

Aug. 3, 1926.

1,594,475

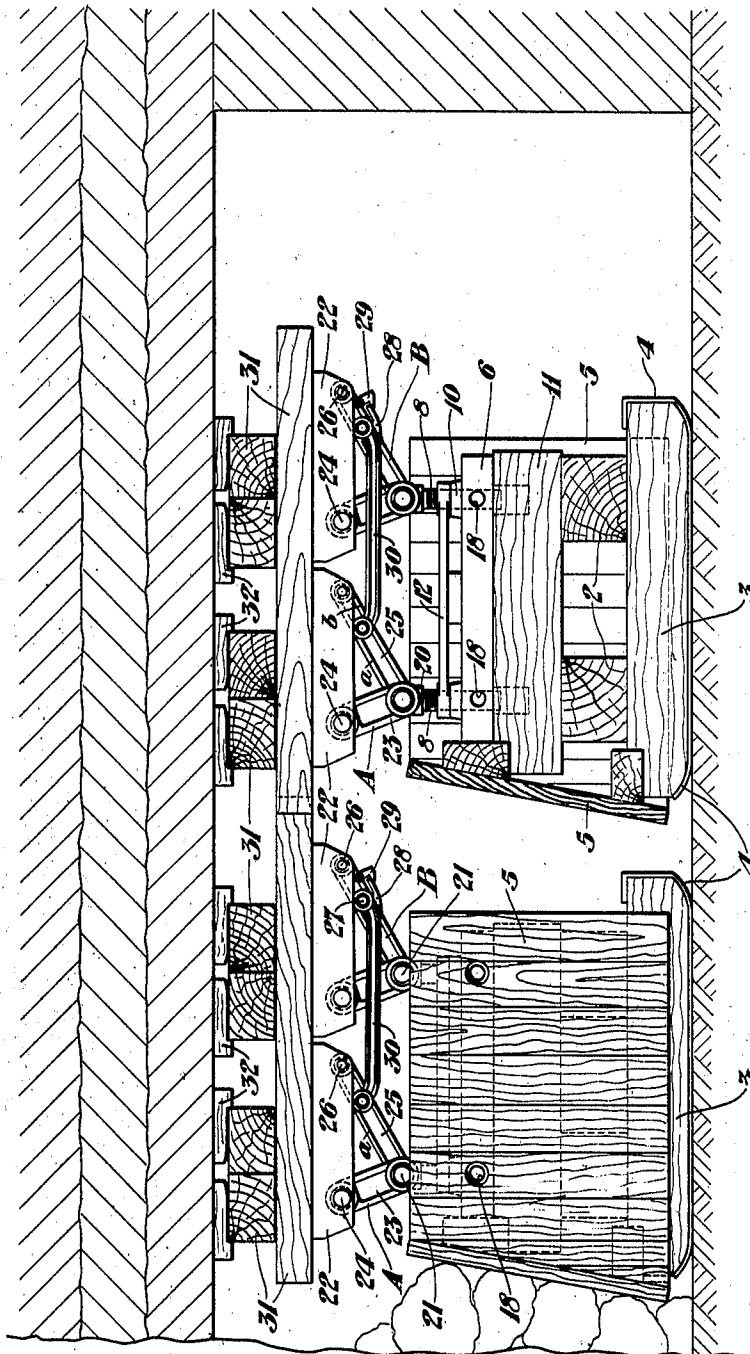
F. E. SMITH

ROOF SUPPORTING MECHANISM

Filed March 23, 1926

4 Sheets-Sheet 1

Fig. 1.



Witnesses:

Edwin T. Smith

Inventor:

