May 26, 1959 C. B. SIEBER 2,888,246

IMPACT TOOL

Filed June 3, 1955 2 Sheets-Sheet 1

Fig. 1.

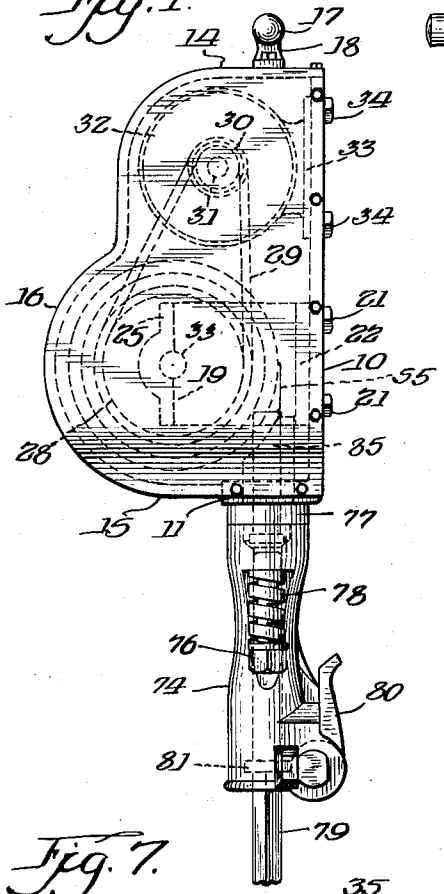


Fig. 2.

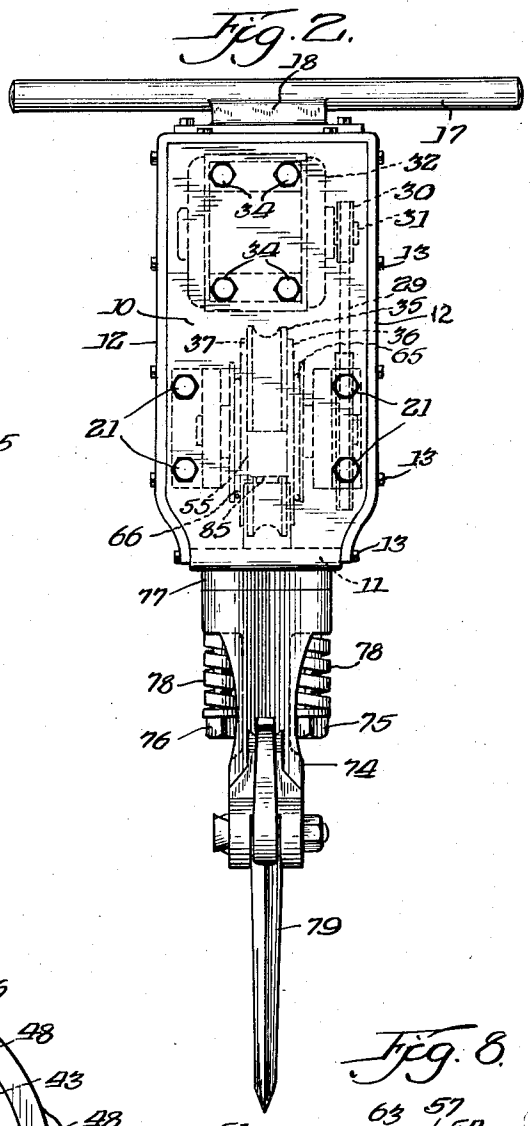


Fig. 7.

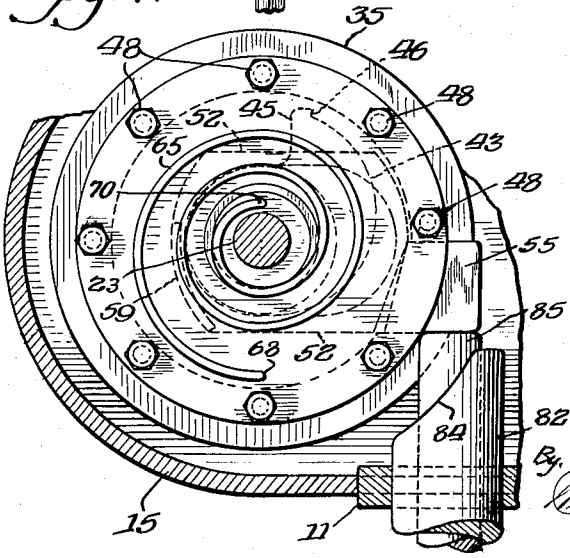
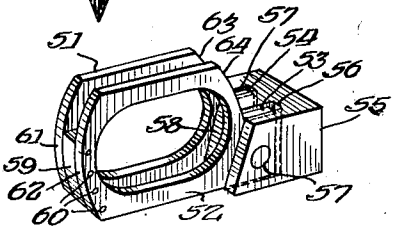


Fig. 8.



