Feb. 24, 1925.

1,527,757

J. A. STREET

AUTOMATIC CHOCK

Filed May 16, 1921

2 Sheets-Sheet 1

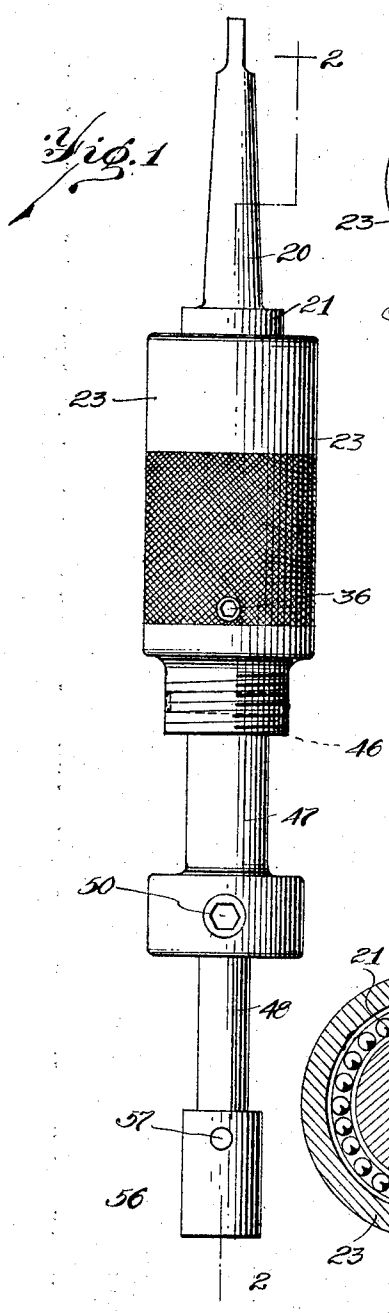



Fig. 1

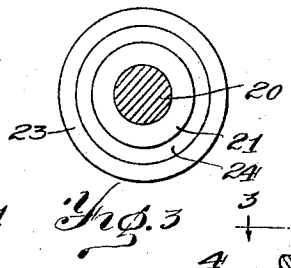



Fig. 3

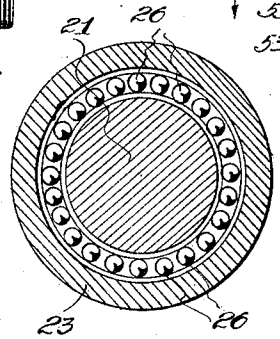



Fig. 4




Fig. 2

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Fig. 5

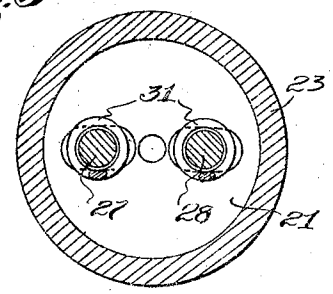



Fig. 6

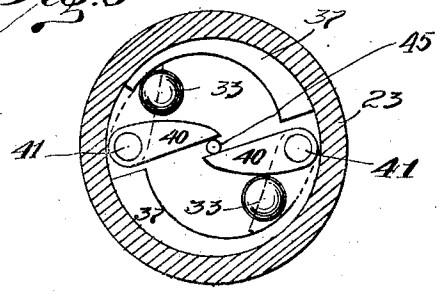



Fig. 7

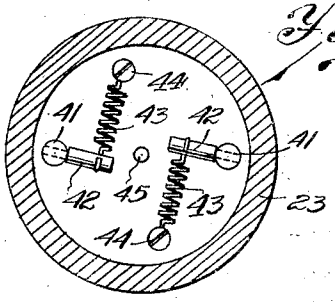
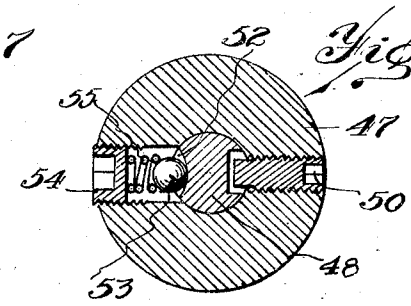