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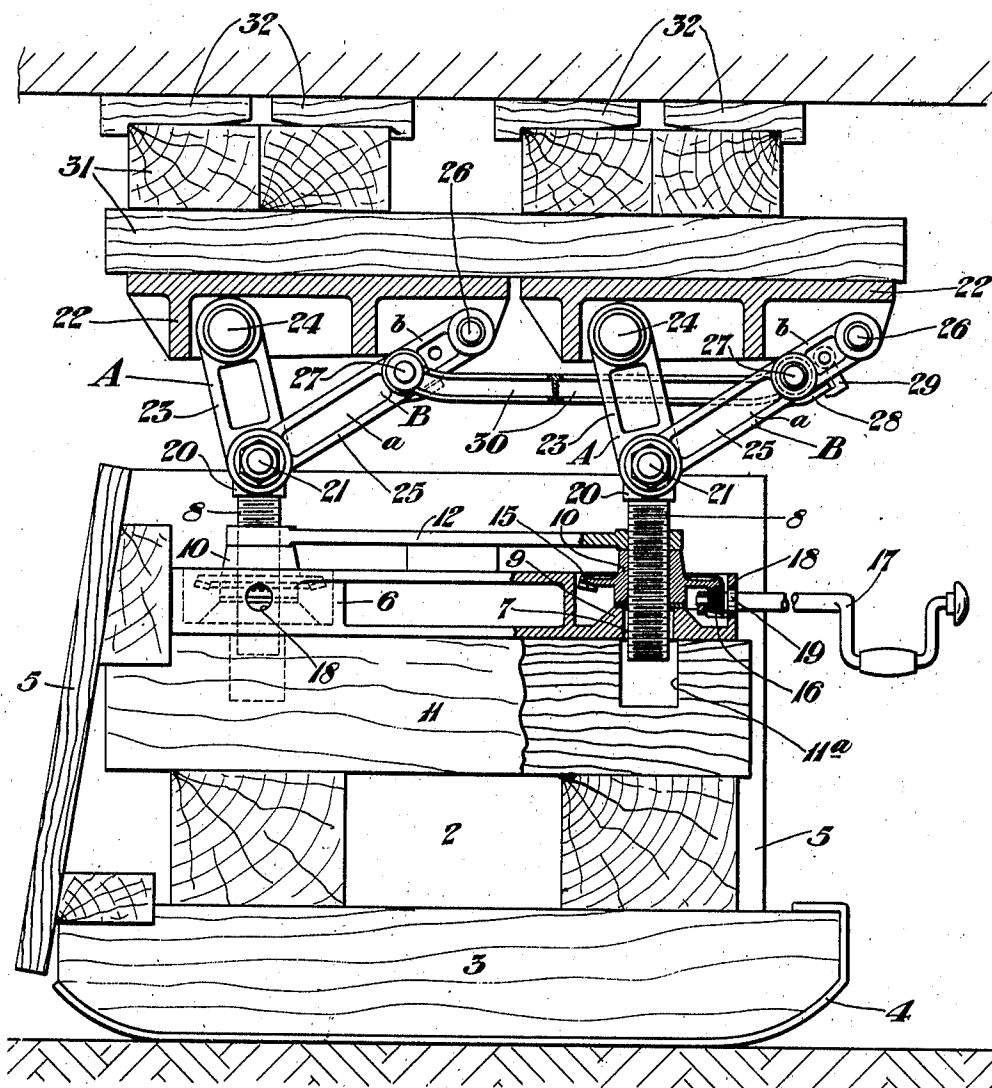
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ROOF SUPPORTING MECHANISM

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4 Sheets-Sheet 2

Fig. 2.



Witnesses:

