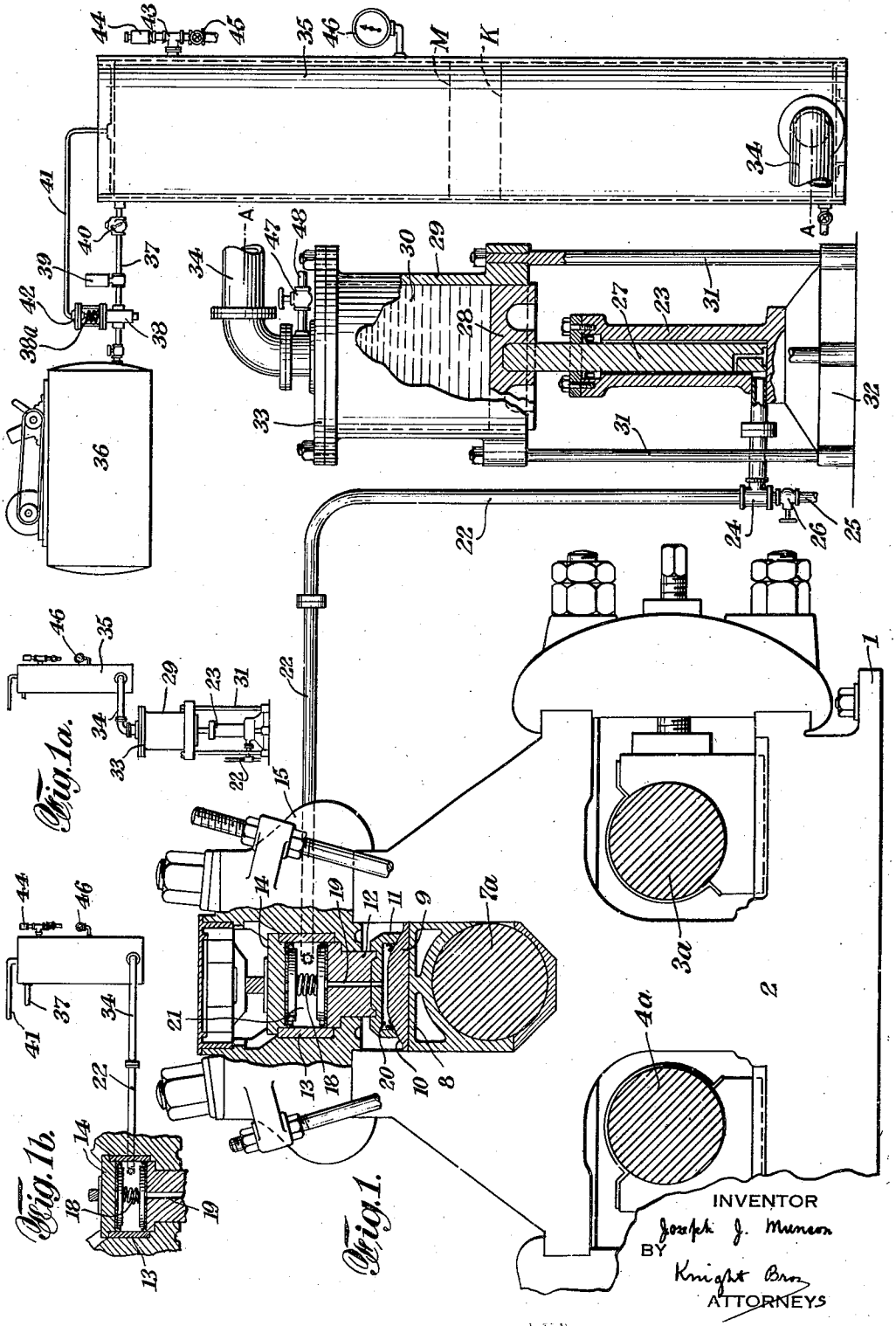
Dec. 7, 1937. J. J. MUNSON 2,101,266

ROLLING MILL

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Dec. 7, 1937. J. J. MUNSON 2,101,266

