

March 25, 1958

R. P. DELLNER
DRILL STEEL CENTRALIZER

2,828,109

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2 Sheets-Sheet 1

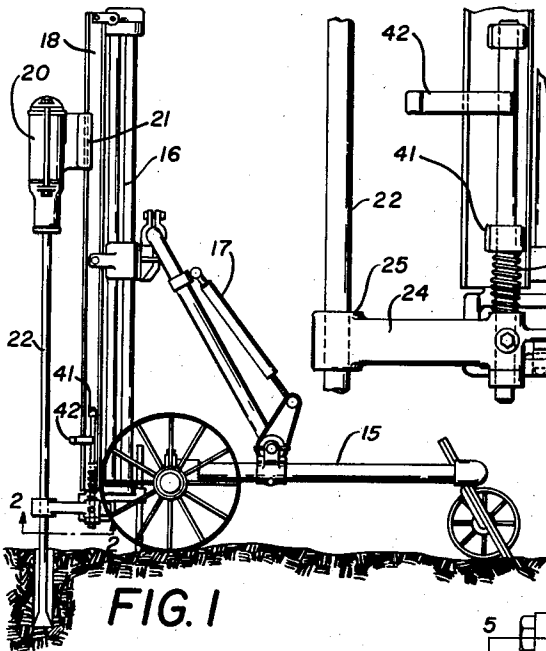


FIG. 1

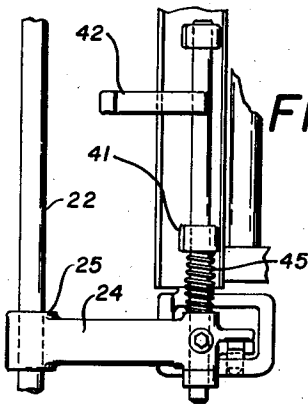


FIG. 11

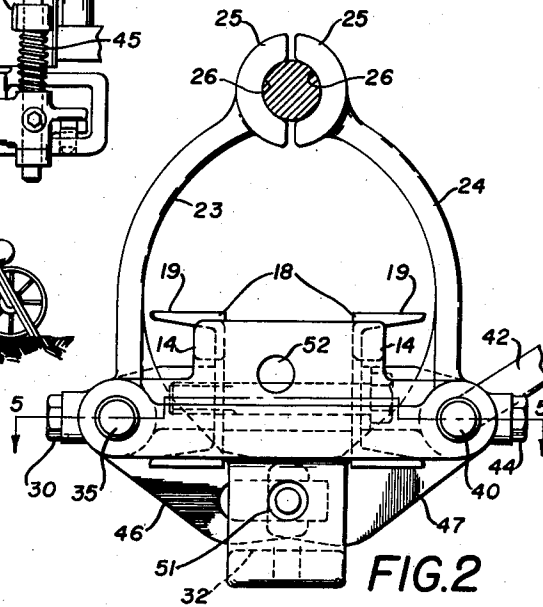


FIG. 2

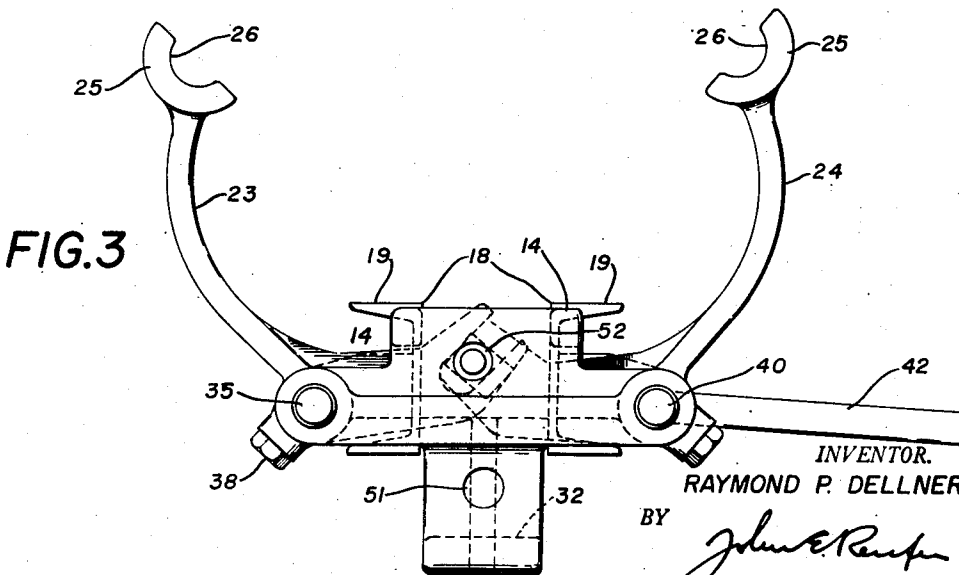


FIG. 3

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DRILL STEEL CENTRALIZER

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2 Sheets-Sheet 2

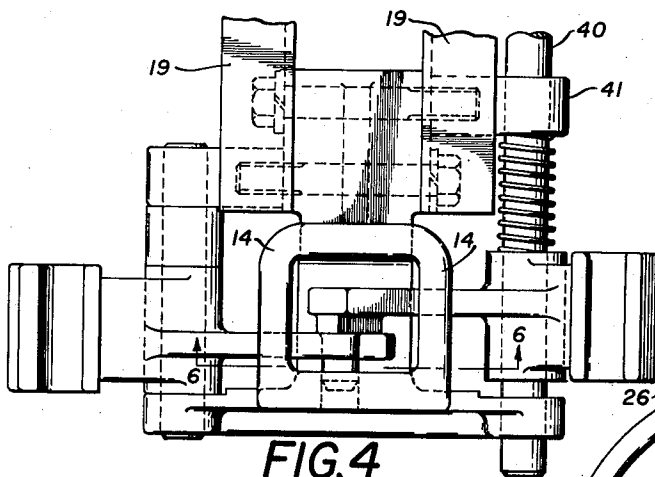


FIG. 4

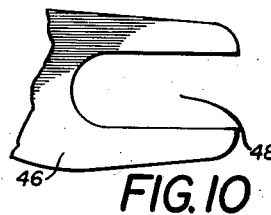


FIG. 10

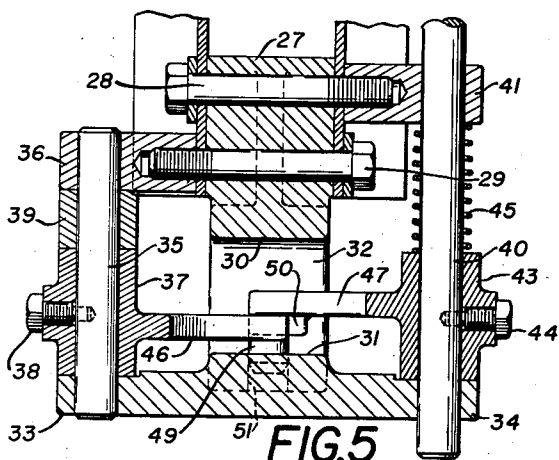


FIG. 5

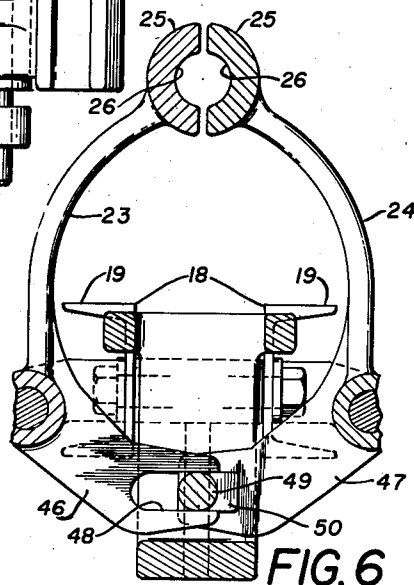


FIG. 6

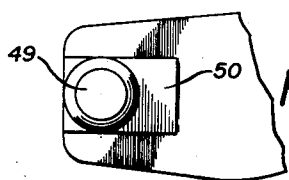


FIG. 9

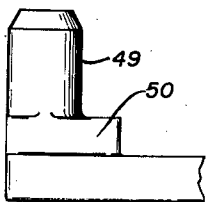


FIG. 8

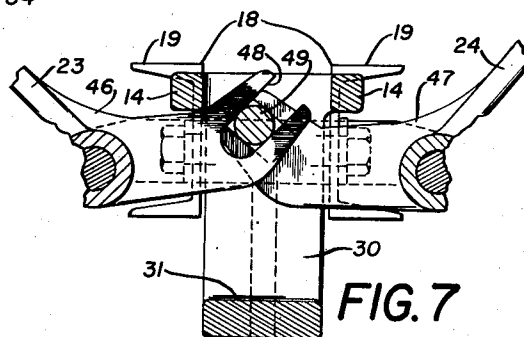


FIG. 7

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DRILL STEEL CENTRALIZER

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12 Claims. (Cl. 255—51)

This invention relates broadly to rock drills, but more particularly to improvements in rock drill steel centralizers.

With rock drills of the drifter type, that is, rock drills slidably mounted on a support for guided movement thereon, it becomes important for the drilled hole to be started coaxially with the center axis of the rock drill. Such perfect alignment is necessary to assure subsequent free drilling without danger of the drill steel becoming lodged in a hole started out of line or offset from the center axis of the rock drill. In order to hold the drill steel coaxially with the rock drill, the latter is provided with an auxiliary guiding device or drill steel centralizer, generally mounted on the front end of the support and capable of opening or swinging out of the path of the rock drill as the drilling operation progresses.

