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LATCH-TYPE CONNECTING DEVICE

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This invention concerns devices suitable for the quick attachment and detachment of force-transmitting members, such as the attachment and detachment of push rods to an operator therefor, and relates more particularly to latch members therefor and the mounting therefor and arrangement thereof in the devices.

One object of the invention is the provision of a novel latch type of connecting device in which a single force is applicable to the device at least partly through the latch member to retract such member from the latching position pursuant to attaching or detaching the device.

A further object is the provision of a latch-type connecting device which may be manipulated from a single side for either attaching or detaching while causing release of the latch.

A further object is the provision of a device embodying the above features in a simple sturdy structure susceptible of economical production.

These and other desirable objects, features, advantages, and capabilities inherent in and encompassed by the invention will be better understood from the ensuing description and the annexed drawings, wherein:

Fig. 1 is a side elevational view of a tractor having a preferred embodiment of the present invention installed thereon for connecting a rock-shaft with a tillage tool operating link;

Fig. 2 is an enlarged side elevational view of a connecting device constructed according to the principles of this invention and of the character illustrated in Fig. 1; and

Fig. 3 is a front elevational view of two adjacent rock-shaft arms with respective connecting devices of the present invention mounted thereon.

The devices 11 are shown in Fig. 1 for operatively connecting rock-arms 12 and 13 with tools which the rock-arms are adapted to operate. The arm 13 is for operating a tillage tool 14 carried upon parallel links 15 and 16 pivotally connected to the tractor body and lifted to the transport position shown when a link 17 is moved endwise upwardly. This link 17 is pivotally connected with the upper end of a rockable arm 18, and this arm is pivotally connected with the front end of a push rod 19 whereby when the rock-shaft 21, with which the arm 13 is constrained for rotation, is pivoted clockwise, the push rod 19 will be thrust endwise forwardly to pivot the arm 18 clockwise and thereby move the link 17 endwise upwardly.

In Figs. 2 and 3, the rock-shaft arm 13 is illustrated as having a bifurcated upper end portion

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22 with opposed side walls 23 and 24 of which a portion of the former is broken away to expose a portion of the latter. These side walls 23 and 24 are unconnected by any spanning parts between their upper edges. Two anchorage pins 25 and 26 extend between the walls 23 and 24. A device as 11 is adapted to be hooked onto or connected with either of these anchorage pins.

The device 11 comprises a solid metallic body 27 having one end 28 suitably connected with the push rod 19 by a connecting member 29. There are opposite upper and lower edges 31 and 32 of the body 27, and a notch 33 formed within the body has an entrance 34 communicative with the edge 32 in spaced relation from the end 28. The notch 33 and its entrance 34 are a width for receiving either of the pins or anchorage members 25 and 26. Adjacent to the notch entrance 34, there is a guide face 35 flared outwardly of the notch and divergingly from its principal axis $a-a$. At the opposite end of the body 27, it is formed with a face 36 generally parallel with the guide face 35 and intersecting the side 31 at an obtuse angle b . This face 36 forms one side of a notch X of the body.

A diagonal bore 37 extends between the two faces 35 and 36 in intersecting relation with a hole 38 formed in an intermediate portion of the body. This bore 37 serves as a bearing for a latch-pin 39 which is encircled by a helical spring 41 disposed within the hole 38 for reacting between a side thereof and a stop pin 42 for normally maintaining the left end of the pin in obstructing relation with the notch entrance 34. Further endwise movement of the pin across the notch entrance is prevented by the stop member 42 abutting against the side of the hole 38.

When it is desired to attach or detach the device 11 to an anchorage as 26, the latch-pin 39 will be grasped at that portion thereof projecting beyond the face 36 into the notch X. The length of the pin can be shorter because of the notch X providing access thereto for manual engagement. When manually engaged, the pin can be withdrawn endwise upwardly and to the right, against the force of the compressible spring 41, incident to withdrawing the lower end of the pin from obstructing relation to the notch 33. This force applied upwardly and to the right in pulling the latch-pin into the unlatched position can be utilized in a single motion for concurrently lifting the device at the left end of a push rod as 19 upwardly from the anchorage pin 26.

Manual engagement and actuation of the latch-pin as aforesaid may be employed when at-

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taching the device to a pin as 26, and, subsequent to disposal of the pin within notch 33, pin 39 will be released and thereby allowed to project into the latching position by the force of the spring 41. An alternative procedure in attaching the device to the pin 26 is possible because of the diagonal arrangement of the pin 39 whereby the lower end face thereof is disposed to face outwardly of the notch 34 and lead diagonally toward or into such notch. This alternative procedure is to place the lower end of the latch-pin against a side of the anchorage pin 26 while pressing downwardly and to the left upon the device, whereby the component of force exerted axially against the end of the latch-pin will cause it to move into the unlatched position, while the guide face 35 cooperates to direct the anchorage pin into the notch 33. The spring will automatically move the latch-pin into its latching position as the pin 26 enters the notch 35.

The diagonal arrangement of the latch-pin 39 which expedites both attachment and detachment of the device with a singly applied force (that applied in a downward direction and to the left for abutting the lower end of the latch-pin against a side of the anchorage pin 26 on attaching the device thereto, and that manually applied to the upper headed end of the latch pin 39 in an upward direction and to the right when detaching the device) has the further advantage of so disposing the manually engageable end of the latch-pin that devices can be utilized upon closely positioned rock-shaft arms without endangering an operator should he be attaching or detaching one of the devices when the rock-shaft carrying the other device should be accidentally power operated or moved.