ROLLING MILL

Filed Jan. 12, 1935 3 Sheets-Sheet 2

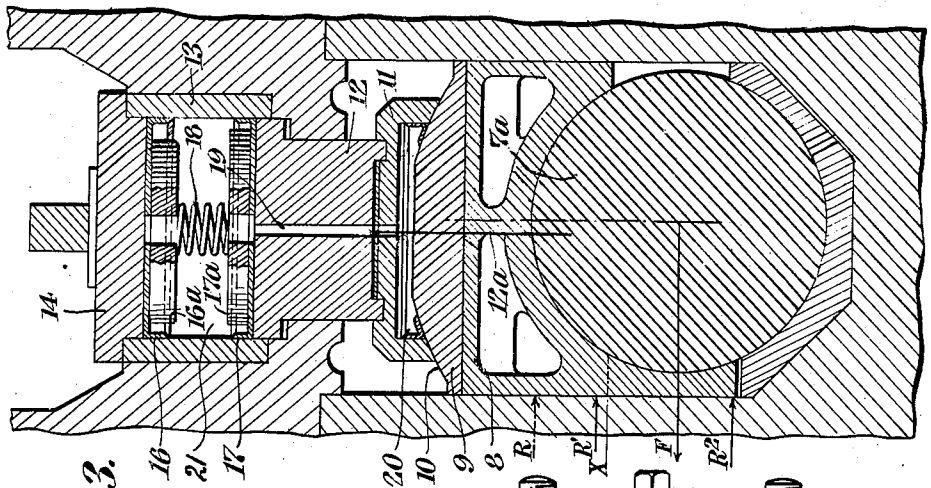


Fig. 3.

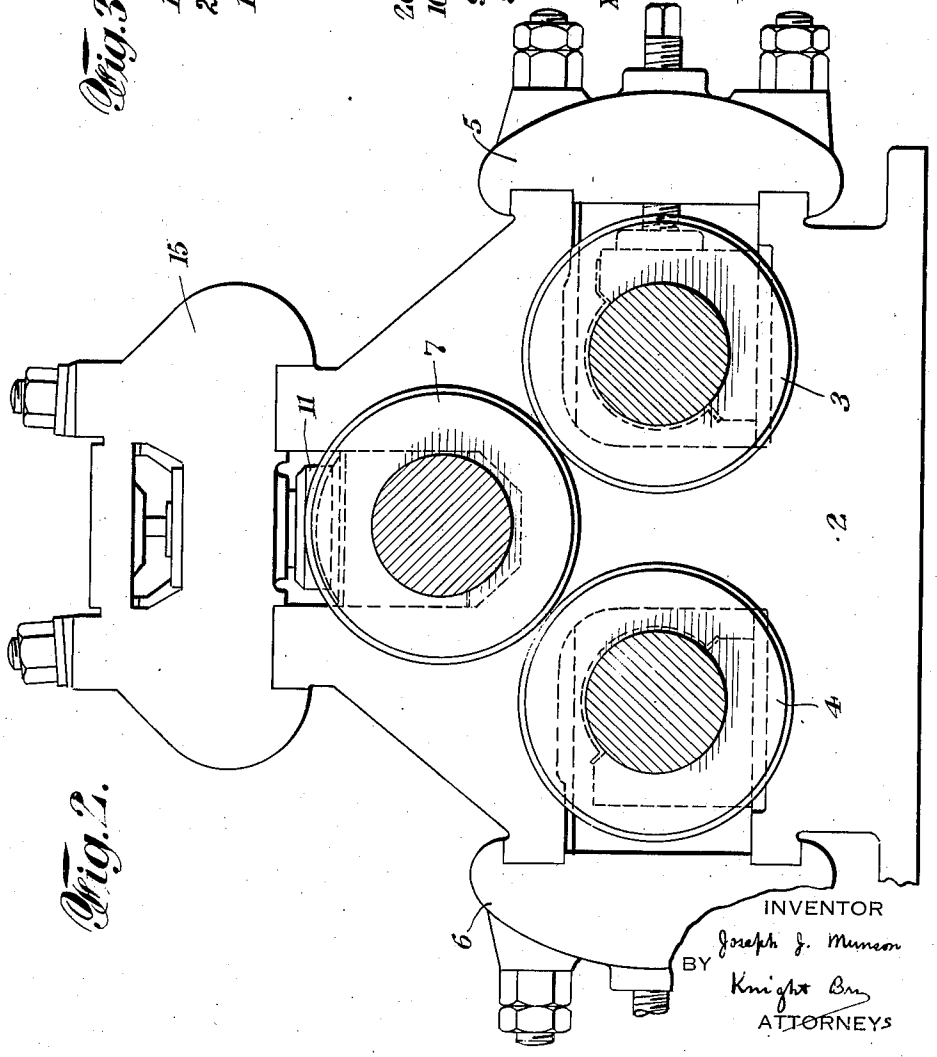


Fig. 2.

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ROLLING MILL

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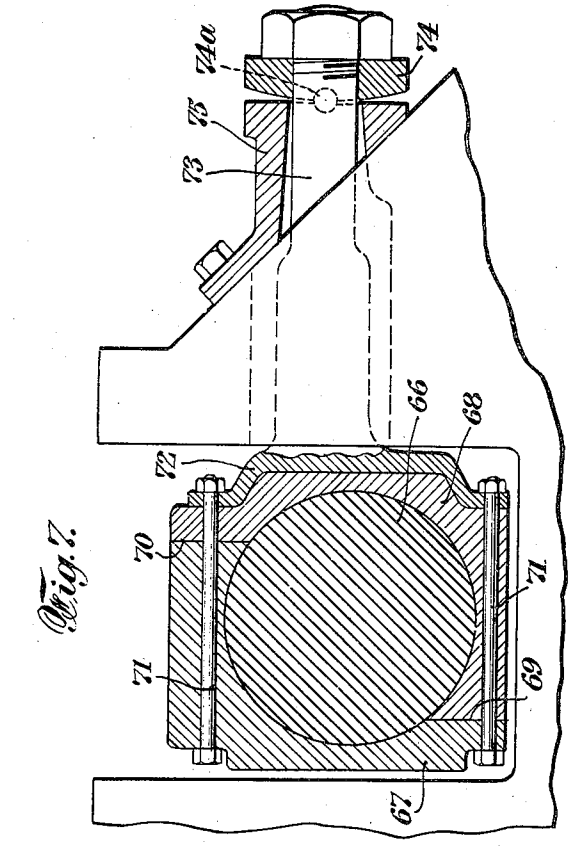