One object of this invention is the provision of a drill steel centralizer of the character stated which is simple in construction and efficient in action and which can readily be shifted into operative or inoperative positions.

Another object of this invention is to provide a centralizer with its drill steel guiding ends shiftable into operative or inoperative positions by a remote control preferably located at easy reach of the rock drill operator.

Another object of this invention is to provide a centralizer with means for locking its drill guiding ends in operative or inoperative positions, the locking means being characterized by relatively large interengaging surfaces adapted to resist wear from the load to which they are subjected especially during the operative position of the centralizer.

Another object of this invention is to provide a simple linkage between the arms of the centralizer through which movement of one into operative or inoperative position is automatically transmitted to the other.

Other objects of this invention will be apparent from the following detailed description wherein similar characters of reference designate corresponding parts, and wherein:

Figure 1 is a side view of a mounted rock drill embodying the invention.

Figures 2 and 3 are enlarged cross sectional views taken on line 2—2 in Figure 1 looking in the direction of the arrows and showing the centralizer in different positions.

Figure 4 is an enlarged front view of the lower end of the rock drill support shown in Figure 1 but with the centralizer opened as shown in Figure 3.

Figure 5 is a longitudinal sectional view taken on line 5—5 in Figure 2 and looking in the direction of the arrows.

Figure 6 is a cross sectional view taken on line 6—6 in Figure 4 but showing the centralizer closed.

