

UNITED STATES PATENT OFFICE

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MINE PROP

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The present invention relates to certain new and useful improvements in mine props, and particularly to that class of mine props which are adapted to temporarily support a mine roof adjacent a working face, and to be readily reclaimed after the necessity for such support has passed.

In the longwall system of mining, coal is extracted from its native bed from relatively long faces which retreat as the mining operation progresses. For the protection of the miners and the mining apparatus, during the mining operations, means must be provided to support the mine roof immediately in front of said coal face, and economy dictates that these supports shall be reclaimed as the mining operations progress. I am aware that temporary roof supports of various sorts have been heretofore proposed which may be withdrawn and again used as the working face recedes. All of such devices which have been heretofore proposed, with which I am familiar, are objectionable because of their excessive first cost, and of the time and labor required for their manipulation.

It is the especial object of this invention to provide a roof supporting prop which shall be of relatively small initial cost, easy to place, efficient in service, and which may be conveniently and expediently reclaimed and relocated as the working face advances.

The means whereby I attain this object is fully set forth in the following specification, and illustrated in the accompanying drawings of which

Fig. 1 is a side elevation, partly in section, of the preferred embodiment of my invention.

Fig. 2 is a fragmentary sectional view taken along the line II—II of Fig. 1.

Fig. 3 is a transverse sectional view taken along the line III—III of Fig. 1.

Fig. 4 is a diagrammatic elevation, on a reduced scale, illustrating the relation of my improved mine post to the floor and roof of the mine, when said post is in roof supporting position.

Fig. 5 is a diagrammatic view, similar to Fig. 4, illustrating the method of releas-

ing the post from roof supporting position preparatory to its removal to a new position.

Like numerals refer to similar parts in the several figures.

As shown in the drawings, my improved mine prop comprises a wooden post 1 of suitable length which is encased in a steel tubing 2 projecting at both ends beyond the ends of the post. Extending into the lower end of the casing 2, and abutting against the flat end of the post 1, is a cast steel foot 3 which is held in operative relation with the post 1 and casing 2 by a lag screw 4 inserted through an axial aperture 5 in the foot casting 3. A cast steel head 6 projects into the casing 2, abuts against the opposite end of the post 1, and is held in operative relation with the post and casing by a lag screw 7 inserted through an axial aperture 8 formed in the head casting. At its lower end the foot casting 3 is of hemispherical shape adapted to tiltably engage a correspondingly shaped socket 9 formed in a cast steel pedestal 10 which is adapted to rest upon the floor of the mine. The pedestal casting 10 is preferably formed with a relatively broad floor engaging flange 11 adapted to support the weight of the posts and its load without exerting undue pressure upon the mine floor. Formed in the body of the pedestal 10 are suitable apertures 12 adapted to receive a hook 13 formed on the end of a rod 14 to afford a handle for sliding the pedestal 10 along the mine floor into the desired position. At its upper end the head casting 6 is of rectangular cross section, and the upper edges 15 of its lateral walls 16 present inclined bearing surfaces adapted to engage the correspondingly inclined edges of the walls 17 of a cap casting 18 which constitutes the roof engaging element of the prop. The cap casting 18 is provided with depending flanges 19 at each side adapted to engage the sides of the head casting 6 to prevent lateral displacement of these parts relative to each other. Mounted in suitable apertures of the side walls 17 of the cap casting 18 is a bolt 20 upon which is pivotally mounted a latch 21 adapted to extend into a slot 22 of the head casting

6. The latch 21 is provided with a laterally expanded head 23 adapted to engage the faces 24 of the head casting, to prevent the cap 18 from sliding downwardly upon the inclined surface of the head casting 6.

In the practice of longwall mining a series of roof supporting props is arranged at suitably spaced intervals in a row extending substantially parallel with the coal face to support the mine roof above the area where- in the mining operations are conducted. At each advance of the working face a new line of props is established, and those of the preceding line are removed to allow subsidence of the unsupported roof.

To position my improved roof supporting prop in such a system, the pedestal casting 10 is moved over the mine floor to the desired position. The post 1 is then placed perpendicularly with its foot resting in the socket 9 and the inclined bearing surface 15 sloping downwardly away from the coal face 25. The cap casting 18 is then placed in position upon the head of the post and locked in place by engagement of the latch 21. Wedges 26, or other suitable filling devices, may then be placed between the flange 18 of the cap, and the mine roof 27, as shown in Fig. 4, to hold the post in upright position until partial subsidence of the roof shall place a load upon it.

To remove the prop, an upward blow with a miner's pick, or other suitable tool, is sufficient to release the latch 21 and allow the head 6 of the post to slide beneath the cap 18, causing the post to tip towards the coal face 25 and allowing the cap to fall to the mine floor. The hook 13 may then be inserted in the aperture 12 and the pedestal dragged over the mine floor to its new position. The post 1 will then be restored to its perpendicular position and the cap 18 readjusted and secured in place in the manner above described.

