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HYDRAULIC JUMPER EXTRACTOR

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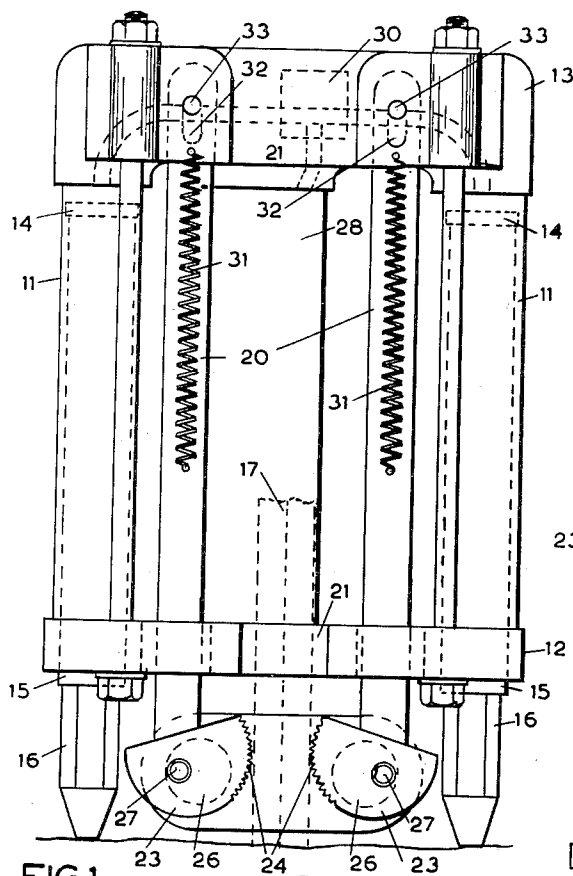


FIG. 1

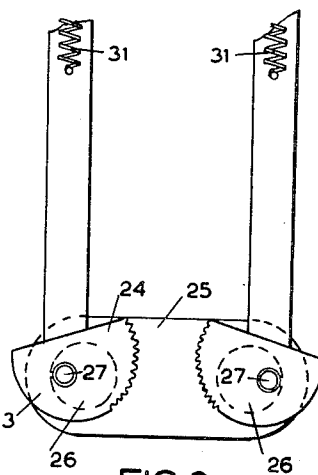


FIG. 3

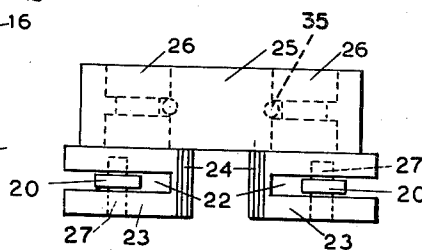


FIG. 4

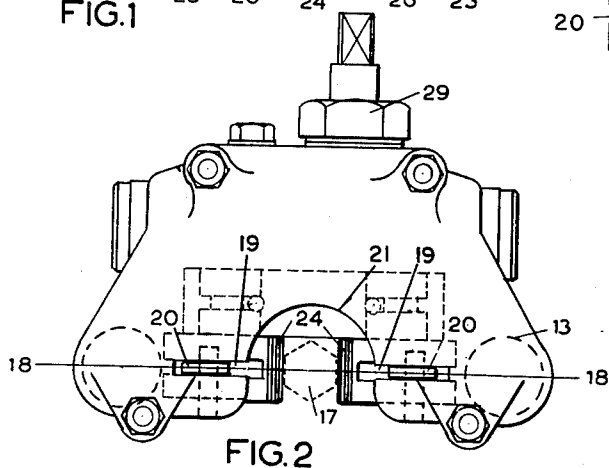


FIG. 2

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HYDRAULIC JUMPER EXTRACTOR

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4 Claims. (Cl. 254—30)

This invention relates to means for extracting rock drills, jumpers or drill steels (hereinafter referred to as jumpers), which become stuck in holes in rock during drilling operations.

Many devices have been developed for releasing jumpers which cannot normally be withdrawn from the hole which is being drilled in a rock for providing a hole for the insertion of a blasting charge.

It is the object of this invention to provide an extractor which is compact and self-contained and which operates by means of a special form of hydraulic jack.

In accordance with this invention the jumper extractor comprises a rigid structure supported by a pair of hydraulic cylinders with plungers mounted to be projected therefrom, a pair of gripping dogs in line with and between the bottoms of the cylinders and a pair of tension members tying the dogs to the structure.

In more detail the invention provides a jumper extractor with the two hydraulic cylinders spaced apart, rigid yoke shaped structures clamping the cylinders top and bottom with the centre portion of the yoke providing an opening from top to bottom in line between them, plungers from the cylinders adapted to be projected downwardly, pending tension members parallel to the cylinders and in line with the central opening of the yoke, said members flexibly anchored in the top structure, a cam shaped dog pivotally secured to the end of each member, tension springs attached to the dogs normally to close them, a reservoir held between the structures, a pump in the top structure and a passage connecting the reservoir to the hydraulic cylinders.