Figure 7 is a partial view corresponding to Figure 6 but with the centralizer opened.

Figure 8 is an enlarged side view of the link end of one of the centralizer arms; Figure 9 is a top plan view

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thereof and Figure 10 is the top plan view of the link end of the other arm.

Figure 11 is an enlarged side view of the centralizer as shown in Figure 1.

Referring to the drawings, the rock drill support is shown to include a wheel supported frame 15 carrying a drill guiding frame 16 pivotally movable relative thereto by a suitable actuating mechanism 17. The drill guiding frame is preferably made of two relatively long channel bars 18 mounted back to back in spaced but parallel relation, with the upper sides thereof as seen in Figures 2 and 3 forming longitudinal guides 19. A rock drill 20 has a base 21 formed with guideways fitting closely over the guides 19, thereby enabling longitudinal guided movement of the rock drill on the frame 18. The rock drill 20 is of the usual type, preferably actuated by compressed air for delivering impacts in rapid succession to a drill steel 22 which extends therefrom as clearly shown in Figure 1.

As previously stated, in order to start the drilled hole coaxially with the center axis of the rock drill 20 as well as maintain the drill steel in that aligned position during the drilling operation, the front or lower end of the drill guiding frame 18 is provided with an improved drill steel centralizer comprising two arms 23 and 24. The upper or outer ends of the arms as seen in Figure 2, are shaped like half tubular sections 25 extending longitudinally to form two semi-circular drill steel guiding ends 26 adapted to substantially surround the drill steel 22 to maintain it coaxially with the center axis of the rock drill 20.