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Fig. 3.

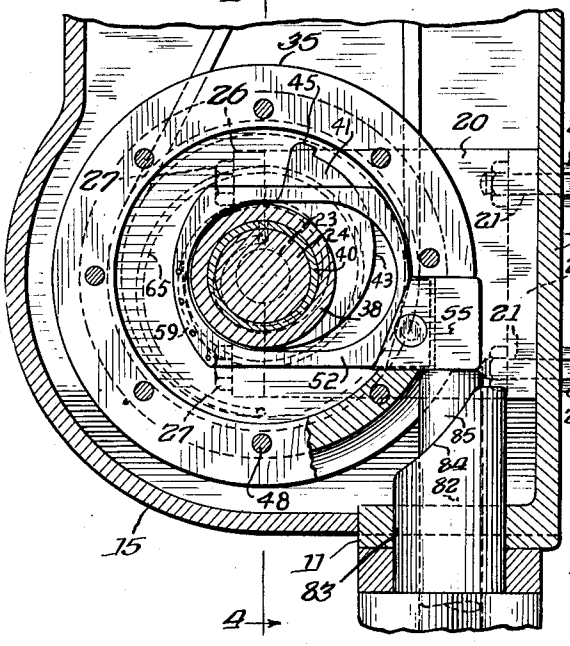


Fig. 4.

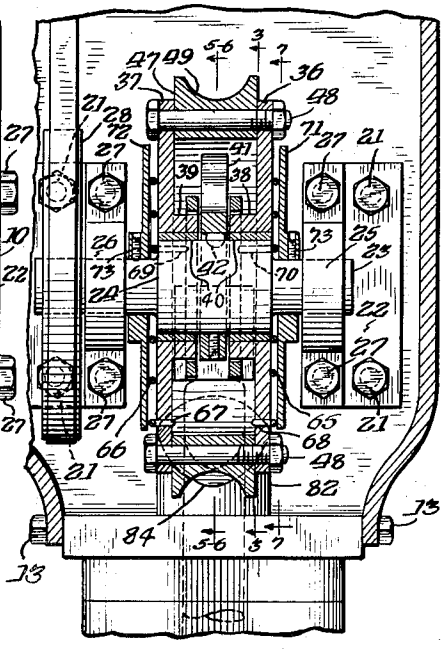


Fig. 5.

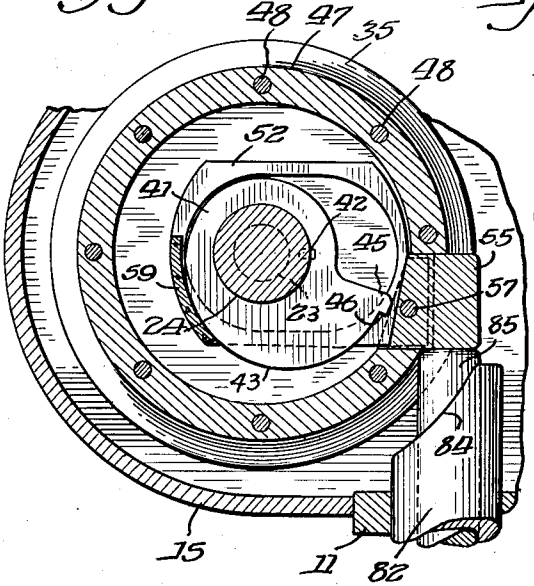
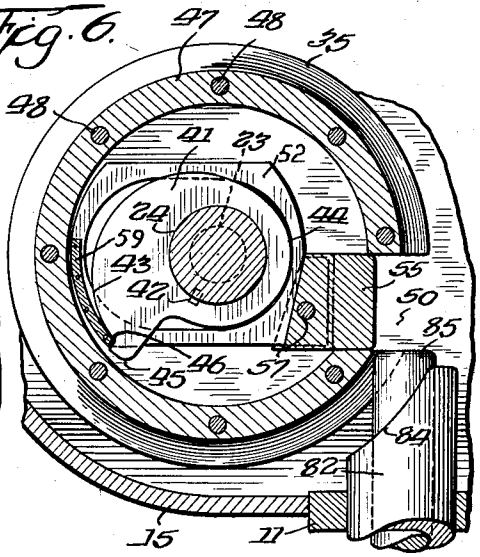


Fig. 6.



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United States Patent Office 2,888,246 Patented May 26, 1959

2,888,246

IMPACT TOOL

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Application June 3, 1955, Serial No. 513,093

13 Claims. (Cl. 255—39)

My invention relates to a power-operated impact tool and has particular reference to a tool in which an impact is directed upon a working part of the mechanism and may be used for a multiplicity of purposes such as breaking up concrete structures like concrete driveways, walls, walks, pavements, etc., such tools being commonly known in the trade as demolition tools and, by the substitution of working parts, may be converted into driving mechanisms for driving spikes, a sheet-driving tool, or the like, depending upon the particular character and kind of work being performed.