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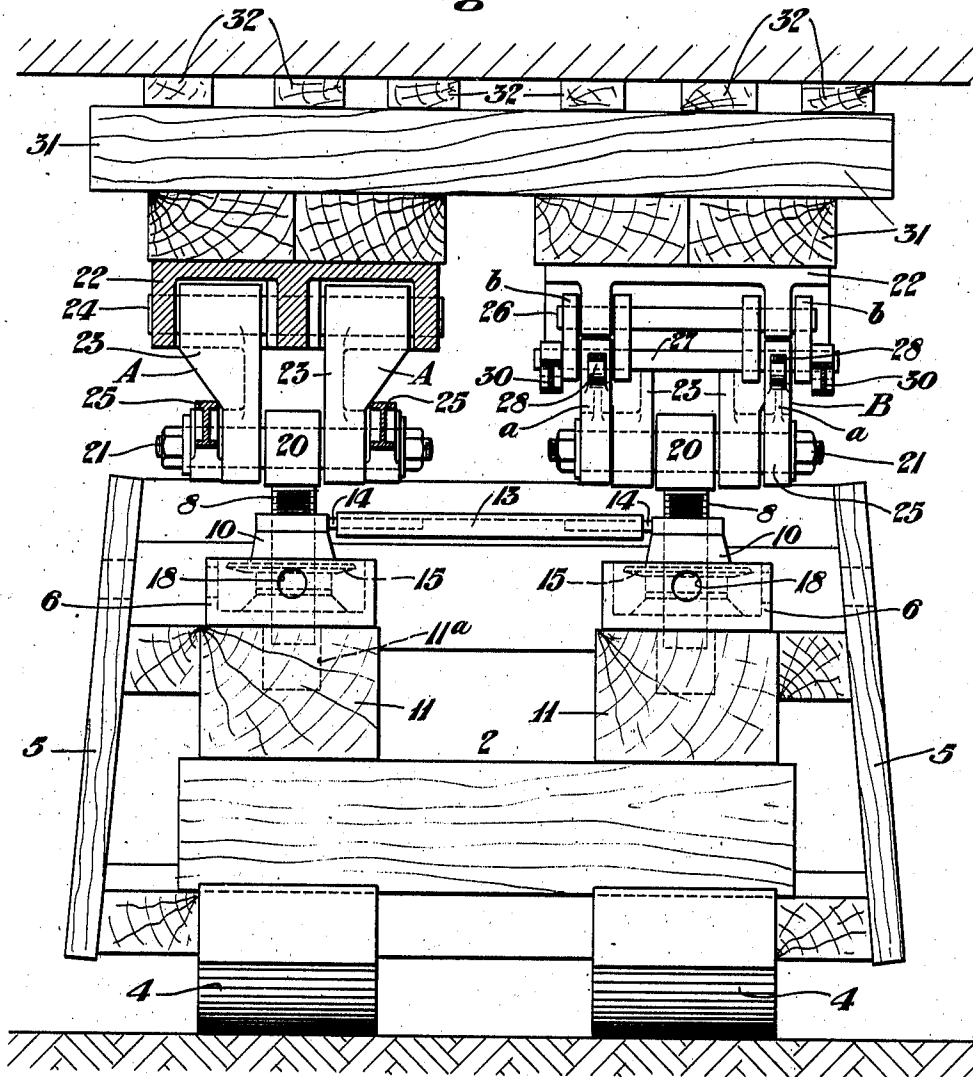
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ROOF SUPPORTING MECHANISM

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4 Sheets-Sheet 3

Fig. 3.



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ROOF SUPPORTING MECHANISM

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4 Sheets-Sheet 4.

Fig. 5.