Acting as a spacer between the front or lower ends of the channels 18 as seen in Figure 1, is a front head 27 secured therein by two cross bolts 28 and 29 clearly shown in Figure 5. From the channel bars 18, this front head extends longitudinally in the form of a deep U shaped portion having transversal side walls 30 and 31, and a bottom wall 32, the side walls being united at their upper ends by two laterally spaced bridges 14. The side wall 31 is also provided with integral laterally extending longitudinally apertured lugs 33 and 34, the former acting as a bearing for one end of a shaft 35 which has its other end similarly supported in a lug 36 secured to one of the channel bars 18 by the cross bolt 29. Intermediate its ends, the arm 23 is formed with a hub portion 37 fitted on the shaft 35 and secured thereto by a set screw 38. One end of the hub 37 engages the inner side of the lug 33 while the other end is spaced from the lug 36 by a collar 39. The other apertured lug 34 also serves as a rotating and sliding bearing for one end portion of an actuator or rod 40, which rod extends inwardly alongside of the drill guiding frame 18 and is mounted thereon by apertured lugs such as 41 secured to one of the channel bars 18 by the cross bolt 28. As shown the rod 40 is relatively short, but when drilling horizontally, in order to enable operation of the centralizer from any place along the entire drilling apparatus, the rod 40 is made to extend the full length of the drill guiding frame 18. In such event, the lugs 41 which support the rod are spaced at regular intervals along the entire length of the rod and are located below the guides 19 out of the path of the rock drill 20. The rod 40 can be of any desired length calculated to bring a handle 42, fixed on the rod adjacent the other end thereof, at the easy reach of the rock drill operator.

Intermediate its ends, the arm 24 is also provided with a hub portion 43 fixed on the rod 40 by a set screw 44. This hub 43 is located on the rod 40 opposite the hub of the arm 23, and is urged into end engagement with the underside of the apertured lug 34 by a compress-

sion spring 45 mounted on the rod 40 between the hub 43 and apertured lug 41 shown in Figure 5.

Below their pivotal connections with the support or drill guiding frame 18, the arms 23 and 24 have inner ends in the form of laterally and inwardly projecting tail pieces 46 and 47 respectively, overlapping each other with the tail piece 46 nearest to the side wall 31 of the front head 27, and the tail piece 47 longitudinally movable between the tail 46 and the side wall 30, as clearly shown in Figure 5. These inner ends or tail pieces are interconnected by a simple linkage comprising an open-ended slot 48 for the tail 46 in which fits a crosspin 49 fixed to and extending longitudinally from the end portion of the tail 47. As shown in Figures 8 and 9, the base of the pin 49 is formed by a raised rectangular pad 50 of a width equal to the diameter of the pin and, when the arms are closed as in Figure 6, adapted to also fit in the slot 48 of the tail piece 46.

In the side wall 31 of the U shaped portion of the front head 27, are two drilled holes or sockets 51 and 52, one above the other, in which the free end of the pin 49 is adapted to drop for locking the arms 23 and 24 in either opened or closed positions.

Above their pivotal connections with the support, the arms 23 and 24 are of the same shape and size, so that in their closed or operative position as shown in Figures 2 and 6, the semi-circular drill steel guiding ends 26 are concentric and adapted to surround the drill steel 22 in guiding relation therewith. In this operative position of the arms 23 and 24, the tails 46 and 47 are positioned as shown in Figures 5 and 6, that is, with the pad 50 and a portion of the pin 49 in the slot 48, and with the free end of the pin 49 in the socket 51, thereby preventing pivotal movement of the arm 24 by virtue of its pin 49 in the socket 51 and of the arm 23 by virtue of the pad 50 and pin 49 in the slot 48. In this position of the arms, the compression spring 45 maintains the tails 46 and 47 in overlapping engagement and the hub 43 against the inner side of the lug 34.