Another object of my invention is the provision of an electrically operated impact tool shown embodied and described in a demolition tool primarily adapted for breaking up concrete structures, regardless of whether it be in walls, roadways, sidewalks, or the like, and which may be operated by various kinds of power applying means—the device shown being operated by electric power supplied through a motor mounted in the tool, although hydraulically operated motors may be used as well as various other means by which power in the form of impact blows is delivered to a working tool.

Another and further object of my invention is the provision of a tool in which a rotary impact member is provided which may be operated by an electric motor and in such manner that a series of heavy blows can be directed against a tool for demolition work and which operates very rapidly, so that the force exerted on the working end of the tool is very considerable and at the same time a certain amount of vibration is imparted to the tool and to the structure being broken, which assists in breaking up and cracking the structure, such as concrete, and the like.

Another and further object of my invention is the provision of a tool which can be operated by an electric motor thus doing away with the use of air compressors and the like in the operation of tools of this type so that the tool may be operated by connecting it to a suitable source of electric power which is often available close by without the necessity of using an air compressor and motor power for operating the air compressor, which must be hauled onto the job, thereby providing an extra amount of labor, etc. in keeping the air compressor in operation to supply the power to operate the demolition tool.

Another and further object of my invention is the provision of an electrically operated demolition tool which takes the place of air operated demolition tools now in common use and which is simple in construction, simple in operation and in which the force of the blows can be greater than that of an air hammer of the same size and in which the tool itself is much more easily held in position by the operator and because the tool is not subject to as much vibration as are air hammers.

Another and further object of my invention is the provision of a demolition tool which is substantially self-contained and which needs only to be supplied with electric current in order to provide power for the operation

of the tool, without the necessity of providing extra compressor equipment such as is commonly employed at the present time.

These and other objects of my invention will be more fully and better understood by reference to the accompanying drawings and in which—

Fig. 1 is a side elevational view of my invention embodying a demolition tool.

Fig. 2 is a front elevational view of the tool shown in Fig. 1.

Fig. 3 is a vertical sectional view of the working parts of the tool shown in Figs. 1 and 2 on line 3—3 of Fig. 4.

Fig. 4 is a vertical sectional view through the working parts of the tool on line 4—4 of Fig. 3.

Fig. 5 is a vertical sectional view of the working parts of the tool showing the impact head in extended position on line 5—5 of Fig. 4.

Fig. 6 is a vertical sectional view of the working parts showing the impact tool in retracted position taken on line 6—6 of Fig. 4.

Fig. 7 is a vertical sectional view showing the impact head in extended position on line 7—7 of Fig. 4, and

Fig. 8 is a perspective view of the movable yoke and cam and the impact head secured thereto.

Referring now specifically to the drawings and in which like reference characters refer to like parts throughout, a base plate **10** is shown having a flange **11** at one end thereof, with an integrally formed cover **12** being provided which has three closed sides and a closed top and bottom and which has its edges fitted over the side edges of the plate **10** and flange **11** and is secured to the plate **10** and flange **11** by means of bolts **13, 13** which provides a complete housing for the main working parts of the tool. The cover has a top portion **14** and curved bottom **15**, with a curved rear side **16** and is shaped generally to conform to the contour of the mechanism enclosed in the housing at the rear side of the tool, so that the operator in grasping the handle **17** with both of his hands does not have his view obstructed to the workpiece by the housing. The handle **17** is secured to the top **14** of the housing by means of a bracket **18**.

Spaced brackets **19** and **20** are provided which are secured to the base plate **10** along each of its sides by bolts **21, 21** extending through the base portion **22, 22** of the brackets **19** and **20** and through the base plate **10**, upon which brackets **19** and **20** a rotatably driven axle **23** is mounted, the axle **23** having an enlarged central portion **24**, with the ends of the axle **23** being journalled in the brackets **19** and **20** and held in position by cap members **25** and **26** secured to the brackets **19** and **20** respectively by bolts **27, 27**. A belt wheel **28** is mounted upon one end of the axle **23** having a driving belt **29** extending thereover which leads to a pulley **30** on the projecting end of a motor shaft **31** of a motor **32** which is mounted on the inner face of the base plate **10** by means of a bracket **33** secured to the base plate **10** by means of bolts **34, 34**. Suitable electrical lead connections are provided (not shown) which lead through a switch (also not shown) mounted in the handle **17** and to any suitable source of electric power by means of which power the motor is operated as desired.

