike the clutch elements on the head with an impact, the force of which is materially increased over that which would be obtained solely from the momentum of the motor. Moreover, the flexibility of the drive allows the motor to operate without substantial retardation, the force thereof being stored up in the accumulator when movement of the hammer is momentarily arrested. The operation thus described is, of course, recurrent to produce a rapid succession of blows for firmly seating the nut. The tool is then withdrawn from the work and the spring plunger 43 automatically disengages the control clutch 37 and stops the operation of the accumulator and the head.

The teeth 26, 27, of the impact clutch 25 being similar in form on their opposite sides, the head 13 may be similarly operated in the opposite direction by reversal of the driving motor. In such use the tool may be used to loosen bolts or nuts, in which use the hammering action takes place in the initial portion of the operation and is followed by direct driving of the head after the nut or bolt has been partially loosened.

It should be noted that the hammer is of much greater mass than the head and that both hammer and head are compact. The head itself, therefore, offers little resistance to movement by the impact force of the hammer and a minimum amount of the impact force is dissipated in overcoming the inertia of the head. Moreover, the compact nature of the parts minimizes the dissipation of force due to the inherent elasticity of the metal.

It will be apparent from the foregoing that a device has been provided which creates and utilizes an impact force much greater than can be obtained solely and directly from the motive power. Moreover, since this force is transmitted with a minimum of loss to the part being operated on, the device is highly efficient.

I claim as my invention:

1. A device for accumulating torsional force in an impact tool comprising a pair of end members, resilient means interposed between said end members and operable to resist relative rotative displacement of the end members from a normal relation, and generally longitudinal elongated resilient members extending externally on said means between said end members and acting during relative rotative movement of the end members to vary the distance between said end members in predetermined proportion to the rotative displacement thereof.

2. An impact tool comprising two opposed relatively movable members having releasable interengaging means constituting a driving connection between said members under certain conditions of operation, said means being successively releasable and reengageable under other operating conditions, and driving means for one of said members comprising a prime mover, and a power accumulator having an elongated body formed from rubber and operatively connected at its opposite ends to said one of said members and said prime mover respectively.

3. In an impact tool the combination of a reversible driving member, a rotatable tool head and an operating connection therebetween comprising resilient means connected at one end to said driving member and rotated thereby, and a separable impact clutch having one clutch element on said head and the other element connected to said resilient means, said clutch elements having rotation transmitting cam faces similarly operable in either direction of rotation of the driving member to effect relative separation of said elements when rotation of said head by said member is resisted by a predetermined force.

4. A tool of the character described comprising a driving member and a coaxial tool head, means supporting said tool head for rotative and longitudinal movement, a hammer mounted for rotative and longitudinal movement between and coaxially with said head and driving member, a releasable impact clutch between said hammer and said head, a resilient power accumulator having one end connected to said hammer for rotating and axially moving the hammer to operatively engage said impact clutch, a normally open control clutch having one element fixed to said driving member and an opposed element drivingly connected to the other end of said accumulator, and means operated by axial movement of said tool head as it is engaged with the work to engage the elements of said control clutch.

5. An impact tool comprising a driving member, a tool head mounted for axial and rotative movement, a rotatable hammer, a disengageable impact clutch interposed between said hammer and said head for transmitting rotative forces therebetween, said clutch having engageable cam faces tending to open said clutch, a resilient power accumulator connected at one end to said hammer for rotating the same, a control clutch having one element connected to said driving member and the other element connected to the other end of said accumulator, and means actuated by engagement of the tool head with the work to operate said control clutch.

6. An impact tool comprising a rotative driving member, an alined tool head mounted for rotation and limited axial movement, a shaft extending between and having its opposite ends rotatably journaled in said driving member and said head, a cylindrical hammer surrounding said shaft and having a rotative and slidable engagement with said shaft at one end, an impact clutch at said end of the hammer having axially separable elements on said hammer and head respectively, a hub mounted on said shaft for longitudinal movement therewith and forming a rotative and slidable bearing for the other end of said hammer, a power accumulating device within said hammer having its opposite ends connected to said hammer and said hub, a control clutch having opposed separable elements on said hub and said driving member, and means acting to maintain said clutch normally open, said clutch being adapted to be closed by axial shifting of said head, said shaft and said hub in the application of the tool to the work.

7. An impact tool comprising a rotative driving member, an alined tool head mounted for rotation, a shaft extending between and having its opposite ends rotatably journaled in said driving member and said head, a cylindrical hammer surrounding said shaft and having a rotative and slidable engagement with said shaft at one end, an impact clutch at said end of the hammer having axially separable elements on said hammer and head respectively, a hub mounted on said shaft for longitudinal movement therewith and forming a rotative and slidable bearing for the other end of said hammer, and a power accumulating device within said hammer forming a rotation-transmitting connection between said hub and said hammer.

8. An impact tool comprising a housing having a rotatable driving member projecting therefrom, a casing detachably secured to said housing surrounding and coaxial with the projecting end of said driven member, a projecting tool head rotatably and slidably mounted in the other end of said casing and having a clutch element thereon, and a hammer assembly removable from said casing as a unit when the casing is detached from said housing, said hammer assembly comprising a central shaft rotatably and slidably journaled at its opposite ends in said head and said driving member when said casing and housing are in assembled relation, a cylindrical hammer surrounding said shaft and having a rotatable and slidable bearing engagement with said shaft at one end, a hub fixed to said shaft, an end wall detachably fixed to said hammer and having a rotatable and sliding bearing engagement with said hub, said hub having a flange within said hammer and engageable with said end wall, a power accumulator within said hammer having rotation-transmitting connections at its opposite ends with said hammer and said hub, and said hub and said hammer having clutch elements thereon engageable with the clutch elements on said driving member and said head, the elements on said head and said hammer having a cam engagement tending to disengage said element when a predetermined force opposes rotation of said head.