As the drilled hole is started generally on an uneven surface, the drill steel 22 is subjected to lateral forces causing it to bear against the drill guiding ends 26 and tending to open the arms 23 and 24. This accidental opening of the arm 24 is prevented by the pin 49 in the socket 51, and of the arm 23 by the pin 49 and pad 50 in the slot 48 of the tail piece 46. It will be noted that this locking means offers relatively large wear resisting surfaces between the pin 49 and socket 51, and between the pad 50 and slot 48.

When it is desired to open or shift the centralizer into the position shown in Figure 3, the operator will pull on the handle 42 fixed on the rod 40, causing the rod and the arm 24 fixed thereon to move axially inward until the tail piece 47 contacts the stop or side wall 30 of the front head 27. As the arm 24 is moved inwardly, the pad 50 will move out of the slot 48 and the pin 49 out of the socket 51 while remaining in the slot 48. Thereafter the handle 42 is turned downwardly, causing the rod 40 and arm 24 to rotate in a clockwise direction in Figure 6 and simultaneously the arm 23, by virtue of the pin 49 in the slot 48, to rotate in the opposite direction. This rotation of the arms is limited by the tail piece 46 engaging one of the bridges 14, as clearly shown in Figure 7, which engagement is calculated to bring the pin 49 into register with the socket 52. Upon release of the handle 42, the compression spring 45 acting on the hub 43 will drive the arm 24 forwardly with the pin 49 into the socket 52, thereby locking the arms in the opened or inoperative position as shown in Figures 3 and 4. In this last position of the arms, the pad 50 lies across the slot 48 and is not effective in locking the arms. As clearly shown in Figure 3, it will be understood in their out of drill guiding position, the arms 23 and 24 are spaced sufficiently to enable free travel of the front end of the rock drill 20 between them as the rock drill base 21 reaches

the lower end in Figure 1 of its travel on the support 16, thereby enabling maximum travel of the rock drill on its support.

With reference to Figure 7, it will be seen that the arms are locked in open or inoperative position by the pin 49 in the socket 52 and slot 48, the pad 50 now lying across the slot 48. However, in this new position of the arms, the pin while having rotated about 90° in the slot, is also deeper in the slot, thereby resulting in the interengaging locking surfaces being different for the operative and inoperative positions of the arms.

When it is desired to reset or close the centralizer, the above described operation is repeated in reversed order. In this instance, when the drill guiding ends 26 contact the drill steel, the pin 49 is into register with the socket 51.

From the foregoing description, it will be understood that the invention provides for an improved drill steel centralizer wherein swinging motion of one of its arms is automatically and simultaneously transmitted to the other through a simple linkage between the arms, which linkage also serves as a locking device having different interengaging locking surfaces of greater effective area during the operative than during the inoperative position of the centralizer, and that the centralizer is operable from the normal rock drill operating position of the operator.

Although the foregoing description is necessarily of a detailed character, in order to completely set forth the invention, it is to be understood that the specific terminology is not intended to be restrictive or confining and it is to be further understood that various rearrangements of parts and modification of structural detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

I claim:

1. A drill steel centralizer comprising a support and a pair of arms pivoted thereon with one arm axially movable on its pivotal axis relative to the other, cooperating drill steel guiding means on one end of said arms movable into and out of operative position upon pivotal movement of said arms, a pin on the other end of said axially movable arm fitted in a slot in the other end of the other arm through which pivotal movement of one arm is automatically transmitted to the other, locking means for holding said arms in operative position of said guiding means including a socket in said support engaged by said pin and a pad on said pin carrying arm non-rotatably fitted in said slot, said locking means being releasable upon the axial movement of said one arm.

2. In a drill centralizer, a support, a pair of guide arms pivotally mounted on the support having outer ends adapted to swing toward and from one another into and out of steel guiding position, one of said arms being axially movable on its pivotal axis relative to the other, a pin and slot connection between the inner ends of said arms through which pivotal movement of one arm is transmitted to the other in opposite direction, and a socket in the support adapted to receive the pin of said connection upon axial movement of said one arm for locking said arms in steel guiding position.