Fig. 8



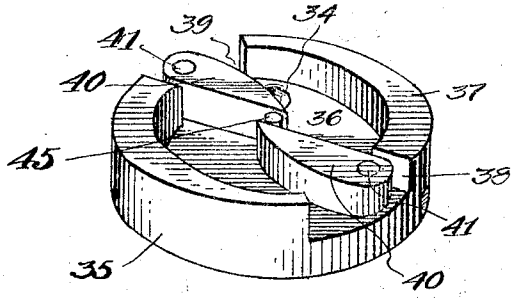




Fig. 10

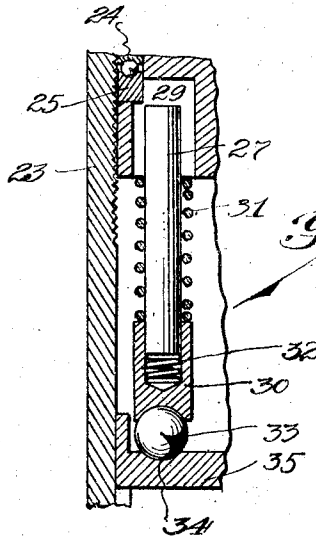



Fig. 9

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Patented Feb. 24, 1925. 1,527,757

# UNITED STATES PATENT OFFICE.

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## AUTOMATIC CHOCK.

Application filed May 16, 1921. Serial No. 469,837.

*To all whom it may concern:*

Be it known that I, JAMES A. STREET, citizen of the United States, residing at Pontiac, county of Oakland, State of Michigan, have invented a certain new and useful Improvement in Automatic Chocks, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to automatic chocks.

It is particularly designed as a chock for use as one of a series of multiple tapping chocks being adapted, however, for use as a drilling and bolting chock.

The breaking of taps and drills is of frequent occurrence in such operations due to three principal causes. First, the tap will strike a hard place in the metal and there being no release in the downward or rotatory pressure the tap will be twisted or broken off; second, in multiple tapping operations certain of the taps will not line up with the holes to be tapped and the taps will frequently break; third, an increase in the downward pressure, especially where working in multiple, due to certain of the taps having completed their tapping operations, will bring an increase of downward pressure upon the remaining working taps which will frequently cause breakage.

My chock is so constructed that the driven tool holding section automatically releases, uncoupling the drill or tapping tool from the driver when the tap suddenly strikes a hard place in the metal or when the downward pressure is substantially increased beyond a certain point.

In bolting operations it is adapted to automaticallly release when the nut is sufficiently tightened on the bolt instead of continuing the threading operation and twisting the bolt off as frequently occurs in the present practice.

These and other objects, together with the details of construction and operation will more fully appear from the following description, appended claims and accompanying drawings, in which:

Figure 1 is an elevation of my improved chock.

Figure 2 is a longitudinal section taken on line 2—2 of Figure 1,

Figure 3 is a cross section taken on line 3—3 of Figure 2,

Figure 4 is a cross section taken on line 4—4 of Figure 2,

Figure 5 is a cross section taken on line 5—5 of Figure 2,

Figure 6 is a cross section taken on line 6—6 of Figure 2,

Figure 7 is a cross section taken on line 7—7 of Figure 2,

Figure 8 is a cross section taken on line 8—8 of Figure 2,

Figure 9 is a fragmentary enlarged section showing one of the coupling plungers partly in elevation.

Figure 10 is a perspective of the coupling bearing plate.

My automatic chock comprises a driving shank and a driven tool holding member adapted to be releasably coupled to such shank in such a manner that when the tool carried thereby in its operation suddenly strikes an obstruction tending to arrest its rotation it automatically uncouples from the driving shank, permitting the continued independent rotation of the driving shank. The connection between said driving shank and driven tool holding member is of such a character, however, that when the torque exerted is substantially constant and uniform, said members will rotate as one piece.