9. A power transmitting device for the accumulation of energy from a driving member and the delivery of accumulated energy to a driven member with an impact force comprising a body formed from resilient rubber, and axially facing means on the opposite end faces of said body to

be engaged for the application of torsional stress to said body.

10. A power transmitting device for an impact tool comprising, in combination, a resilient body capable of being rotatably twisted with like effect in either direction out of a normal condition, means at one end of said body through which a power imput may be applied to twist said body and thereby effect an accumulation of energy therein, and means at the other end of said body through which a driving connection with a part to be driven may be established and released accumulated energy transmitted to the driven part.

11. For use in an impact tool, a power transmitting device comprising, in combination, a rubber body capable of accumulating energy when a torsional force is applied thereto, means for connecting one end of said body with a rotatable prime mover, and means at the other end of said body for transmitting the accumulated energy of the body by rotational impact to a part to be driven.

12. For use in an impact tool, a force accumulator of the character described comprising an elongated resilient body having means at its opposite ends by which said ends may be relatively rotated to accumulate torsional energy in said body, said body having generally longitudinally extending external means for determining the proportion between the extent of said relative rotation and the variation of body length caused thereby.

13. A power accumulating device adapted for use in an impact tool recurrently to store up energy derived from a prime mover and to expend such stored energy in the form of an impact upon a working member, comprising an elongated member formed of resilient rubber, and means for connecting said member operatively in an impact tool, said member having generally longitudinal external alternating ribs and grooves thereon of predetermined dimensions producing when the device responds to a torsional force a correlation of the relationship between the extent of diminution of length and degree of response as torsional force is applied to one end of the device while the other end is relatively held against rotation.

14. For use in an impact tool or the like having a prime mover, work performing means, and an interruptable driving connection therebetween including rotatable parts separable by relative axial movement, a power accumulator for effecting such movement and return, comprising an elongated member resiliently yieldable longitudinally and rotatably and having means for correlating the extent to which the length of said member is diminished as relative rotation of its ends occurs under the imposition of a torsional force so that separation of said parts is effected upon a predetermined degree of such relative rotation.

15. A power accumulating device for an impact tool having a disengageable clutch mechanism including a driven part comprising an elongated member of resilient rubber-like material adapted to be interposed between a prime mover and said driven part as the sole driving connection, said member being dimensioned to become substantially shorter as a torsional force tending to produce relative rotational displacement between its ends is encountered so that said member will be effective to cause recurrent interruption and reestablishment of the disengageable clutch mechanism.

16. A power accumulating device for an impact tool of the character described comprising a resilient rubber member of mass ample to provide rigidity in said member for transmitting a rotary driving force yet yielding throughout the major portion of its length for the accumulation of energy upon the imposition of such rotary driving force when one end of the member is momentarily held again rotation, and end face means for connecting said member with driving and driven elements of an impact tool.

17. A power accumulating device for an impact tool of the character described comprising an elongated hollow member of resilient rubber having walls of ample thickness and mass to transmit a rotary driving force for operating an impact tool under one load condition and resiliently yielding to acquire torsional energy when a heavier load condition prevents the transmission of said driving force by restraining movement of one end of said member and to expend such acquired energy when the restraint is removed, and means for connecting said member with a free axial movement in an impact tool.

18. A power accumulating device for an impact tool comprising, in combination, a member of resilient rubber having a bore therethrough to receive a driving element of the tool, means on one end face of said member for connecting said member with said driving element, and means on the other end of said member for connecting it with a driven element of said tool.

19. A power accumulating device for an impact tool comprising, in combination, a cylindrical member of resilient rubber having an axial opening through which a driving element of the tool may extend, means at one end of said member affording an axially detachable interfitting drive connection with said driving element, and means at the other end of said member affording a freely detachable connection with a tool element to be driven.

20. In an impact tool, the combination of a reversible driving member, a rotatable tool head and an operating connection therebetween comprising resilient means connected at one end to said driving member and rotated thereby and a separable impact clutch having one clutch element connected with said head and the other clutch element connected with said resilient means, said impact clutch including rotation transmitting interengageable elements similarly operable in either direction of rotation of the driving member, said resilient means being operative to effect relative separation of said elements when rotation of said head by said member is resisted by a predetermined force.

21. In a device of the character described, the combination of a driving member, a driven member, a driving connection therebetween for operating said driven member in opposite directions, said driving connection being releasable upon relative movement of said members in either direction to interrupt the driving connection and automatically reestablish it after release, a prime mover, and a resilient driving connection between said driving member and said prime mover and constituting the sole driving connection therebetween, said resilient driving connection being adapted to be placed under torsional stress when movement of the driving member in either direction is opposed and concurrently therewith to be shortened to permit release of the driving connection between said driving and driven members followed by an acceleration of the driving member by release of the torsional stress to re-

engage said first mentioned driving connection.

22. A rotary impact tool having an elongated casing, a rotary drive member projecting into said casing, a power accumulating unit in said casing and comprising an elongated body of resilient material adapted to be placed under internal tension and to accumulate torsional energy when twisted in either direction out of a normal position, and to return to said position at a highly accelerated rate when released from the twisting force, a rotary drive connection between said member and one end of said unit and adapted to be established by insertion of said unit longitudinally into said casing, and a tool having a separable intermittent rotary impact drive connection with said unit.

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