In the devices above described I have provided a roof supporting prop of relatively small initial cost, which may be easily placed in roof supporting position, which is efficient in service, and which may be released from one roof supporting position and adjusted in another so quickly that the danger attendant upon its manipulation is greatly reduced, thereby contributing to increase the safety of the men and apparatus employed in the mine.

Considering the broad aspects of my invention, it will be seen that I have provided a prop adapted to be retained in operative position by longitudinally acting compressive forces, and releasing means are provided whereby a relative tipping movement of the upper portion 2—3—6 to the base pedestal 10 is permitted to render the prop inoperative. Considering merely portion 2—3—6 and the cap, it will be seen that upon releas-

ing the latch the prop is longitudinally yieldable under the compressive forces, due to the wedge surfaces, and these wedge surfaces act to impart a tilting impulse to the column. So far as I am aware I am the first to provide a prop readily tiltable out of operative position, and, further, to provide means for automatically initiating the tilting movement.

While I have shown the lower bearing surfaces of column 2—3—6 as being spherical, it is, of course, only necessary or desirable that the section of this bearing portion be arcuate in the plane of potential tipping of the column. It is, however, desirable in the efficient operation of the device that this bearing portion be either spherical or arcuate in the manner described in order to permit the ready disengagement of the inclined cooperating faces without making their angle of inclination too oblique relative to the horizontal.

It is to be understood that I do not limit myself to the precise construction here shown, as the parts may be subject to wide variation without departure from the spirit of my invention.

What I claim is:

1. In a prop for supporting a mine roof, the combination with a pedestal adapted to rest upon the floor of a mine, of a post having a substantially hemispherical foot adapted to rocking engagement with a correspondingly formed socket in said pedestal, an inclined bearing surface formed upon the upper end of said post, and of roof supporting cap supported upon said bearing surface as and for the purpose set forth.

2. In a prop for supporting a mine roof, the combination with a pedestal adapted to rest upon the floor of a mine, of a post having a substantially hemispherical foot adapted to rocking engagement with a correspondingly formed socket in said pedestal, an inclined bearing surface formed on the upper end of said post, a roof supporting cap supported upon said bearing surface, and means preventing accidental relative movement of said post and cap, as and for the purpose set forth.

3. In a prop for supporting a mine roof, the combination with a pedestal adapted to rest upon the floor of a mine, of a post having a substantially hemispherical foot adapted to rocking engagement with a correspondingly formed socket in said pedestal, an inclined bearing surface formed on the upper end of said post, a roof supporting cap supported upon said surface, and latch means carried by the cap and engaging the post for preventing relative movement of said post and cap.

4. In a prop for supporting a mine roof, the combination with a pedestal adapted to rest upon the floor of a mine, a post having

- a substantially hemispherical foot adapted to rocking engagement with a correspondingly formed socket in said pedestal, an inclined bearing surface formed on the upper end of said post, a roof supporting cap supported upon said bearing surface, and a latch adapted to prevent the sliding of said post relative to said cap, as and for the purpose set forth.
- 5 5. In a prop for supporting a mine roof, an upper longitudinally yieldable portion having a lower bearing extremity of arcuate contour, a base portion having a seat for said bearing extremity and thereby supporting said upper portion in upright position under working conditions, and latch means to retain said upper portion in upright unyielding position and being releasable to relieve load pressure upon said prop and to permit said upper portion to yield and to rock along the arcuate contour of its bearing extremity for rendering the prop inoperative.
- 10 6. In a prop of the class described, the combination with a post having an inclined bearing surface and a shoulder, of a roof supporting cap supported upon said bearing surface, and a latch pivoted to said cap and releasably engageable with said shoulder to retain said post in supporting relation to said cap.
- 15 7. In a prop of the class described the combination with a post having an inclined bearing surface and a pair of spaced upstanding lugs, of a roof supporting cap supported upon said bearing surface, and latch means carried by said cap and releasably engageable between said lugs for the purpose set forth.
- 20 8. In a prop of the class described, the combination with a post having a pair of spaced upstanding inclined bearing flanges, a roof supporting cap having a pair of spaced depending flanges slidably supported upon said post flanges, means for preventing movement of said cap transversely of said post flanges, and releasable means to hold said post in roof supporting relation with said cap.
- 25 9. In a prop of the class described, the combination with a post having a pair of spaced upstanding inclined bearing flanges and a pair of spaced upstanding blocks, of a roof supporting cap having depending flanges slidably supported upon said post flanges, and a latch pivotally mounted within said cap and releasably engageable between said blocks.
- 30 10. In a mine prop, the combination with a post having an inclined bearing surface; of a roof supporting cap supported upon said surface, and a latch pivoted to one of said elements and releasably engageable with the other to prevent accidental movement of said cap relative to said inclined surface.
- 35 11. In a prop, the combination with a post having a lower arcuate bearing extremity upon which the post is tiltably supported; of a wedge-shaped cap upon the post and disengageable therefrom by lateral force which causes tilting movement of said post upon said arcuate bearing extremity.
- 40 In testimony whereof I have hereunto set my hand.

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