A built up wheel designated as a whole as **35** is provided which is rotatably mounted on the axle **23** and which consists of circular side plates **36** and **37** having central circular openings therein, and having inwardly extending trunnions **38** and **39** thereon which are spaced from each other at their inner ends and form hub portions for the wheel **35**. Bearing rings **40, 40** are mounted in each of the side plates **36** and **37** and extend inwardly to the ends of each of the trunnions **38** and **39**, and provide bearings upon which the wheel **35** rotates about the

axle 23. A cam 41 is provided which is mounted on the enlarged portion 24 of the axle 23 and is secured to the axle 23 by means of a key 42 so the cam 41 moves in fixed rotation with the axle 23. The cam 41 has a high cam surface 43 and a low cam surface 44 thereon, substantially opposite each other, and has a projection 45 thereon extending outward from the cam 41 adjacent the high surface 43 at the rear surface thereof as the cam rotates, with a hook 46 thereon for purposes hereinafter described.

The wheel 35 has a rim 47 thereon which is mounted between the outer edges of the circular side plates 36 and 37 and is secured to the said side plates by means of a plurality of bolts 48, 48 which extend through the side plates 36 and 37 and through the rim 47. The rim 47 has a channel 49 therein which does not extend entirely around the plates 36 and 37 but has a portion cut out to form an opening 50 therein, for purposes hereinafter described. The channel 49 is arcuate or concave as shown. Yokes 51 and 52 are provided having extensions 53 and 54 thereon at one of their ends upon which an impact head 55 is mounted, the impact head having slots 56 and 57 therein into which the extensions 53 and 54 are fitted, with a pin 57 extending transversely through the impact head 55 and the extensions 53 and 54, with a portion 58 of the head 55 being positioned between the yokes 51 and 52, which acts as a spacer for the yokes 51 and 52 and also has a cam follower, and has a cam member 59 which is fitted between the yokes 51 and 52 at their ends opposite the impact head 55, which is secured between the yokes 51 and 52 by means of rivets 60, 60 and which also acts as a spacer for the yokes 51 and 52. The ends 61 and 62 of the yokes 51 and 52 are arcuate in contour and conform to the curvature of the inner surface of the rim 49 forming a part of the wheel 35, while a portion of the ends 63 and 64 adjacent the impact head 55 is also arcuate in contour, conforming generally to the curvature of the inside surface of the rim 47 of the wheel 35. The yokes 51 and 52 have elliptical openings therein into which trunnions 38 and 39 extend which form support bearings for the sliding movement of the yokes 51 and 52 which are less in length than the internal diameter of the wheel 35, and are arcuate in shape at each of their ends to conform to the curvature of the rim 49 forming a part of the wheel 35. The impact head 55 extends into the opening 50 in the wheel rim 47 and is in a close sliding position on the surfaces of the rim 47 adjacent the opennig 50 outward across the channel 49 in the rim 47 and between the plates 36 and 37 and moves to an impact position (Fig. 5) and inward out of impact position (Fig. 6) depending upon the position of the yokes 51 and 52 to which the head 55 is connected. The yokes 51 and 52 are spaced from each other so that the cam 41 may operate between them and for the projection 45 to pass between the yokes for engagement with the cam follower 59 as the cam 41 rotates with the axle 23. The impact head 55 is mounted at the lower corner of the yokes 51 and 52 in their ends opposite the cam follower 59, is generally rectangular in shape, and is fitted somewhat closely in the opening 50 and between the plates 36 and 37 with its side opposite the impact side substantially parallel to the center cross-sectional plane of the wheel 35 while its lower or impact side is parallel to a cross-sectional plane of a segment of the wheel in a line approximately one half the distance between the center of the wheel and the bottom of the channel 49 in the rim 47. The normal position of the upper end of the transmission member 85 is parallel to the segmented plane thus described, and because of the channel 49 and the location of the transmission member with respect to the rim of the wheel, the entire surface area of the transmission member is within a plane tangent to the wheel at the outer edge of the wheel and the blow of the impact head 55 is delivered to the transmission member on a line perpendicular to the horizontal plane of the wheel.

Spiral springs 65 and 66 are provided which have their outer ends 67 and 68 respectively mounted in the plates 36 and 37 towards their outer peripheries and which are coiled about the axle 23 and have their inner ends 69 and 70 respectively anchored into the side wall on each end of the enlarged central portion 24 of the axle 23. The springs 65 and 66 are normally wound under some tension when the device is assembled and are so mounted that the rotation of the wheel 35 upon the axle 23 coils the spiral springs to a further degree, placing them under greater tension. The spiral springs 65 and 66 provide means by which the wheel 35 receives the major portion of its rotative force from the axle 23 during the operation of the device. Side plates 71 and 72 are mounted upon the axle 23 and secured thereto by threaded bolts 73, 73 so the plates 71 and 72 rotate in synchronism with the axle 23 but are spaced from the plates 36 and 37 so the springs 65 and 66 are held in a single plane for efficient operation.