Fig. 7.

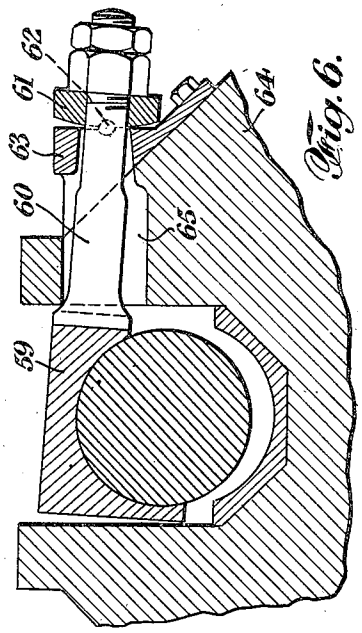


Fig. 6.

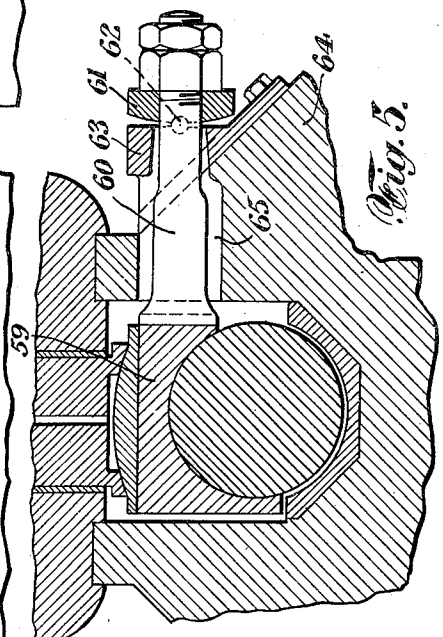


Fig. 5.

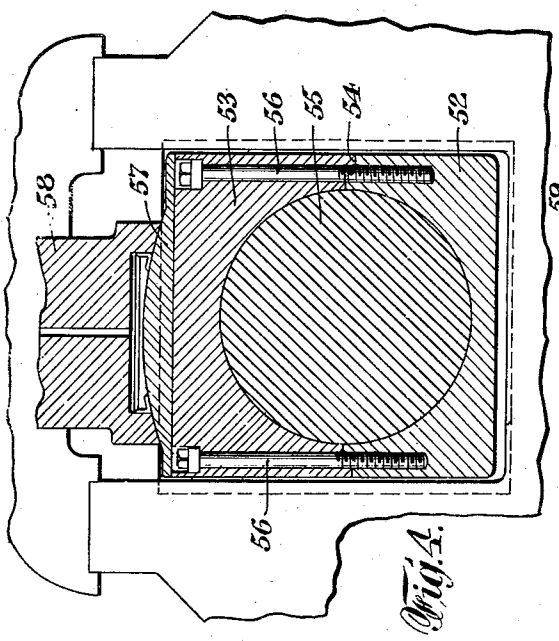


Fig. 4.

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2,101,266

ROLLING MILL

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Application January 12, 1935, Serial No. 1,457

11 Claims. (Cl. 308—9)

This invention relates more especially to that type of rolling mills in which so-called "floating pressure rolls" are employed in opposition to one or more fixed axis rolls for operating upon material of varying bulk passing through the mill. My present invention is illustrated on the accompanying drawings in its adaptation to a sugar cane mill. In mills of this character, a top pressure roll is usually suitably mounted for an upward and downward movement with respect to one or two other rolls which usually rotate about fixed axes, the bearings for said top pressure roll being constructed and arranged to permit a relative tilting of the roll's axis of rotation with respect to the fixed axis or axes of the roll or rolls cooperating therewith.

The primary object of my invention is to provide an improved construction, combination and arrangement of parts in rolling mills of the character referred to for the purpose of overcoming certain inherent drawbacks related to the transmission of high pressures to the floating roll under non-uniform and irregularly applied stresses imposed upon slidably contacting parts of rolling mills commonly employed at the present time.

Another object of my invention is to provide a hydraulic system of improved construction whereby a variable pressure load may be applied to a floating bearing without the acceleration or deceleration of heavy masses which render the operation unsteady and uncertain.