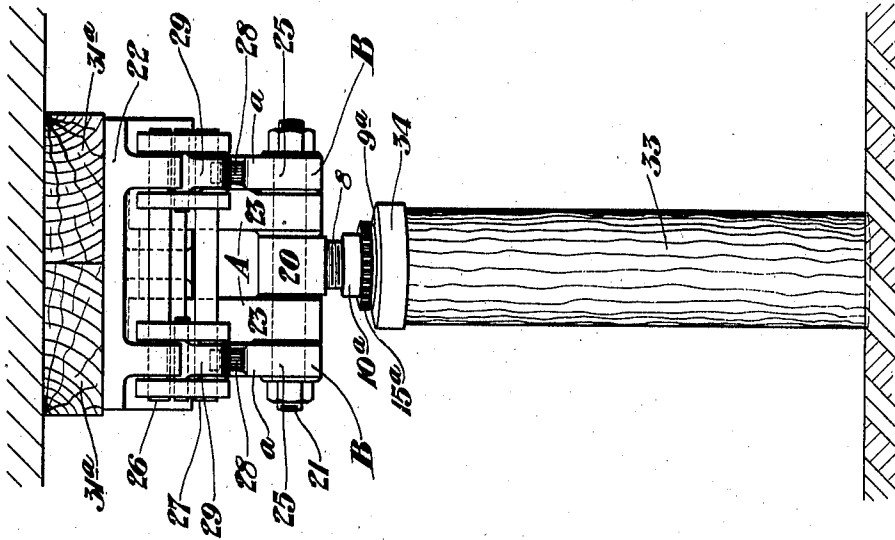
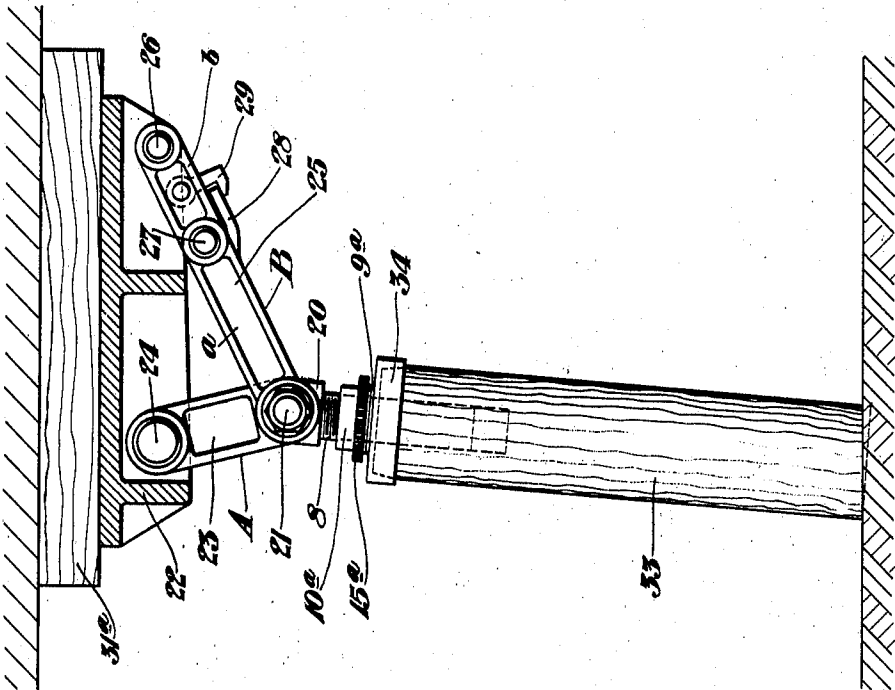


Fig. 1.



Patented Aug. 3, 1926.

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UNITED STATES PATENT OFFICE.

FRANK E. SMITH, OF SCOTSDALE, PENNSYLVANIA.

ROOF-SUPPORTING MECHANISM.

Application filed March 23, 1926. Serial No. 96,836.

This invention relates to mine roof supports and more particularly to mechanical mine roof supports or props adapted to be readily moved forward in the mine as the mining progresses.

The object of the present invention is to provide a readily releasable or collapsible prop or support which may be collapsed when it is desired to move it thereby relieving it of the roof pressure.

Another object is to provide a prop or support having the novel construction, design, and combination of parts hereinafter described and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevation showing a crib form of mine roof props embodying my invention in operative position.

Figures 2 and 3 are sectional views of the mine roof props of Figure 1.

Figure 4 is a side and Figure 5 is a front elevation of a modified form of mine roof prop embodying my invention.

Referring more particularly to the drawings, the numeral 2 designates the crib base of the roof support which has its bottom members 3 shaped to form skids and provided with metal wear faces 4.

A shield casing 5 is built around the back and both sides of the crib to prevent the gob from falling in and burying the crib, thus making advancing of the crib easier. The crib base 2 and casing 5 is shown formed from wood, although it will be understood that metal may be used to form all or any part of the structure instead of wood if desired.

A jack supporting base or beam 6 is mounted on each side of the crib base 2 and is provided with apertures 7 to receive the screw-shank or stem 8 of a screw-jack and bearing portions 9 for supporting the nut 10 of the jack. The top timbers 11 of the crib are also recessed as at 11^a to receive the ends of the stems 8 of the jacks.

The jack-stems 8 are tied together from front to rear by bars 12 and are prevented from spreading sidewise by tie bars 13 screwed on projecting arms 14 of the bars 12.

The jack adjusting or operating nuts 10 are provided with bevel gears 15 adapted to be meshed with a pinion 16 on a removable operating tool or crank 17 adapted to be inserted through an opening 18 in the supporting base or beam 6. The shank or crank

portion of the tool 17 is provided with a bearing 19 of greater size than the pinion 16 and snugly fitting the opening 18 so as to provide a bearing for the tool.

The opening 18 may be formed at any suitable accessible point in the bases or beams 6, but are shown formed in the front end of the bases for the front jacks and in the side walls for the rear jacks. The shield 5 must also be cut away to permit access to the openings 18 for the rear jacks.