A shank member 74 is provided which is secured to the base member 10 by means of bolts 75 and 76, with a collar 77 interposed therebetween and springs 78, 78 mounted upon the bolts 75 and 76, holding the shank securely to the main frame. A spike tool 79 is mounted in the shank 74 in the usual manner of mounting these tools in air hammers and has a latch 80 which is normally fitted under a collar 81 on the spike 79 to hold the spike in position in the shank 74, this latch construction being of the same type and kind now employed in the usual air hammers or demolition tools. A guide tube 82 is provided at the upper end of the shank which extends through an opening 83 in the flange portion 11, the tube 82 having an arcuate shaped upper end 84 conforming generally to the curvature of the outer periphery of the rim 47 and has a transmission plug 85 which is circular in cross-section mounted therein and which extends into the arcuate channel 49 in the rim 47 but out of contact with the rim 47, so that as the wheel 35 is rotated, the impact head 55 engages the upper end of the transmission member 85 which, in turn, transmits its force to the spike 79, thereby imparting a blow to concrete or the like at the end of the spike 79. It will be understood that the working tool 79, which as shown is in the form of a spike, can be removed and a spade, a digging tool, a cutting chisel, a tamper, or the like, can be substituted therefor, as well as other tools such as a spike driver or sheeting driver now commonly used with air hammers for demolition tools.

The assembly of the mechanism inside of the wheel 35 is accomplished by first placing the cam 41 in position between the yoke members 51 and 52 and then placing this combination into position over the stub bearing on one of the plates 36 or 37, and after this assembly has been made the other plate forming the wheel and the rim 47 is placed into position and this unit bolted together upon the axle 23, which combination can thereafter be inserted into position and mounted on the plate 10, with the springs 65 and 66 being placed into position, as well as the plates 71 and 72, and the unit mounted on the base plate 10 by placing the caps 25 and 26 in position over the ends of the axle 23.

In the operation of the device, it will be understood, that the axle 23 and the cam 41 mounted thereon are in constant rotation through power being supplied thereto by the motor 32 through the belt 29 to the pulley 28 on the shaft 23, while the rotation of the wheel 35, the yokes 51 and 52 and the impact head 55 is intermittent and stops completely as each blow is delivered by the impact head 55 to the transmission member 85. Considering the parts in the positions shown in Fig. 5 with the axle 23 and cam 41 being rotated in a clockwise direction, and a blow just having been delivered by the head 55 to the transmission member 85, the high side 43 of the cam 41 is approaching the cam follower 59 (Fig. 6). As this surface 43 of the cam 41 engages the

follower 59 the yokes 51 and 52 are drawn radially inward of the wheel 35 until the head 55 clears the transmission member 85 and the projection 46 has engaged with the edge of the cam follower 59, and the wheel 35, yokes 51 and 52 with the impact head 55 are free to rotate (Fig. 5). The axle 23 has continued to rotate during the time the wheel 35 has stopped rotation, thereby winding the springs 65 and 66 to a greater extent than is in their normal condition thereby storing energy therein to be later released. As the impact head 55 clears the transmission member 85, the wheel 35 resumes rotation, which rotative movement is initiated by the radial thrust of the projection 45 against the trailing edge of the cam follower 59, and by the pull of the springs 65 and 66 upon the wheel combined with the tension or energy stored in the springs 65 and 66. The speed of rotation of the wheel 35 accelerates very rapidly from its initial start of rotation until at the instant of each impact of the head 55 the wheel 35 is travelling at least two and a half to three times the speed of rotation of the axle 23 and cam 41 with an average speed of about twice that of the rotation of the axle 23. The rapid acceleration and rotation of the wheel in a very short period of time is secured because the rotative force acting upon the wheel is applied near the rim thereof instead of through a shaft upon which a wheel is usually mounted because of the application of leverage to the wheel which is readily understood in the art. As shown in the drawings, the parts of the device just after the instant of impact of the head 55 on the transmission member 85 is illustrated in Fig. 5 of the drawings, while in Fig. 6 the working parts of the tool are shown in their respective positions at the initial movement of rotation of the wheel 35 after its rotation has been interrupted as an impact blow is being delivered by the impact head 55. As the speed of rotation of the wheel 35 increases because of the pull of the springs 65 and 66 developed by the rotation of the axle 23 plus the use of the stored energy in the springs 65 and 66, the cam follower 59 moves on the surface of the cam 41 towards the low side 44 thereof, centrifugal force causes the impact head to move internally in the opening 50 in the wheel 35 towards the outer edge of the rim 49, while the impact head 55 is overtaking the projection 45 on the cam 41, and as it does so, the surface 58 on the impact head 55 engages the trailing side of the projection 45 thereby becoming a cam follower, and as the impact head passes over the projection 45 the said head is forced outward into impact position in the wheel rim 49, as the cam follower reaches the low side of the cam 41, permitting this outward radial movement of the yokes 51 and 52. The speed of rotation of the wheel 35 continues to accelerate as the impact head 55 passes over the projection 45 until the wheel 35 is rotating approximately three times as fast as is the rotation of the axle 23, until the working parts are in approximately the position shown in Fig. 3 of the drawings, when a blow is delivered by the head 55 to the transmission member 85, the rotation of the wheel 35 is interrupted, one cycle of operation has been completed and the parts are in position to commence a new cycle of operation.