In my device, let 20 indicate a driving shank which is formed with a head 21 provided with a radial flange 22, which is adapted to be freely received within an internally threaded barrel 23. A bearing formed in two separate halves, 24 and 25, is adapted to be fitted within the barrel, seating against flange 22 and forming an upper bearing therefor serving to hold the driving shank within the barrel. The upper section 24 of the bearing is externally threaded to thread in the barrel providing adjustment and securing the bearing in place. These sections 24 and 25 have their adjacent faces formed to serve as a ball race within which is received ball bearings 26. Means hereinafter described are provided for releasably coupling this driving shank with the barrel so that they will rotate in one piece.

The barrel 23 is adapted to receive a tool holding socket coupled thereto to rotate therewith as hereinafter more fully described, or as shown in Figures 1 and 2, the latter end of the barrel may be externally

threaded to receive a drill socket or bolting socket when it is desired to use the same as a single drill or bolting machine.

My invention lies in the coupling of the barrel or the driven tool holding member with the driving shank in the manner described and in the hereinafter described combination of said feature with the provided means for releasing the tool holding socket from the driven member upon a substantial increase of downward pressure, which function would prove particularly useful in multiple tapping operations.

The coupling mechanism comprises a series of coupling links or coupling plungers 27 and 28, two being here shown. Said plungers are adapted to be received at one end within recesses 29 formed in the head of the driving shank, which recesses are enlarged over the diameter of the plungers to permit limited, individual freedom of movement of each of the plungers. These recesses 29 are elongate in shape as shown in Fig. 5, being of slightly larger diameter than the plungers 27 and 28 in one direction but of substantially larger diameter at right angles thereto. Each of these plungers is preferably formed with an independent removable cap 30 adapted to fit over the opposite end from the end received within the driving shank, and a spiral spring 31 is provided encircling the plunger bearing against the cap at one end and the driving shank at the other so as to yieldingly hold the plunger downward from the driving shank. The spring 31 is of a diameter as shown in Fig. 5 so that the upper end of the spring bears against the driving shank surmounting the recess 29. The end of the plunger received within the cap 30, seats against a spiral tension spring 32 which is positioned within the hollow of the cap for the purpose hereinafter described. The free end of the cap is concave to form a pocket for a locking ball 33, which ball is adapted to seat in a concaved depression or receiving pocket 34, formed in a bearing plate 35, which is locked by means of set screws 36 to the barrel. This bearing plate 35 is positioned in the bottom of the barrel, and it is apparent that as the threaded section 24 is threaded downwardly within the barrel, the spiral springs 31 and 32 will be compressed, increasing the downward pressure on the plungers 27 and 28 so as to hold the locking balls 33 more firmly within the provided pockets 34 in the bearing plate. This provides an adjustment of the coupling mechanism.

In the normal operation of this machine, rotation is in a clock-wise direction and the tension exerted by the spiral springs is sufficient to hold the locking balls in the provided seats in the bearing plate 35 so that the driving shank and the barrel are locked securely together to rotate as one piece. When the driven tool, however, suddenly strikes an obstruction tending to arrest its rotation, the locking balls 33 are moved out of the provided seats in the bearing plate providing the obstruction is of such a character as to sufficiently retard the rotation of the tool and carried by the coupling pin caps they move around in a clock-wise direction in the eccentric recess 36 formed in the bearing plate.