3. In a drill centralizer, a support, a pair of guide arms pivotally mounted on the support having outer ends adapted to swing toward and from one another into and out of steel guiding position, one of said arms being axially movable on its pivotal axis, a pin and slot connection between the inner ends of said arms through which pivotal movement of one arm is transmitted to the other in opposite direction, the pin of said connection being fixed on said axially movable arm, a socket in the support adapted to receive said pin to lock said arms in steel guiding position, spring means urging said pin into said socket, and means alongside of said support connected to said axially movable arm to manually release said pin from said socket.

4. In a drill centralizer, a support, a pair of guide arms pivotally mounted on the support having outer ends

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adapted to swing toward and from one another into and out of steel guiding position, one of said arms being axially movable on its pivotal axis, a pin in a slot connection between the inner ends of said arms through which pivotal movement of one arm is transmitted to the other in opposite direction, the pin of said connection being fixed on said axially movable arm, a socket on the support adapted to receive said pin upon axial movement of said one arm to lock it and the other by virtue of said connection into steel guiding position, spring means urging said one arm into pin and socket interengaging position, and stop means on the support limiting axial movement of said one arm into pin out of socket position while retaining said pin in a slot connection.

5. In a drill steel centralizer, a support, a pair of guide arms pivotally connected to the support having outer ends adapted to swing into and out of drill guiding position, a pin in a slot connection between the inner ends of said arms preventing relative pivotal movement therebetween, and socket means on the support adapted to receive the pin of said connection for locking said arms into drill guiding position.

6. In a drill, a support, a pair of guide arms pivotally connected to the support for movement of one end of said arms toward and from one another into and out of steel guiding position, means on said support carrying one of said arms for axial movement on its pivotal axis relative to the other, spring means urging said one arm axially in one direction, a linkage between the inner ends of said arms through which pivotal movement of one arm is transmitted to the other in opposite directions, and means on the support cooperating with said linkage upon axial movement of said one arm in said one direction for locking said arms in steel guiding position.

7. In a drill steel centralizer, a support, a pair of guide arms pivotally connected to the support having a first end adapted to swing into and out of drill steel guiding position, an arbor fixed to one of said arms carried by the support for rotation on its own axis, interengaging means between the second ends of said arms through which pivotal movement of said one arm is transmitted to the other in opposite direction, said arbor being manually rotatable to swing the first ends of said arms into and out of drill steel guiding position.

8. In a drill steel centralizer, a support, a pair of guide arms pivotally connected to the support on parallel axes and having one end portion adapted to swing into and out of drill steel guiding position, pieces forming the other end portions of said arms extending toward each other in overlapped relationship within parallel planes perpendicular to said axes, and interengaging means on said

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pieces transmitting pivotal movement of one arm to the other in opposite directions.

9. In a drill steel centralizer, a support, a pair of guide arms pivotally connected to the support on parallel axes and having one end portion adapted to swing into and out of drill steel guiding position, pieces forming the other end portions of said arms extending toward each other in overlapped relationship within parallel planes perpendicular to said axes, and a pin and slot connection on said pieces arranged in a manner whereby pivotal movement of one of said arms is transmitted to the other in opposite directions.

10. In a drill steel centralizer, a support, a pair of guide arms pivotally connected to the support on parallel axes and having one end portion adapted to swing into and out of drill steel guiding position, pieces forming the other end portions of said arms extending toward each other in overlapped relationship within parallel planes perpendicular to said axes, a pin on one of said pieces fitted within a slot on the other piece in a manner whereby pivotal movement of one of said arms is transmitted to the other in opposite directions, said pin being axially slidable through said slot, and socket means on the support adapted to receive said pin upon its slidable movement through said slot to lock said arms against pivotal movement.

11. In a drill centralizer, a support, a pair of guide arms pivotally connected to said support at a place intermediate the ends of said arms, one end of said arms adapted to swing into and out of drill steel guiding position, and interconnecting means between the other ends of said arms and said support for locking said arms into said drill steel guiding position.

12. In a drill steel centralizer, a support, first and second guide arms connected to the support having one end thereof adapted to move into and out of drill guiding position, a first and a second means fixed on the other ends of said first and second arms respectively, and a third means integral with said support cooperating with said first and second means for locking said arms into drill guiding position.

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