As a blow is delivered by the impact head 55 to the transmission member 85, the entire reactive force developed as a result of the blow, is transferred from the head 55 to the wheel 35 and substantially absorbed by the springs 65 and 66 so there is no part of the tool subjected to such severe shock that breakage or extreme wear may develop with respect to any of the working parts. Likewise vibration of the tool is reduced to a minimum so a workman can easily hold a demolition tool of the type shown in Figs. 1 and 7 of the drawings with less effort than is possible with a demolition tool operated by compressed air.

As a blow is delivered in the transmission member, the transmission member is driven downwardly slightly as the springs 78, 78 are compressed, the reactive force is transferred to the wheel 35 the head 55 is substantially freed of any friction at the sides and it is easily and quickly drawn inward free of the transmission member without wear to any extent in the parts, and because of the particular construction of mounting of the head as hereinabove explained, the impact blow is delivered squarely upon the end of the transmission member.

The speed of rotation of the axle 23 can be varied from 300 to 1000 r.p.m., which means that every time the gear is rotated, a blow is delivered to the working tool and which, in a rotation of 600 r.p.m., delivers a succession of extremely powerful blows to the working tool. Because of the fact that the opening in the rim 47 substantially conforms to the contour of the impact head 55, as the blow is delivered on the transmission member the shock of this blow is transmitted to the rim of the wheel, so that breakage of the impact head is very unlikely. Also, I have found that the tool is capable of delivering heavier blows than the ordinary demolition tool now in use through the use of compressed air and capable of doing extremely heavy work beyond that possible to be accomplished by the ordinary tools now in service.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of the invention.

What is claimed is:

1. An impact tool comprising in combination, a frame, a rotatable axle mounted thereon, a built up wheel comprising a pair of side plates having inwardly turned trunnions at their centers to form an axial bearing for the said wheel and a rim secured to the said plates at their outer edges having an opening therein, the said wheel being rotatably mounted on the said axle, a cam fixed to the said axle and rotatable therewith, a yoke having an elongated opening therein slidably mounted to move in an inwardly and outwardly direction on the hub of the wheel internally thereof, a cam follower on the said yoke for co-operation with the said cam on the said axle, an impact head on the said yoke extending into the opening in the rim of the wheel, and coiled spiral springs on each side of the said wheel secured at their inner ends to the said axle and having their outer ends secured to the wheel whereby the rotative force of the axle near its outer periphery is communicated to the said wheel.

2. An impact tool comprising in combination, a frame, a rotatable axle mounted thereon, a built up wheel comprising a pair of side plates having inwardly turned trunnions at their centers to form an axially mounting for the said wheel and a rim secured to the said plates at their outer edges having an opening therein, the said wheel being rotatably mounted on the said axle, a cam fixed to the said axle and rotatable therewith, a yoke having an elongated opening therein slidably mounted on the hub of the wheel internally thereof to move in an inwardly and outwardly direction, a cam follower on the said yoke for co-operation with the said cam on the said axle, an impact head on the said yoke extending into the opening in the rim of the wheel, coiled spiral springs on each side of the said wheel secured at their inner ends to the said axle and having their outer ends secured to the wheel whereby the rotative force of the axle near its outer periphery is communicated to the said wheel, and a pair of plates secured to the said axle and spaced from the sides of the wheel whereby the springs are retained in a single plane.

3. An impact tool comprising in combination, a frame, a rotatable axle mounted thereon, a wheel having a hub portion and having an opening in the rim thereof rotat-

ably mounted on the said axle, a cam fixed upon the axle and rotatable therewith the cam having high and low cam surfaces thereon substantially opposite each other on its outer periphery and having a projection thereon adjacent the high cam surface, a yoke having an elongated opening therein slidably mounted within the said wheel on the hub portion thereof adapted to move radially in an inward and outward direction, a cam follower on the said yoke co-operating with the said cam to move the yoke radially of the wheel, an impact head mounted on the said yoke extending into the opening in the rim of the said wheel and movable inwardly and outwardly therein, spiral springs on each side of the said wheel being their inner ends connected to the said axle and their outer ends to the said wheel near the outer periphery thereof whereby the rotative force of the said axle is communicated to the said wheel.