If desired, a suitable mechanical connection (not shown) may be provided for connecting the beveled gears 15 of the forward and rear jacks, so that when the gear of the front jacks is operated the gear of the rear jack will be operated in unison therewith.

Each of the screw-jack stems 8 is provided with a horizontally apertured head 20 in which is pivotally mounted a pin 21 on which is pivotally mounted roof supporting legs A and B which support a roof engaging beam 22.

The roof supporting legs A and B may each be composed of a pair of levers or arms, as shown, or a single lever or arm, as desired.

As shown, the rear leg A is composed of a pair of relatively short levers or arms 23 pivotally mounted on the pin 21 at their lower ends, inclined slightly rearwardly, and pivotally connected to the beam 22 at their upper end by a pin 24. The front leg B is composed of a pair of levers 25 also pivotally mounted on the pin 21 at their lower ends, and inclined forwardly on a materially greater angle than the levers 23 of the rear leg, and pivotally connected by a pin 26 to the forward end of the beam 22. The levers 25 are of materially greater length than the levers 23 and are each composed of two parts *a* and *b*, pivotally connected by a pin or shaft 27 which extends through both of the forward levers thus forming a break joint in the forward leg B.

The parts *a* of the levers 25 of the forward jacks, are each provided with a locking tongue 28 which extends upwardly and overlaps the lower portion of the part *b*, and is engaged by a pivoted latch 29 mounted on the part *b*, so as to prevent the collapsing of the levers 25 while the latches are engaged.

The levers 25 of the rear jacks preferably have the tongues 28 and latches 29 omitted and are held against collapsing by

links 30 which are pivotally connected to and extend between the shaft 27 of the forward legs B of the front and rear jacks, so that when the legs B of the forward jacks are locked against collapsing the forward legs of the rear jacks will also be held against collapsing.

When the leg B is collapsed the beam 22 will swing downwardly away from the roof and release the crib so that it may be advanced or moved to a new position.

In operation, the beam 22 may be engaged directly with the roof, or timbers 31 may be supported on the beams 22 so as to give a greater roof bearing, and wedges 32 may be inserted between the timbers and roof and driven home to tighten the support.

In Figures 4 and 5 a modified form of roof support in the form of a single post is illustrated. In this construction a single post 33 is substituted for the crib base, and a single jack support or base member 34 is provided in the form of a cap-piece instead of the beam 6.

The cap-piece 34 is apertured to receive the screw-shank or stem 8 of the screw-jack and is provided with a bearing portion 9^a for supporting the nut 10^a of the jack. The nut 10^a differs from the nut 10 of the preferred construction in that it is provided with ratchet teeth 15^a instead of the beveled gear 15, and is adapted to be operated or rotated by a suitable ratchet-bar (not shown).

The jack-stem 8 is adapted to support the legs A and B and roof engaging beam 22, as in the preferred construction.

The roof support of Figures 4 and 5 may be mounted directly against the roof or may be engaged with a timber 31^a in order to provide a greater surface contact with the roof.

In both of the above roof support constructions the same principles are used. The roof pressure is taken by the legs A and B and delivered through the pin 21 and jack-screw 8 to the body of the support. The leg A being of materially shorter length and thus positioned substantially vertical will receive and transmit the major portion of the load, while the leg B will receive and transmit only a small percentage of the load due to its length and greater inclined position. The leg B which has a break joint, is based on the toggle principle, so that the tripping or collapsing of the support is made in a member of small load. When the leg B is collapsed, the leg A and roof engaging beam 22 rotate around their pivotal mountings permitting the member 22 to swing quickly downward out of engagement with the roof.

While I have shown and described only certain specific embodiments of my invention it will be understood that I do not

wish to be limited thereto since various modifications may be made without departing from the scope of my invention as defined in the appended claims.

Throughout the specification and claims the term "legs" is used to designate the structure supporting the roof engaging beam 22, and is meant to cover either a leg composed of a single lever or arm or a plurality of said levers or arms in combination.

I claim:

1. A roof supporting mechanism for mine roofs, comprising a rigid base, at least one jack-head supported on said base, a roof engaging beam, and a pair of legs pivoted to said jack and said beam, one of said legs being provided with a break-joint adapted to be collapsed to permit said beam to move downwardly from said roof.