Specific features of construction and arrangement will be pointed out in the specification, reference being had to the accompanying drawings which illustrate a preferred embodiment of my invention.

In the drawings—

Figure 1 is a side elevation of one section of a sugar cane rolling mill with attached hydraulic system, parts being broken away, parts shown in section, and with the accumulator or pressure receiver detached and arranged below its true position for economizing space on the drawings.

Figure 1*a* is a side elevation on a reduced scale of the right-hand portion of Figure 1, with the accumulator shown in its true position raised above the piston chamber.

Figure 1*b* is a diagrammatic side elevation of a modified form of the hydraulic pressure connections.

Figure 2 is an enlarged side elevation of the left end of Figure 1 with the nearer roll-supporting frame removed and the roll journals shown in section.

Figure 3 is an enlarged transverse section of one of the upper roll bearings and parts contiguous thereto.

Figure 4 is a vertical transverse section on an enlarged scale of a modified form of one of the bearing members for the floating roll, contiguous portions of the frame being shown in elevation.

Figure 5 is a detail transverse section on a somewhat reduced scale of another form of pressure-equalizing bearing member.

Figure 6 is a view similar to Figure 5 showing the movable parts in changed positions.

Figure 7 is a transverse section on a somewhat larger scale of a modified form of the bearing member shown in Figures 4 and 5, portions being broken away and parts being shown in elevation.

According to present day practice, roller mills of the conventional type are subject to serious drawbacks due in large measure to excessive friction in the bearings and by reason of binding between bearings and housings as well as to the effects of inertia in heavy moving parts. These untoward conditions are especially bad on that side of the mill adjacent to the intermeshing spur gears commonly termed "crown wheels".

It is usual with roll mills of this character to employ hydraulic accumulators and due to the construction of accumulators commonly employed for loading the floating or top rolls of these mills, the free movement of these floating rolls is greatly retarded by the large mass of iron which is usually supported by a rod of small cross-section by means of which said mass of iron must be raised hydraulically by the upward displacement of the pistons through which the roll bearings are loaded. This relatively small rod which supports as much as 10,000 to 30,000 pounds of weight has a very small area compared with the total area of both pistons used to load the top roll; therefore, a very small movement of the roll causes a very much larger movement of the small rod and accumulator weights, for the purpose not only of starting the mass from rest at times but also for rapidly accelerating the movements of the several masses which must respond to upward displacements of the top roll and hence offer high resistance to the roll's accommodation to increasing thickness of the mat and also producing severe shocks when downward movements of the roll along with the falling accumulator weights are suddenly checked.

The friction between the top roll bearing and the housing frequently corresponds to a 200,000 pound horizontal pressure on the top roll journal. Where gears or crown wheels are used on both sides of the mill, that is to say, two crown wheels to each roll, the force which causes friction in the top bearing is more evenly distributed but may readily correspond to 100,000 pounds horizontal pressure on each journal of the roll in large mills. According to common practice at the present day, the bearing boxes for the journals of mill rolls are parted along a horizontal plane through the axis of the mill roll and quite commonly an open space is left between the upper and lower bearing boxes. In view of the explanation given above, it will be seen that a force of 200,000 pounds, say, operating upon the roll journals in substantially a horizontal plane in the direction in which the mat passes between the rolls, produces a tremendous turning moment on the upper bearing block and by its tendency to revolve said bearing block in a clockwise direction, produces a powerful binding action between the bottom forward and rearward upper corners of the bearing block and the front and rear guide surfaces respectively of the housing. For the purpose of overcoming these drawbacks, the present invention contemplates an improved bearing box construction whereby the forwardly directed pressure on the roll journals may be more uniformly distributed and applied over a wider area of contact while at the same time localizing the pressure in such a way as to counteract in large measure the turning moment referred to above. As an alternative device for overcoming these drawbacks, my invention contemplates a bearing box of improved construction according to which an upper portion of said bearing box or the bearing box entire may be relieved of all frictional engagement with the housings by a pivotal anchorage distant from and to the rear of the roll.

While the drawings illustrate my invention in an adaptation to a rolling mill having the same general characteristics as that shown in U. S. Patent No. 1,978,218 which was granted to Carl S. Nadler under date of October 23, 1934, I desire to state that my invention can be advantageously applied to various other types of rolling mills such, for example, as the old type pressure plate and ram or piston device for loading the roll bearings. The present invention, however, has a peculiar value in connection with the Nadler construction for securing a free and substantially unhampered movement of the top roll of a rolling mill.