The invention further provides for the tension members to be flexible and to be threaded through slots in the dogs and secured therein by pivots offset from the centre of the dogs.

One preferred embodiment of the invention by way of example is illustrated in the accompanying drawing in which:

FIG. 1 is a front elevation of the extractor,

FIG. 2 is a plan thereof,

FIG. 3 shows the dogs in elevation, and

FIG. 4 is a plan view of the dogs.

In the drawing, 11 shows a pair of hydraulic cylinders made by a pair of tubes clamped between a suitably shaped plate 12 at their lower ends and a metal casting 13 in which their tops are accommodated.

These hydraulic cylinders 11 have plungers each consisting of a piston head 14 and a plunger 15 sliding through the plate 12 forming the bottom covers for the cylinders 11. These sliding plungers 15 are fitted with suitable shoes 16 which may be of hard metal and shaped to make contact with the ground drilled by the jumper to be extracted.

The top casting 13 and the bottom plate 12 are some-

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what yoke shaped so that the jumper 17 to be extracted may be located centrally on a line 18—18 between the centres of the hydraulic cylinders 11.

From apertures 19 in the top casting hang a pair of tension members 20. These members hang on each side of the central opening 21 in the yoke shape, that is in line on either side of the central opening 21. This allows them to be in line and on each side of the stuck jumper 17 or the like. The tension members 20 are themselves made of flexible material.

On their lower ends the members 20 are passed into slots 22 in the gripping dogs 23. These dogs 23 are given the usual cam shape and are mutually disposed so that they rotate to grip a jumper 17 or the like between them. The slot 22 for threading the member 20 through each dog 23 is off-set away from the cam 24 in each case. The outward spread of the dogs 23 is limited by a block 25 to which they are pivoted by pivots 26 held in block 25 by detents 35 and the pins 27 for attaching dogs 23 to the tension members 20 is eccentric to the pivots 26.

Between the casting 13 and the bottom yoke shaped plate 12 is secured a third cylinder 28 which serves as a reservoir for the fluid for the hydraulic cylinders. In the casting 13 is a manually operated pump 29 and passages and valves 30 are provided to enable fluid to be pumped from the reservoir 28 to the hydraulic cylinders 11. A suitable valve releases the fluid which is returned to the reservoir 28 when the plungers in the cylinder 11 are pushed back.

To make use of the extractor it is placed so that it straddles the projecting end of the jumper 17. In this position the end of the jumper 17 may be only long enough to be gripped by the dogs 23 resting on the rock face or the end of the jumper 17 may extend into the extractor as shown or well above it.

The clamping dogs 23 are pressed against opposite sides of the jumper 17 by the tension springs 31 which tie the tension members 20 to the top casting 13. The tension members 20 are slotted at 32 about their supporting pins 33.

The action of the springs 31 is to bring the block 25 against plate 12 ready for the engagement of the dogs 23 with the jumper 17.

The pump 29 passes fluid to the hydraulic cylinders or jacks 11 which are in line 18 on opposite sides of the jumper 17. The hydraulic jacks 11 start to lift the casting 13 which in turn pulls on the tension members 20. The dogs 23 grip the jumper 17 between them and the grip is increased with the pull of the tension members 20. The tension members 20 are so hung that the jumper 17 can be shaken or rotated slightly to loosen it while the grip of the dogs 23 and the pull on the tension members 20 are maintained.

What I claim as new and desire to secure by Letters Patent is:

1. A jumper extractor comprising a rigid structure, a pair of hydraulic cylinders spaced apart in parallel relationship with plungers projecting therefrom, said plungers projecting from said structure in a plane with and on opposite sides of the jumper, a pair of gripping dogs in the same plane, a pair of elongated, resilient tension members pivotally suspended at one end from said structure substantially parallel to said plungers and which are pivotally attached at the other end to said gripping

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dogs, and a hydraulic pump in said structure connected with said cylinders.

2. A jumper extractor as claimed in claim 1 in which said rigid structure comprises a pair of yoke pieces which engage said hydraulic cylinders at their ends, said yoke pieces having an opening therein extending unobstructedly between said cylinders which will accommodate the gripping dogs and the jumper to be extracted.

3. A jumper extractor as claimed in claim 1 in which a pair of elongated springs is provided, each of said springs being attached at one end to said rigid structure, and the other end of which is attached to said tension members such that said gripping dogs are brought into operation to grip a jumper.

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4. A jumper extractor as claimed in claim 1 in which said dogs are each rotatably mounted on a single block and said tension members are attached to said dogs eccentrically to said rotatable mounting.

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