

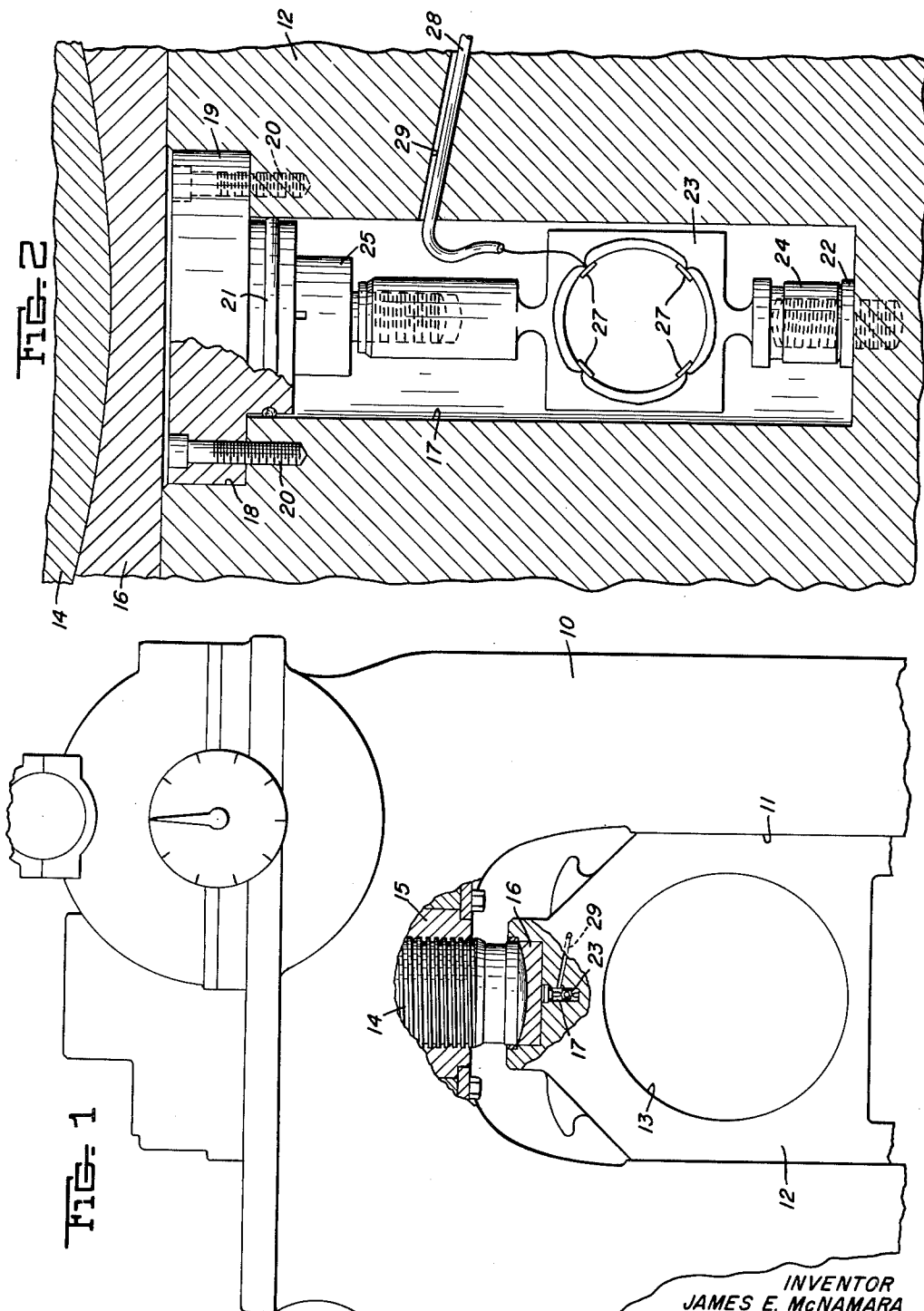
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MILL-ROLL CHOCK WITH LOAD-RESPONSIVE ELEMENT

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MILL-ROLL CHOCK WITH LOAD-RESPONSIVE ELEMENT

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This invention relates to the measurement of the pressures exerted by the rolls of metal-rolling mills and, in particular, to a chock for a mill roll having a load-responsive element incorporated therein.

In the present-day operation of metal-rolling mills, it is desirable for various purposes to measure the pressure exerted by the rolls on the work. This has been done by installing load cells subject to the strain induced in the mill housings or by placing load cells between the mill screws and the roll chocks. In the latter case, the load cells must be designed to sustain the entire rolling load which by necessity makes them large and heavy. Space is at a premium in the windows of mill housings furthermore but even where room is available for large load cells, costly modification of the chocks or windows is usually necessary to accommodate them.