Referring to Figures 1 and 2 of the drawings, one of the rolling mill sections of a sugar cane crushing and rolling mill is shown for the purpose of illustrating my invention. According to these drawings, a main bed plate 1 serves to mount axially spaced side frames or standards of such a mill, only one of said side frames being shown at 2. Journalled within said side frames, are front and rear cane crushing rolls 3 and 4 with their axes 3*a* and 4*a* of rotation arranged substantially in a common horizontal plane. Said front and rear crushing rolls are journalled in suitable bearings to be presently described, which are maintained in suitable relative positions by means of bearing caps 5 and 6 which are bolted to the oppositely arranged side frames or standards. Mounted above and substantially centrally with respect to the front and rear rolls 3 and 4, is a top floating pressure roll 7 which moves vertically and partakes of a tilting movement during the application of pressure to its bearing. As shown in Figure 3 of the drawings, the upper bearing member for each journal of the floating pressure roll 7 is constructed in the form of a bearing block 8 which carries a pressure block 9, said pressure block being provided with an upper cylindrical bearing surface 10 to adapt said pressure block to adjust itself angularly over the concave lower perimetral surface of a chambered cap 11 which is jointed to the bottom end of a hydraulic plunger 12. During the rising and falling movements of the floating pressure roll 7, the bearing members or blocks 8 are in slidable engagement with guide surfaces formed in the side frames 2 and, by reason of their construction and arrangement, operate to counterbalance the binding effects as hereinafter explained. Said plunger 12 is reciprocably mounted within a cylinder 13 and closed above by a plunger block 14 arranged below a mill housing cap 15 which is bolted to the side frame or pedestal, as shown in Figure 2 of the drawings. The hydraulic pressure chamber in cylinder 13 may be sealed above and below by leather packing cups 16 and 17 within which circular plates 16*a* and 17*a* respectively are seated. Interposed between the circular plates 16*a* and 17*a*, is a compression spring 18 for holding the cup packings in place. As explained in the above-identified U. S. Patent No. 1,978,218, the chamber within cylinder 13 may be connected to any suitable source of pressure fluid from which pressure fluid under any desired pressure may be supplied to said chamber. According to the present invention, however, I preferably employ a hydraulic system of improved construction for this purpose to be hereinafter described. Patentee Nadler, in his above-identified patent, has disclosed a rolling mill construction whereby any desired portion of the heavy pressures which are usually transmitted through contacting metal surfaces of the plunger and pressure block, may be transmitted by the direct application of hydraulic pressure to the pressure block. For this purpose, the plunger 12 may be provided with an opening or passage 19 extending therethrough to an auxiliary pressure fluid chamber 20 formed between the lower end of the plunger 12 and the top wall of the pressure block 9. By means of this device, the contacting metal surfaces may be relieved of any desired portion of the friction-creating stresses transmitted through the oscillatably contacting portions of the hydraulic plunger and pressure block. As shown in Figure 1 of the drawings, the main pressure fluid chamber 21 which communicates through the passage 19 with auxiliary pressure fluid chamber 20, is supplied with oil through a pipe 22. The pipe 22 leads from the bottom end of a hydraulic cylinder 23 through a T-fitting 24, one branch of the pipe fitting 24 being connected up to a supply pipe 25 from a hydraulic pump (not shown). A hand valve 26 may be included in the supply pipe 25 for controlling the admission of oil to the hydraulic system from the pump. A hydraulic plunger 27 which operates vertically in the cylinder 23 is surmounted by a piston 28 arranged above the upper end of cylinder 23, said piston being reciprocably mounted in a cylinder 29 of relatively larger diameter than the cylinder 23 and forming a movable wall of an oil chamber 30 which is always filled with oil. The oil cylinder 29 is supported by columns 31 from the bed plate 32 of the hydraulic cylinder 23. Leading from a cylinder head 33 on the upper end of cylinder 29, is a large pipe 34 which is connected to the

lower end of a pressure receiver 35 which extends upwardly from a level above the upper end of the cylinder 29 as shown in Figure 1a of the drawings. In Figure 1, said pressure receiver 35 is shown in a depressed position to permit its representation on an enlarged scale. In the upper right-hand portion of Figure 1 of the drawings, is shown a compressor air receiver 36 connected by a pipe 37 to the upper end of receiver 35, a pressure reduction valve 38 being interposed between compressed air receiver 36 and pressure receiver 35 for a purpose to be hereinafter explained. A safety valve 39 and a check valve 40 are preferably connected up in pipe 37, the former being constructed to limit the rise of pressure in said pipe and the latter being constructed to retain a predetermined pressure in the pressure accumulator cylinder 35. Leading from the upper end of the pressure accumulator 35 is a pipe 41 which is connected to a housing 42 for a diaphragm (not shown) by means of which the pressure reduction valve 38 is operated against the resistance offered by a compression spring 38a. Connected to the pressure accumulator 34 near the top is a T-pipe fitting 43 to one branch of which is connected a safety valve 44, a release valve 45 being connected to the other branch of said T-fitting. A pressure gage 46 may be connected to the pressure accumulator above the surface of the oil therein. For the purpose of explaining the utility of the parts described above, let it be assumed that the hydraulic plunger 27 is in its lowermost position within the cylinder 23. By opening a valve 47 which is arranged above the upper end of the oil cylinder 22, light oil is permitted to flow from any suitable source through a pipe 48 into the pipe 34 until the oil chamber 30, pipe 34, and pressure receiver 35 are filled up to a predetermined level K in said pressure receiver. Valve 47 is then closed, after which the valve 26 in the oil supply pipe 25 is opened to admit oil to the lower end of cylinder 23 for raising the hydraulic plunger 27 to a desirable operating level. By means of this movement, sufficient oil is forced from the chamber 30 to raise the oil in pressure accumulator 35 to a new level such as M. After closing the valve 26, compressed air from compressed air receiver 36 is permitted to flow past the pressure-reduction valve 38 and through the pipe 37 into the upper end of pressure accumulator 35 to any desired pressure under which the mill rolls are to be operated, this pressure being transmitted through the oil chamber 30, piston 28, and hydraulic plunger 27 which transmits the same unit pressure through pipe 22 to the main pressure chamber 21 above each of the top-roll bearings.