The upright flange 37 formed by the cutting away of the bearing plate to make the eccentric recess 36, is cut away at opposite sides as at 38 and 39 and pivoted to the bearing plate in each of such cut-away portions is a swinging cam 40 mounted on a pivot pin 41 which extends downwardly thru the bearing plate and to the lower end of which is secured a radially extending stud 42, to the outer end of which stud is fastened a tension spring 43 which is anchored to the bearing plate by means of a pin 44. The action of these springs is of such a character as to hold the swinging cams 40 in the position shown in Figure 10, where the inner tapered ends of the cams rest against an upright axially projecting stop 45 carried by the bearing plate. These cams are wedge-shaped and provided with one convex face adapted to lie back against the inner periphery of the flange 37 when the cams are swung about pivots 41 by the rotation of the coupling pins when they are disengaged from the recesses in the bearing plate and the driving shank is rotating independently. These swinging cams are so positioned relative the receiving pockets 34 that when they lie back against the wall of the flange they prevent the locking balls 33 from engaging in the pockets 34 as they are moved about the interior of the recess 36. Therefore, when the locking balls are disengaged from the receiving pockets and rotated in a clockwise direction they are prevented from engaging in these pockets, due to the action of these swinging cams. However, when the direction of rotation is reversed the locking balls will swing back into the receiving pockets of the bearing plate, and consequently the barrel 23 will rotate with the driving shank in the reversed direction. Therefore, upon again starting up the rotation of the device in a clock-wise direction the driven and driving members will rotate as one piece. When the locking balls and therefore the coupling mechanism is disengaged from the pockets 34 and the driving shank is rotated in a clockwise direction, the swinging cams 39 and 40 at each revolution of the driving shank are swung backwardly toward the cam flange 37 but as the coupling pin passes the end of each swinging cam the cam under the impulse of the spring 43 is swung back toward the position shown in Fig. 10. Therefore, when the direction of rotation of

the driving shank is reversed the coupling pins fall in behind the cams on the convex sides thereof as shown in Fig. 6 so that the locking balls 33 may engage in the pockets 34.

To perfect this mechanism for use as one member of a multiple chock outfit, I have loosely pivoted by means of the pivot pin 46 a tubular socket 47 to the lower end of the barrel in such a manner as to permit limited floating movement of the tool in a given direction. This tubular socket is adapted to receive a link 48 longitudinally slotted as at 49, in which slot is received the end of a set screw 50 threaded into the socket 47 so as to cause the link and socket to rotate together; while permitting independent longitudinal movement of the link relative to the socket. The link carries a pin 51 adapted to prevent its falling from the socket. On the opposite side of the link is provided a ball receiving pocket 52 adapted to receive a locking ball 53 which is held yieldingly inwardly by means of a set screw 54 and spiral spring 55. At the lower end of this link is pivoted a tool receiving socket 56 adapted to carry a tool in any convenient manner and being pivoted to the link by means of a pin 57 so as to permit floating movement in an angular direction to that permitted by the pivoting of the socket 47 to the barrel 23. This will accommodate this device for use as one unit in a multiple outfit where it is necessary that a slight floating movement be permitted to bring the tool in line with the hole it is desired to tap.

In the operation of this device when used with the socket 47 and the link 49 as shown in Figures 1 and 2, should the downward pressure on the boring tool be suddenly increased either due to the fact that the tool strikes a particularly hard place in the metal tending to retard its downward movement, or in use as one unit in a multiple tapping mechanism where the pressure on certain units has been suddenly increased due to release of pressure on other units, the upward pressure on the link 48 will release the locking bolt 53 from recess 52 and the link will move upwardly in the socket 47. This will prevent any breakage of the tool.

In the operation of this device when the rotation of the tool is obstructed and the locking balls 33 move out of the receiving pockets in the bearing plate permitting the driving shank to rotate independently of the tool holding member, the driving shank will continue to rotate in the normal forward direction without re-engaging the tool holding member. Immediately upon the reverse of the operation, however, the locking balls will again engage in the receiving pockets and the tool holding member will be rotated in a reverse direction to lift the tool out of the work.

What I claim is:

1. In a device of the class described, in combination, a driving member, a rotatable tool-holding member, locking balls rotatable with one member held yieldingly in releasable engagement with said other member to produce rotation of said members as one piece, said yielding releasable engagement of the locking balls being such that upon imposition of resistance to rotation of said driven member sufficient to overcome the yielding engagement of said locking balls said driving member is permitted to overrun said driven member, and obstructing means to prevent re-engagement of said driving and driven members to rotate as one piece during such overrunning without reversal of the direction of rotation.