I have invented a chock for a mill roll having a load-sensing element embodied therein so that deformation of the chock causes the element to give a response. This construction, by using the chock as the load-bearing means, makes it feasible to employ a small, standard load cell without expensive modification of the chock.

A complete understanding of the invention may be obtained from the following detailed description and explanation which refer to the accompanying drawings illustrating the present preferred embodiment. In the drawings: FIGURE 1 is a partial side elevation of a mill housing fitted with the chock of my invention; and

FIGURE 2 is a partial section taken along a plane parallel to the housing of FIGURE 1, with parts in elevation.

Referring now in detail to the drawings, a rolling-mill housing 10 has a window 11 therein. A roll chock 12 slidable vertically in the window is bored as at 13 to receive a bearing (not shown) for the neck of a mill roll. A screw 14 is threaded through a nut 15 in the top of the housing for adjusting the chock in the window and transmitting to the housing the reaction of the pressure exerted by the roll on the work passing through the mill. A washer or bearing block 16 is disposed in a recess in the top of the chock for engagement by the lower end of screw 14. In the illustrated embodiment, chock 12 is one of those in which is journaled the upper roll of a 2-high mill or the upper backing roll of a backed-up mill.

Chock 12 has a vertical bore 17 extending downwardly from the top in vertical alignment with the center of bore 13. The upper end of bore 17 is counterbored as at 18 to receive a closure 19 secured by screws 20. A compressible ring 21 around the reduced lower end of the closure seals the clearance space between the latter and the wall of bore 17. The closure is designed so that, when it is drawn home tightly by screws 20, its upper surface is below the top of the chock.

A stud 22 is screwed into a tapped hole in the bottom of bore 17 coaxially therewith. A load-responsive element in the form of a strain gage 23 having a tapped socket 24 at each end, has its lower end screwed onto stud 22. A bearing screw 25 turned into the socket on the upper end of the gage is adapted to be engaged by the bottom of closure 19. Thus, by properly adjusting screw 25, the initial load applied to gage 23 when the

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closure 19 is tightened may be varied. The gage may conveniently be of the Wheatstone-bridge type having resistors 27 mounted thereon and connected to indicating instruments by a cable 28 extending through a lateral passage 29 drilled into the chock.

When the gage 23 has been installed in bore 17, the latter is filled nearly full with a suitable insulating fluid such as a silicone grease, before closure 19 is applied, to exclude water which might otherwise collect by condensation.

It will be evident that, when the chock of my invention is in service in a mill housing, the pressure exerted by the roll will cause a reaction tending to compress the top portion of the chock between the roll-neck bearing and the washer 16. This reaction, of course, is transmitted by the screw to the mill housing. Compression of the top of the chock slightly deforms element 23. It thereupon changes the ratios between the resistances of the legs of its bridge and gives a correspondingly altered indication corresponding to the roll pressure.

In the case of a chock for the bottom roll of a mill, bore 17, of course, extends upwardly from the bottom of the chock which is supported on the bottom of the window whereby the bottom portion of the chock is compressed under the rolling load.

The advantage of the invention is that it permits the use of a small, standard load-responsive element and eliminates the need of substantial space in the housing window since the portion of the chock between the bearing and screw functions as the load-bearing member, the deformation of which actuates the load-responsive element. The adaptation of the chock to receive the load-responsive element involves only the machining of the bore 17.

Although I have disclosed herein the preferred embodiment of my invention, I intend to cover as well any change or modification therein which may be made without departing from the spirit and scope of the invention.

I claim:

1. A roll-bearing chock for a rolling mill having a seat for a mill screw on the top thereof and a main bore therethrough adapted to receive a roll-neck bearing, said chock also having a second bore in the portion thereof between said screw seat and said main bore, said second bore being normal to said main bore, and a load-responsive element mounted in said second bore so as to be subject to the deformation of said portion under rolling forces.

2. A chock as described in claim 1, characterized by a closure for said second bore and means securing said closure to said chock.

3. A chock as described in claim 2, characterized by said closure having means applying an initial deformation to said element when said closure is secured in place on the chock.

4. A chock as described in claim 3, characterized by said means being an adjusting screw.

5. A chock as described in claim 1, characterized by a stud extending upwardly from the bottom of said second bore, said element being seated on said stud.

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