As cane is supplied to the mill rolls, the top mill roll is displaced upwardly and thus produces a back pressure through pipe 22 and a corresponding displacement of oil from chamber 30 and a consequent rise of oil in pressure-accumulator 35. Under these conditions, the check valve 40 prevents any displacement from the pressure accumulator 35 so that the pressure of the air is automatically raised by each upward movement of the roll journal and piston 12 corresponding thereto. Thus, with an increase in the amount of cane fed to the mill, the upward movement of the top roll produces an automatic increase of pressure applied to the cane at a rate which may be governed by regulating the amount of oil in the pressure accumulator 35. From the foregoing description of my improved form of accumulator, it will be readily understood that various drawbacks inherent in old type accumulators will be overcome in the new form described above. Thus, in accumulators of the old type, a great mass of metal must be supported on and accelerated by a hydraulic plunger of relatively small cross-section with resultant shocks, unsteady operation and high frictional resistance, whereas an accumulator of the form contemplated by the present invention operates smoothly under pressure changes which respond automatically and with an unbroken continuity to changes in load imposed upon the mill. At the same time, the total load imposed upon any top roll bearing may be changed at will by the optional change of the predetermined pressure of the compressed air in the upper end of the cylinder 35.

As stated above, in effect, there may be as much as 200,000 pounds horizontal pressure on the floating top roll journal in the direction in which the sugar cane passes through the rolling mill. As usually constructed, the top bearing box extends less than half way around the journal and has its opposite edges spaced from the horizontal axial plane of the journal. The central line of the contacting surface of this bearing block lies in the vertical axial plane of the journal. The reaction pressure on the old form of bearing block, due to its contact with its guide, may be considered as concentrated along a line midway between its top and bottom side edges as indicated by the broken line arrow R in Figure 3, the bottom edge of said old form of bearing block being indicated at X. Under these conditions, a journal pressure of 200,000 pounds in the horizontal axial plane of the journal would in conjunction with the reaction pressure R constitute a couple and produce a tremendous turning moment tending to revolve the bearing block in a clockwise direction. It is readily seen that the tendency for the bearing block to bind in its guides is tremendously increased by the turning moment referred to above. In consequence, a force of great intensity is required to make the bearing block slip in its guides.

The present invention contemplates simple and effective means for overcoming the drawbacks alluded to above, and for this purpose an improved construction and arrangement of the bearing member whereby the above described defects usually inherent in the bearings for floating mill rolls, may be eliminated. One form of my improved bearing is illustrated in Figure 3 of the drawings wherein it is shown in combination with an expedient which has been employed in attempts to overcome the great drawbacks heretofore met with in bearings of this character. In Figure 3 of the drawings, the journal pressure of 200,000 pounds in the horizontal axial plane, is represented by F. In effect, the upper bearing block which formerly terminated at the broken line X, is provided with an integrally formed extension terminating below the horizontal axial plane at a line R^2. In consequence, the pressure reaction on the bearing block which formerly was considered to be concentrated at R, may in my improved form of bearing block, be considered to be concentrated at a lower line R'. This construction therefore greatly reduces the moment arm of the clockwise turning moment and at the same time produces a counterclockwise turning moment acting on the bearing block and consisting of the force F and an additional reaction pressure R^2, the latter being directed to the lower left-hand corner or edge of the bearing block. In this way, the binding effects between the bearing block and its guides may be reduced to such a degree

that by offsetting the vertical axis 12a of the plunger 12 (see Figure 3) the proper distance from the vertical axial plane of the journal, the bearing or bearing block 8 is readily brought into equilibrium with respect to the turning moments referred to above in such a way as to uniformly distribute the pressure over the contacting surface of the bearing block 8 with the vertical guides within which it slides. In consequence, there will be a large reduction in friction as well as a reduction in the amount of pressure required for overcoming said friction during the up and down movements of the top bearing block.