4. An impact tool comprising in combination, a frame, a rotatable axle mounted thereon, a wheel having side plates with inwardly projecting trunnions therein to form hub portions and having an opening in the rim thereof rotatably mounted on the said axle, a cam fixed upon the axle and rotatable therewith, the cam having high and low cam surfaces thereon substantially opposite each other on its outer periphery and having a projection thereon adjacent the high cam surface, a yoke having an elongated opening therein slidably mounted within the said wheel on the trunnions forcing the hub portions thereof for inward and outward radial movement in the said wheel, a cam follower on the said yoke co-operating with the said cam to move the yoke radially of the wheel, an impact head mounted on the said yoke extending into the opening in the rim of the said wheel and movable inwardly and outwardly therein, spiral springs on each side of the said wheel being their inner ends connected to the said axle and their outer ends to the said wheel near the outer periphery thereof whereby the rotative force of the said axle is communicated to the said wheel.

5. An impact tool comprising in combination, a frame, a rotatable axle mounted thereon, a wheel having side plates with inwardly extending trunnions therein whereby hub portions are formed and having a rim thereon rotatably mounted on the said axle the said rim being arcuate in cross section and having an opening therein, a cam fixed upon the axle and rotatable therewith, the cam having high and low cam surfaces thereon substantially opposite each other on its outer periphery and having a projection thereon adjacent the high camming surface, a yoke having an elongated opening therein and slidably mounted within the said wheel on the hub portions thereof for inward and outward radial movement within the wheel, a cam follower on the said yoke co-operating with the said cam to move the yoke radially of the wheel, and impact head mounted on the said yoke at one corner thereof and extending into the opening on the said wheel and movable inward and outward therein, spiral springs on each side of the said wheel having their inner ends connected to the said axle and their outer ends to the said wheel near the outer periphery thereof whereby the rotative force of the said axle is communicated to the said wheel, and plates on the said axle spaced from the sides of the said wheel whereby the springs are retained in a single plane.

6. An impact tool comprising in combination, a frame, a rotatable axle mounted thereon, a wheel having side plates thereon with inwardly extending central trunnions thereon forming hub portions on the wheel and having a rim thereon rotatably mounted on the said axle the said rim being arcuate in cross section and having an opening therethrough, a cam fixed upon the axle and rotatable therewith, the cam having high and low cam surfaces thereon substantially opposite each other on its outer periphery and having a projection thereon adjacent the high camming surface, a yoke having an elongated opening therein and slidably mounted for inward and outward radial movement within the said wheel on the hub portions thereof, a cam follower on the said yoke co-operating with the said cam, an impact head mounted on the said yoke extending into the opening in the rim of the said wheel and movable therein in an inward and outward direction, spiral springs on each side of the said wheel having their inner ends connected to the said axle and their outer ends to the said wheel near the outer periphery thereof whereby the rotative force of the said axle is communicated to the said wheel whereby the said springs are retained in a single plane, the said impact head being mounted at one corner of the said yoke and offset from the central plane of the wheel.

7. An impact tool comprising in combination, a frame, a rotatable axle mounted thereon, a wheel having side plates thereon with inwardly projecting trunnions forming hub portions on the wheel and having a rim thereon rotatably mounted on the said axle and said rim being arcuate in cross section and having an opening therein, a cam fixed upon the axle and rotatable therewith, the cam having high and low cam surfaces thereon substantially opposite each other on its outer periphery and having a projection thereon adjacent the high camming surface, a yoke having an elongated opening therein slidably mounted within the said wheel on the hub portion thereof, and movable radially of the wheel by the said cam in an inward and outward direction, a cam follower on the said yoke co-operating with the said cam and the said projection, an impact head mounted on the said yoke extending into the opening on the said wheel and movable therein in an inward and outward direction, spiral springs on each side of the said wheel being their inner ends connected to the said axle and their outer ends to the said wheel near the outer periphery thereof whereby the rotative force of the said axle is communicated to the said wheel, and plates in the said axle adjacent to the side plates of the said wheel whereby the springs are retained in a single plane, the said projection engaging the side of the cam follower after an impact blow to initiate rotation of the said cam in one of its positions and the rear of the impact head in another one of its positions and the rear of the impact head in another one of its positions at the time an impact blow is delivered by the said impact head whereby inward movement of the impact head is prevented.