2. A roof supporting mechanism for mine roofs, comprising a rigid base, at least one jack-head supported on said base, a roof engaging beam, and a pair of legs having their lower ends pivoted on the same axis on said jack and having their upper ends pivoted to said beam so as to project upwardly and outwardly from said jack when extended, one of said legs being of materially greater length than the other and therefore projecting outwardly on a materially greater angle than the other leg and being provided with a break-joint intermediate its ends, said last named leg being adapted to be collapsed to permit said beam to move downwardly from said roof.

3. A roof supporting mechanism for mine roofs, comprising a rigid base, at least one jack-head supported on said base, a roof engaging beam, a pair of legs having their lower ends pivoted on the same axis on said jack and having their upper ends pivoted to said beam so as to project upwardly and outwardly from said jack when extended, one of said legs being of materially greater length than the other and therefore projecting outwardly on a materially greater angle than the shorter leg and being provided with a break-joint intermediate its ends, said last named leg being adapted to be collapsed to permit said beam to move downwardly from said roof, and means for normally holding said joint from breaking.

4. A roof supporting mechanism for mine roofs, comprising a crib base, at least one jack-head supported on said base, a roof engaging member, and a pair of legs pivoted to said jack and said member, one of said legs being provided with a break-joint adapted to be collapsed to permit said member to swing downwardly away from the mine roof.

5. A roof supporting mechanism for mine roofs, comprising a crib base, at least one screw-jack supported on said base, a roof engaging member, and a pair of legs pivoted

to the vertically movable screw member of said jack and said roof engaging member, one of said legs being provided with a break-joint adapted to be collapsed to permit said roof engaging member to swing downwardly away from the mine roof.

6. A roof supporting mechanism for mine roofs, comprising a crib base, at least one screw-jack supported on said base, a roof engaging member, and a pair of legs pivoted to the vertically movable screw member of said jack and said roof engaging member, one of said legs being provided with a break-joint adapted to be collapsed to permit said roof engaging member to swing downwardly away from the mine roof, and means for normally holding said joint from breaking.

7. A roof supporting mechanism for mine roofs, comprising a crib base, at least one screw-jack supported on said base, a roof engaging member, and a pair of legs pivoted to the vertically movable screw member of said jack and said roof engaging member, one of said legs being provided with a break-joint adapted to be collapsed to permit said roof engaging member to swing downwardly away from the mine roof, and a manually releasable latch mechanism for normally holding said joint from breaking.

8. A roof supporting mechanism for mine roofs, comprising a base, at least one roof engaging member, and a pair of legs having their lower ends pivotally mounted on said base and having their upper ends pivotally secured to said member, one of said legs being provided with a break-joint adapted to be collapsed to permit said member to swing downwardly away from the mine roof.

9. A roof supporting mechanism for mine roofs, comprising a base, at least one roof engaging member, and a pair of legs having their lower ends pivotally mounted on the

same axis of said base, said legs being inclined outwardly and upwardly and having their upper ends pivotally secured to said roof engaging member, one of said legs being provided with a break-joint intermediate its ends, said last named leg being adapted to be collapsed to permit said roof engaging member to swing downwardly away from the mine roof.

10. A roof supporting mechanism for mine roofs, comprising a base, at least one roof engaging member, and a pair of legs having their lower ends pivotally mounted on the same axis on said base, said legs being inclined outwardly and upwardly and having their upper ends pivotally secured to said roof engaging member, one of said legs being of materially greater length than the other and therefore projecting outwardly on a materially greater angle than the other leg, said last named leg being provided with a break-joint intermediate its ends so as to provide for collapsing of said leg to permit said roof engaging member to swing downwardly away from the mine roof.

11. A roof supporting mechanism for mine roofs, comprising a crib base, a plurality of screw-jacks, supported on said base, pairs of legs having their lower ends pivoted to the vertically movable screw member of each of said jacks, roof engaging members pivotally connected to the upper ends of each of said pairs of legs, one of said legs of each of said pairs of legs being provided with a break-joint adapted to be collapsed to permit said roof engaging members to swing downwardly away from the mine roof.

In testimony whereof, I have hereunto signed my name.

FRANK E. SMITH.