This is illustrated in Fig. 3 where the two rock-shafts 12 and 13 are shown with respect to the devices 11 connected therewith for the attachment of push rods as 19 which extend in the same direction from these arms 12 and 13. When engaging the latch-pin 39 of either of the devices 11 shown in Fig. 3, it is unnecessary for the operator to place any part of his body within the path of movement of either of the other rock-arms. It is particularly unnecessary for the operator to place any part of his hand or wrist into a space, such as that indicated at S in Fig. 1, where an accidental power operation of these arms could effect a scissor-like severing operation for injuring the operator.

Having thus described the preferred embodiment of the invention, I claim:

1. In a device for detachable connection with an anchorage member, a body having opposite sides and a notch with an entrance communicating with one of said sides in spaced relation from an end of such body, said body also having a latch-pin bearing extending diagonally therethrough from the other side thereof at a position adjacently to said end thereof to a position adjacently to the notch entrance, a latch-pin movably axially in said bearing and having a latch end portion with an end face extending transversely of such latch-pin, said latch-pin having a latching position wherein said end portion thereof projects from the bearing across the notch entrance in obstructing relation therewith and wherein said end face is disposed to face outwardly of said notch entrance and lead diagonally thereinto while an opposite end portion of said latch-pin projects from the bearing at the opposite side of the body, said opposite end portion of the pin being for manual engagement to

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withdraw the pin lengthwise into an unlatched position wherein the latch end portion is removed from across the notch entrance, and means for normally yieldably maintaining the pin in the latching position.

2. In a device for detachable connection with an anchorage member, a body having opposite sides and a notch with an entrance communicating with one of said sides in spaced relation from an end of such body, said body also having a hole and a latch-pin bearing bore extending diagonally through said body in intersecting relation with said hole, said bore reaching from the other side of said body at a position adjacently to said end thereof to a position adjacently to the notch entrance, a latch-pin movably axially in said bearing, said latch-pin having a latching position wherein a latch end portion thereof projects from the bearing across the notch entrance in obstructing relation therewith and wherein an opposite end portion projects from the bearing at the opposite side of the body, said opposite end portion of the pin being for manual engagement to withdraw the pin lengthwise into an unlatched position wherein the latch end portion is removed from across the notch entrance, means limiting axial movement of the pin in the direction for projecting across the notch entrance, and a helical spring disposed within said hole in encircling relation with the portion of said pin extending through the hole, and said spring reacting between an edge of the hole and said pin for yieldably maintaining the pin in the latching position.

3. In a device for detachable connection with an anchorage member, a body having opposite sides extending in the same general direction from an end, a notch formed at the intersection of one of said sides and said end, and a notch having an entrance communicating with the other of said sides in spaced relation from said end of the body, said body also having a latch-pin bearing extending diagonally therethrough from a position within the first-named notch to a position adjacently to the entrance of the second notch, a latch-pin movably axially in said bearing and having a latch end portion with an end face extending transversely of such latch-pin, said latch-pin having a latching position wherein said end portion thereof projects from the bearing across the notch entrance in obstructing relation therewith and wherein said face is disposed to face outwardly of said notch entrance and lead diagonally thereinto while an opposite end portion of said latch-pin projects from the bearing into the first named notch, said first named notch providing space for improving the manual accessibility of said opposite end portion of the pin to expedite manual withdrawal of the pin lengthwise into an unlatched position wherein the latch end portion is removed from across the notch entrance, and means for normally yieldably maintaining the pin in the latching position.

4. In a device for detachable connection with an anchorage member, a body having opposite sides and a notch with an entrance communicating with one of said sides in spaced relation from an end of such body, said entrance accommodating the insertion of said anchorage member into the notch, a guide face flared outwardly of the notch divergingly from the principal axis thereof to assist in guiding the anchorage member thereinto, a second face on said body adjacently to said end thereof and disposed in general par-

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allelism with said guide face, obliquely to the other side of the body and intersecting the same at an obtuse angle, said body also having a latch-pin bearing extending diagonally thereof between and communicating outwardly through each of said faces, a latch-pin movable axially in said bearing, means limiting movement of an end portion of the pin outwardly of said guide face into an obstructing position over the notch entrance, the opposite end portion of said pin projecting outwardly of the bearing beyond the second face to facilitate manual engagement thereof for withdrawing the pin lengthwise from said obstructing position, and means for normally yieldingly maintaining the pin in said obstructing position.

5. In a device for detachable connection with an anchorage member, a body having opposite sides and a notch having an entrance opening into one of said sides in spaced relation from an end of the body, the notch entrance being accommodative of the anchorage member so the latter can be disposed within the notch, a guide face flared outwardly of the notch at the side thereof nearest to said end of the body and divergingly from the principal axis of the notch to assist in guiding the anchorage member thereinto, there being a second face upon said body in general parallelism with said guide face at the opposite side of said body adjacently to said end thereof, a hole through said body within a section thereof disposed between said faces, there being a latch-pin bearing extending diagonally through the body between said faces and in intersecting relation with said hole, a latch pin movable axially in said bearing and being projectable outwardly from said guide face into latching position in obstructing relation with the notch entrance, an end portion of said pin pro-

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jecting outwardly beyond the second face of said body to facilitate manual engagement for withdrawing the pin into an unlatching position, means preventing movement of the pin endwise beyond the latching position, a spring disposed within said hole in encircling relation with the pin and reacting between said pin and the body for urging the pin into the latching position.

6. In a device for detachable connection with an anchorage member, a body having a notch through the entrance of which said member is passable thereinto, a guide face flared outwardly of the notch divergingly from the principal axis thereof to assist in guiding the member thereinto, said body also having a latch-pin bearing extending axially toward said guide face and communicating outwardly therethrough, a latch-pin movable axially in said bearing transversely of the notch axis, means limiting movement of the pin outwardly of said face into an obstructing position over the notch entrance, and means for normally yieldingly maintaining the pin in said obstructing position for preventing accidental removal of the anchorage member from the notch.

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