Referring now to Figure 4 of the drawings which shows another embodiment of this form of my invention, the bearing member may be constructed as a closed box bearing comprising a bottom bearing block 52 jointed to an upper bearing block 53 at 54 and completely housing the journal 55 of a floating mill roll, said bearing blocks being rigidly united by threaded bolts 56 and slidably mounted in the frame guides as indicated. A pressure block 57 may be interposed between the bearing block and the lower end of a hydraulic plunger 58 of the Nadler type.

According to the embodiment of my invention shown in Figures 5 and 6 of the drawings, sliding friction as well as binding between bearings and guides may be entirely eliminated by constructing the bearing member to comprise an upper bearing block 59 of suitable form and size for unencumbered vertical movements and a rearwardly presented rocker arm 60 which carries a rocker 61 for oscillatably engaging a frame portion 63 in the form of a bracket mounted on the side frame 64. A suitable opening 65 in the side frame permits the rocker arm 60 to swing freely and provides for an untrammeled up and down movement of the bearing block 59, the raised position of said bearing block 59 being shown in Figure 6. Suitable means for preventing a downward displacement of rocker 61 in the absence of pressure thereon, may be provided in the form of a pin 62 which interengages pivotally with the rocker 61 and frame portion 63 without interfering with a free oscillatory movement of one upon the other. It will be understood that this embodiment of my invention may be employed with or without the expedient of offsetting the center line of hydraulic plunger 12 with respect to the vertical axial plane of the journal in the manner shown in Figures 3 and 4.

As shown in Figure 7 of the drawings, the journal 66 of the floating roll may be completely boxed in a bearing member comprising bearing sections 67 and 68 jointed along planes 69 and 70 offset from the vertical axial plane of journal 66 and secured together by bolts 71 which also secure a socket plate 72 thereto. Said socket plate may be provided with a rocker arm 73 having a rocker 74 in oscillatable engagement with a flat bearing surface on the outer end of a bracket 75, which forms a portion of the side frame, a retaining pin 74a being arranged to pivotally interengage between rocker 74 and bracket 75 for preventing a downward displacement of the former when no pressure is brought to bear thereon.

Referring now to Figure 1b of the drawings, my invention also contemplates a hydraulic press of the character shown in Figure 1 with the pipe 34 leading from the oil compartment of the compressed air hydraulic accumulator 35 connected directly to the pipe 22 leading into the hydraulic pressure chamber of the hydraulic press. In places where high air pressures are available, an assembly of this character provides an improved system in which the regulation of applied pressures is more directly and rapidly accomplished and wherein changes in pressure in one part of the system are instantaneously transmitted to other parts of said system.

I claim:—

1. In a device of the character described, the combination with a fixed frame provided with spaced vertical guide surfaces, of a mill roll rotatable about a tiltable axis, a bearing block rotatably engaging said mill roll and slidably engaging said spaced parallel guide surfaces, said mill roll being in journalling rotatable engagement with said bearing block and subject to a lateral journal pressure substantially normal to one of the guide surfaces, and means operating downwardly on said bearing block between said guide surfaces for counteracting the upward tilting movements of said mill roll, said bearing block being provided on the side exposed to said journal pressure with a downward extension in slidable engagement with said one of the guide surfaces above and below the axis of said mill roll.

2. In a device of the character described, the combination with a fixed frame provided with spaced vertical guide surfaces parallel to each other, of a mill roll rotatable about a tiltable axis, a bearing block slidably engaging said spaced parallel guide surfaces, said mill roll being in rotatable engagement with said bearing block and subjecting said block to upward and lateral stresses, and means operating downwardly on said bearing block between said guide surfaces for counteracting the upward tilting movements of said mill roll, said bearing block being provided on the side of lateral stress with a downward extension appreciably below the roll axis and being arranged in slidable engagement with one of said vertical guide surfaces above and below the axis of said mill roll for transmitting prevailing lateral pressures exerted by said mill roll in normal direction to said last-mentioned guide surface.

3. In a device of the character described, the combination with a fixed frame provided with spaced vertical guide surfaces parallel to each other, of a mill roll rotatable about a tiltable axis, a bearing block slidably engaging said spaced parallel guide surfaces, one end of said mill roll being in journalling rotatable engagement with said bearing block and subject to a lateral journal pressure substantially normal to one of said guide surfaces, and means operating downwardly on said bearing block between said guide surfaces for counteracting the upward tilting movements of said mill roll, said means including a pressure block in oscillatable engagement with said bearing block, said bearing block being provided on the side of said journal pressure with a downward extension appreciably below the roll axis and arranged in slidable engagement with said one of the guide surfaces above and below the axis of said mill roll for counteracting the second-mentioned pressure above and below the axis of said mill roll.

4. In a device of the character described, the combination with a floating mill roll rotatable about an axis which is tiltable in a vertical plane and subject to lateral pressure, of a bearing box and a floating bearing in said box for rotatably and floatingly supporting said roll, means for applying pressure to said bearing for counteracting the vertical axis-tilting movements of said

mill roll, and a radial arm connected at one end to said bearing and having its other end anchored at a fixed point to support said roll against lateral movements due to said lateral pressure.