8. An impact member comprising in combination a frame, a rotatable axle mounted in the said frame, a wheel rotatably mounted on the said axle having a recess in the rim portion thereof, a spiral spring wound around the said axle connected to the axle at one of its ends and to the wheel at its outer end whereby rotative force from the axle is communicated to the said wheel, the rotative force being constant and the movement of the wheel being intermittent, the rotative force from the axle being absorbed by the said spring during the non-rotative periods of the wheel and released to the wheel upon its resuming rotation, a striking member movably mounted upon the wheel, having an impact head thereon extending into and slidably mounted within the recess in the said wheel, and movable outward into impact position by the rotation of the wheel, and means whereby the striking member and impact head are withdrawn from impact position after each impact blow by the striking member.

9. An impact tool comprising in combination a frame, a power driven axle mounted on the frame, a wheel on the said axle rotatably mounted thereon, the said wheel having a hub portion and having a rim portion with an opening in the said rim portion extending radially therethrough, a spiral spring wound around the said axle and connected at its inner end to the said axle and at its outer end to the wheel whereby rotative movement of the axle is transmitted to the said wheel, a rotatable reciprocating striking member mounted within and supported by portions of the said wheel, the said member having an

impact head on its outer end extending into the opening in the said rim whereby the said striking member is rotated by the said wheel and an impact blow is delivered by the said head to a receiving plug, the said impact head being in sliding engagement with the wheel rim, the said striking member and the said head being forced into impact position by centrifugal force imparted thereto by the rotation of the wheel and a cam mounted in the said axle and rotatable therewith in engagement with the striking member, and cam followers in the said striking member for engagement with the said cam whereby the striking member is moved out of impact position with an impact receiving plug.

10. An impact tool comprising in combination a frame, a power driven axle mounted on the frame, a wheel on the said axle rotatably mounted thereon, the said wheel having a hub portion and having a rim portion with an opening in the said rim portion extending radially therethrough, a spiral spring wound around the said axle and connected at its inner end to the said axle and at its outer end to the wheel whereby rotative movement of the axle is transmitted to the said wheel, a rotatable reciprocating striking member mounted within and supported by portions of the said wheel, the said member having an impact head on its outer end extending into the opening in the said rim whereby the striking member is rotated by the said wheel and an impact blow is delivered by the said head to an impact receiving plug, the said impact head being in sliding engagement with the wheel rim, the said striking member and the said head being forced into impact position by centrifugal force imparted thereto by the rotation of the wheel, a cam mounted upon and rotatable with the said axle in engagement with the said striking member, cam followers on the said striking member for intermittent engagement with the cam whereby the striking member is moved into and out of impact relation with a striking plug.

11. An impact tool comprising in combination a frame, a power driven axle mounted on the frame, a wheel on the said axle rotatably mounted thereon, the said wheel having a rim portion with an opening in the said rim portion extending radially therethrough, a spiral spring wound around the said axle and connected at its inner end to the said axle and at its outer end to the wheel whereby rotative movement of the axle is transmitted to the said wheel, an inward and outward movable member mounted within and supported by portions of the said wheel, the said member having an impact head on its outer end extending into the opening in the said rim and in sliding engagement therewith, the said member and the said head being forced into impact position by centrifugal force imparted thereto by the rotation of the wheel, and means within the said wheel whereby the said member and striking head are withdrawn from impact

position after the striking head has delivered a blow to an impact receiving member.

12. An impact tool comprising in combination a frame, a power driven axle mounted on the frame, a wheel on the said axle rotatably mounted thereon, the said wheel having a rim portion with an opening in the said rim portion extending radially therethrough, a spiral spring wound around the said axle and connected at its inner end to the said axle and at its outer end to the wheel whereby rotative movement of the axle is transmitted to the said wheel, a striking yoke within the wheel having an impact head at one end thereof extending into the opening in the said rim and slidably mounted therein, the said striking yoke being slidably mounted on the hub of the wheel and having a reciprocal movement within the said wheel into and out of impact position, the said yoke being moved into impact position by centrifugal force imparted thereto by the rotation of the wheel, and means within the wheel whereby the striking yoke is withdrawn from impact position after an impact blow has been delivered by the impact head.

13. An impact tool comprising in combination a frame, a power driven axle mounted on the frame, a wheel on the said axle rotatably mounted thereon, the said wheel having a hub portion and having a rim portion with an opening in the said rim portion extending radially therethrough, a spiral spring wound around the said axle and connected at its inner end to the said axle and at its outer end to the wheel whereby rotative movement of the axle is transmitted to the said wheel, a striking yoke comprising a pair of members, combined cam followers and spacers mounted between the yoke members at each of the ends of said yoke, an impact head on the outer end of the said striking yoke extending into the opening in the said rim and in sliding engagement with the wheel rim, the yoke members being supported by the hub portion of the wheel, and a cam fixed on the said axle and rotatable therewith for engagement with the cam followers whereby the yoke and impact head are moved into and out of engagement with an impact receiving plug at predetermined times.

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