2. In an automatic chock, in combination, a driving member, a driven tool holding member connected therewith and adapted to rotate independently thereof, coupling pins carried by one of said members to rotate therewith, the other of said members provided with receiving pockets adapted to engage the free ends of said coupling pins so that said driving and driven members will rotate as one piece, means adapted to hold said coupling pins yieldingly within said receiving pockets, means adapted to engage said coupling pins to prevent their engaging in the receiving pockets when one of said members is rotated independently the other in a given direction.

3. In an automatic chock, in combination, a driving member, a driven tool holding member connected therewith and adapted to permit the driving member to rotate independently thereof, coupling pins carried by one of said members adapted to rotate therewith, the other of said members provided with receiving pockets adapted to engage the free ends of said coupling pins so that said driving and driven members will rotate as one piece, means adapted to hold said coupling pins yieldingly within said receiving pockets, means adapted to engage said coupling pins to prevent their engaging in the receiving pockets when the driving member is being rotated independently of the driven member in a forward direction.

4. In an automatic chock, in combination, a driving member, a driven tool holding member connected therewith and adapted to permit the driving member to be rotated independently thereof, coupling pins carried by one of said members to rotate therewith, the other of said members provided with receiving pockets adapted to engage the free ends of said coupling pins so that said driving and driven members will rotate as one piece, means adapted to hold said coupling pins yieldingly within said receiving pockets, means adapted to engage said coupling pins to prevent their engaging in the receiv-

ing pockets when the driving member is being rotated independently the driven member in a forward direction, but adapted to permit said pins to engage in said pockets when the direction of rotation is reversed.

5. In a device of the class described, in combination, a driving member, a driven tool holding member, coupling plungers carried by one of said members, the other of said members provided with receiving pockets adapted to receive said coupling plungers to releasably lock said members together to rotate as one piece, swinging cams so pivoted as to be actuated by said coupling plungers when disengaged from the receiving pockets during the forward movement of rotation of the driving member so as to obstruct the entrance to said receiving pockets preventing the coupling plungers from engaging therein.

6. In a device of the class described, in combination, a driving member, a driven tool holding member comprising a barrel coupled to said driving member so as to permit independent rotation thereof, coupling plungers carried by said driving member to rotate therewith, said barrel provided with an eccentric recess formed in the bottom thereof in which are positioned receiving pockets adapted to engage the free ends of said coupling plungers so that said driving member and barrel will rotate as one piece, swinging cams pivoted in said eccentric recess so positioned relative to said receiving pockets that when the coupling plungers are disengaged from the pockets, rotating independently of the barrel they will successively engage said cams, moving the same over said receiving pockets in such a manner that the plungers will be prevented from engaging in the pockets.

7. In a device of the class described, in combination, a driving shank, a barrel adapted to serve as a tool holding member carried by said shank but adapted to permit independent rotation thereof, a bearing plate positioned in the bottom of said barrel adapted to rotate as one piece therewith, said bearing plate provided with an eccentric recess in the bottom of which is formed concaved depressions, coupling plungers loosely carried by said driving shank adapted to be held resistingly downwards against said bearing plate the free ends of which plungers are convex to engage in the concaved depressions in the bearing plates, swinging cams pivoted to the bearing plate so positioned relative the side wall of the eccentric recess and the concave depressions that as the coupling plungers rotate in the eccentric recess they will successively engage the swinging cams in such a manner that they are prevented from engaging in the depressions in the bearing plate and rotating in a forward direction and are permitted to freely engage in said depressions when the direction of rotation is reversed.

8. In an automatic chock, in combination, a driving member, a driven tool holding member, means releasably engaging said driving and driven members together to rotate as one piece comprising a plurality of coupling pins loosely carried by one of said members provided with means for being held yieldingly against the other of said members, said other member provided with concave depressions adapted to engage said pins so that said members will rotate as one piece, swinging cams pivoted to the member in which said concave depressions are formed in such relative position thereto that they will be successively engaged by said coupling pins in such a manner as to prevent the pins from engaging in the concave recesses when the driving member is rotated independently of the driven member in a forward direction.