5. In a device of the character described, the combination with a fixed frame, of a floating mill roll rotatable about an axis which is tiltable in a vertical plane and subject to lateral pressure, fixed bearing boxes in said frame and floating bearings in said boxes for rotatably and floatingly supporting said roll and arranged to partake of the axis-tilting movements of said roll, means for applying downward pressure to each of said bearings, and laterally-spaced arms pivotally anchored in said fixed frame and connected to said bearings respectively, said bearings being constructed and arranged to rotatably engage the mill roll journal above and below its axis in all positions of said mill roll to support said roll against lateral movements due to said lateral pressure.

6. In a device of the character described, the combination with laterally spaced side frames, of a floating mill roll rotatable about an axis which is tiltable in a vertical plane and subject to lateral pressure, said mill roll being provided with axially spaced journals movable vertically in said side frames, bearing blocks constructed and arranged to bear downwardly on said journals respectively in a direction to counteract the axis-tilting movements of said roll, means for applying a downward pressure to each of said bearing blocks, each of said bearing blocks being provided with a bearing surface contacting with one of said journals over an arc extending around and below the axis of rotation of said floating roll, and means for movably connecting said journal to the side frame corresponding thereto, said connecting means comprising a shank having one end trunnioned in said side frame, said journal being mounted on the other end of said shank to support said roll against lateral movements due to said lateral pressure.

7. In a device of the character described, the combination with a floating mill roll rotatable about an axis which is tiltable in a vertical plane, and subject to lateral pressure, journals for said roll and bearing blocks constructed and arranged to bear on said journals and to partake of the axis-tilting movements of said roll, means for applying pressure to each of said bearing blocks, said pressure applying means including a pressure block oscillatably contacting with each of said bearing blocks in a surface formed and arranged to accommodate the axis-tilting movements of said floating roll, and means for swingingly supporting said journal from a point distant from and laterally of the axis of said mill roll, said journal being constructed and arranged to rotatably engage the mill roll journal above and below its axis in all positions of said mill roll to support said roll against lateral movements due to said lateral pressure.

8. In a sugar cane mill, the combination with a fixed frame, of a mill roll journalled about a fixed axis in said frame, a floating mill roll rotatable about an axis displaceable automatically towards and away from the fixed axis mill roll under changing thicknesses of the mat passing between said rolls while the mill is running, a rigid member movably interposed between the two sides of said fixed frame and one end of the floating mill roll, said member being constructed and arranged to transmit pressure from a load-applying means to said roll end and to transmit the resultant stress due to said load and the reactionary pressure of the passing mat on said roll to one of the sides of the fixed frame, said member being in normal abutment with the pressure receiving side of said fixed frame along a movable line of contact extending in a plane normal to the frame sides and substantially including the axis of said floating mill roll end said member being in rotary bearing contact with said roll end on opposite sides of said normal plane.

9. In a roll mill of the character described, the combination with a fixed frame, of a pair of rolls journalled about fixed parallel axes in said frame, a third roll rotatable about an axis displaceable towards and away from the common axial plane of the fixed axis rolls under changing thicknesses of the passing mat while the mill is running, a combined guide and bearing for constraining one end of the third roll to movement in a predetermined path, said guide and bearing being in normal sliding bearing engagement with said fixed frame, and said bearing having an upper brass extending on one side of said frame an appreciable distance below the axis of the third roll end, for transmitting lateral pressure components, occurring on that side at right angles to the direction of roll displacement, to said fixed frame in normal and displaced positions of said roll end.

10. In a sugar cane mill, the combination with a fixed frame, of a roll journalled about a fixed axis in said frame, a second roll rotatable about an axis displaceable automatically towards and away from the first-mentioned roll under changing thicknesses of the mat passing between said rolls while the mill is running, a combined guide and bearing for constraining one end of the second roll to movement in a predetermined path, said bearing and guide being in slidable contact with said fixed frame to transmit to said frame lateral pressures resulting from forces displacing said second roll end in said path and directed in a plane extending normally to the frame sides and substantially including the axis of said end of the second roll, said guide and bearing being on the lateral pressure side of the roll end in rotary contact with said roll end on opposite sides of said plane, to transmit said lateral pressures to said frame in every position of the second roll in said predetermined path.

11. A journal for a floating mill roll, having a vertical and a lateral stress component, comprising a fixed journal box, a lower brass fixed in said box and an upper brass disposed to move vertically to follow the normal upward movements of said roll, said upper brass extending on the side at which the lateral roll stress is exerted an appreciable distance below the axis of the roll, means for supporting said upper brass against said lateral stresses, and movable pressure means vertically applied against said brass for counteracting the upward stresses of said roll to permit a limited vertical movement of said roll at a desired downward roll pressure.

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