9. In a device of the class described, in combination, a driving shank, a driven tool holding barrel coupled to said shank in such a fashion as to permit independent rotation thereof, means releasably coupling said driving shank and driven barrel together so they will rotate as one piece comprising a plurality of coupling pins loosely carried in said driving shank, the opposite ends of which are held yieldingly downwards against an eccentric bearing surface formed in the bottom of said barrel, locking balls held resistingly downwards by said pins, said eccentric bearing surface provided with concave depressions adapted to engage said balls so as to releasably lock said barrel and driving shank together to rotate as one piece, swinging cams pivoted to said eccentric bearing surface in such a manner that they will successively engage said locking balls when they are being rotated independently of the barrel in such a manner as to prevent said balls from being received in the concave depressions formed in the bearing surface when said balls are being rotated in a forward direction, but adapted to permit said balls to freely engage in said concave depressions when they are rotated relative to said bearing surface in the reverse direction.

10. In a device of the class described, in combination, a driving shank, a driven tool supporting member, means adapted to releasably couple said tool supporting member with said driving shank so that they will rotate as one piece coupled together, but will permit independent rotation of the driving shank when uncoupled comprising locking members carried by said driving shank so as to rotate therewith provided with means for being held yieldingly toward said driven member, said driven member provided with an eccentric recess in which is formed locking cavities adapted to receive

said locking members in such a manner as to releasably couple said driving shank and driven member together to rotate as one piece, swinging cams pivoted in said eccentric recess so positioned relative said locking cavities therein as to engage said locking members in such a manner that they will rotate within said eccentric recess in a given direction without engaging in the locking cavities but will engage in said cavities when the direction of rotation is reversed.

11. In a device of the class described, in combination, a driving member, a driven tool-supporting member, said driven member provided with a tool supporting socket adapted to rotate therewith but coupled thereto in such a fashion that when the downward pressure thereon reaches a certain point the socket will be released to move inwardly relative the driven member, means releasably coupling said driving and driven members together in such a manner that they will rotate as one piece in a given direction and when uncoupled said driving member will continue to rotate in the same direction independently of the driven member without reengaging the same, said means adapted to operate to recouple said members together when the direction of rotation of the driving member is reversed.

12. In a device of the class described, in combination, a driving member, a driven tool supporting member, coupling means adapted to couple said members together to rotate as one piece comprising a bearing plate carried by one of said members, provided with an eccentric recess in which is formed a plurality of concave depressions, the other of said members provided with coupling pins adapted to be held yieldingly within said concave depressions in the bearing plate, swinging cams pivoted to said bearing plate in such a manner that they will successively engage said coupling pins so as to prevent the pins from falling in the concaved depressions when they are being rotated within the eccentric recess in the forward direction, but adapted to permit said pins to engage in said concaved depressions when their direction of rotation is reversed.

13. In a device of the class described, a driving member, a driven member, spring-controlled coupling mechanism operable to engage said driving and driven members together to rotate as one piece adapted to disengage said members to permit the driving member to overrun the driven member upon imposition of restraint to rotation upon said driven member sufficient to overcome the spring controlling said coupling mechanism, and means operable to prevent the re-engagement by said coupling mechanism of said members for rotation during the continued overrunning of the driven member by the driving member.

14. In a device of the class described, a rotatable driving member, a rotatable driven member, coupling mechanism operable to engage said driving and driven members together to rotate as one piece adapted to disengage said members to permit the driving member to overrun the driven member upon resistance to rotation upon said driven member reaching a determined point, and means controlling said coupling mechanism to prevent re-engagement thereby of said driving and driven members to rotate as one piece during the continued overrunning by one member over the other operable to permit said re-engagement upon reversal of rotation.

In testimony whereof, I, JAMES A. STREET, sign this specification.

JAMES A. STREET.