Oct. 2, 1934. H. E. COX ET AL 1,975,389

REFINING MILL OF THE ROLL AND ADJUSTABLE BREAST BAR TYPE

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Fig. 1.

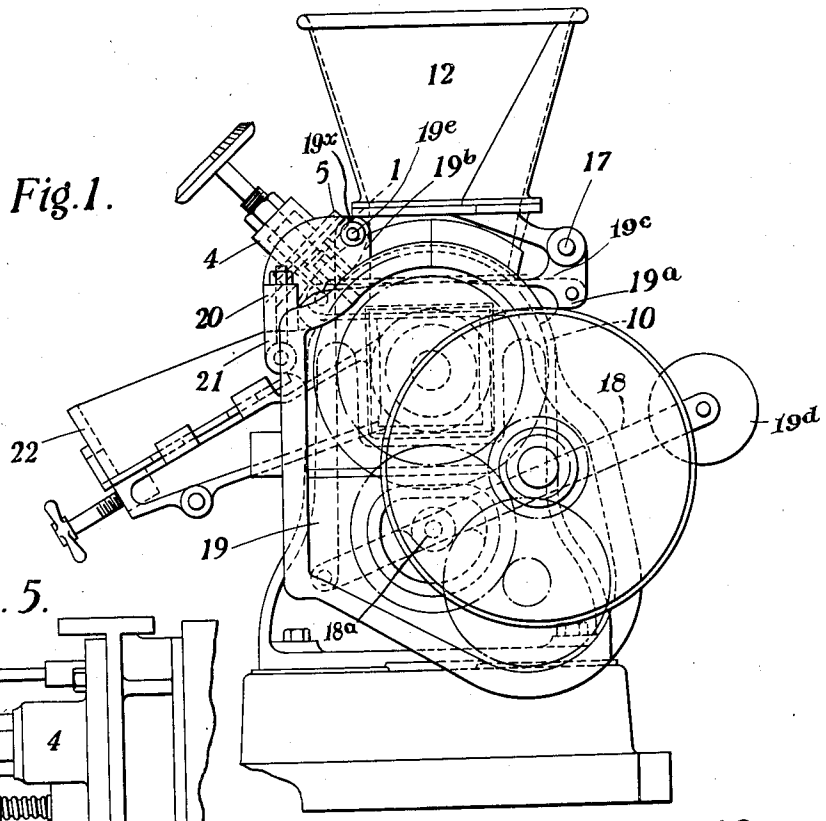


Fig. 5.

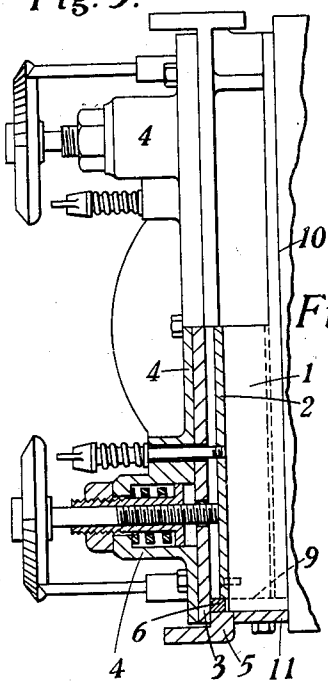


Fig. 9.

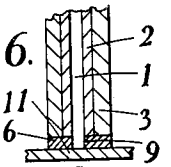


Fig. 12.

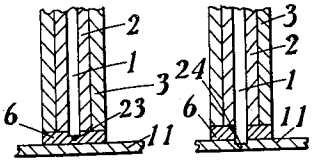


Fig. 6.

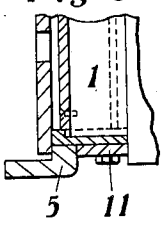


Fig. 8.

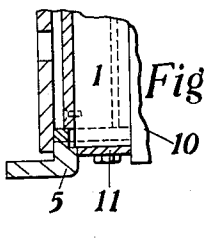


Fig. 11.

Fig. 7.

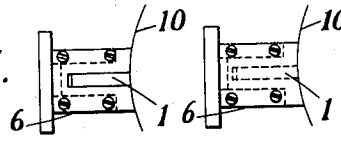


Fig. 10.

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REFINING MILL OF THE ROLL AND ADJUSTABLE BREAST BAR TYPE

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Fig. 2.

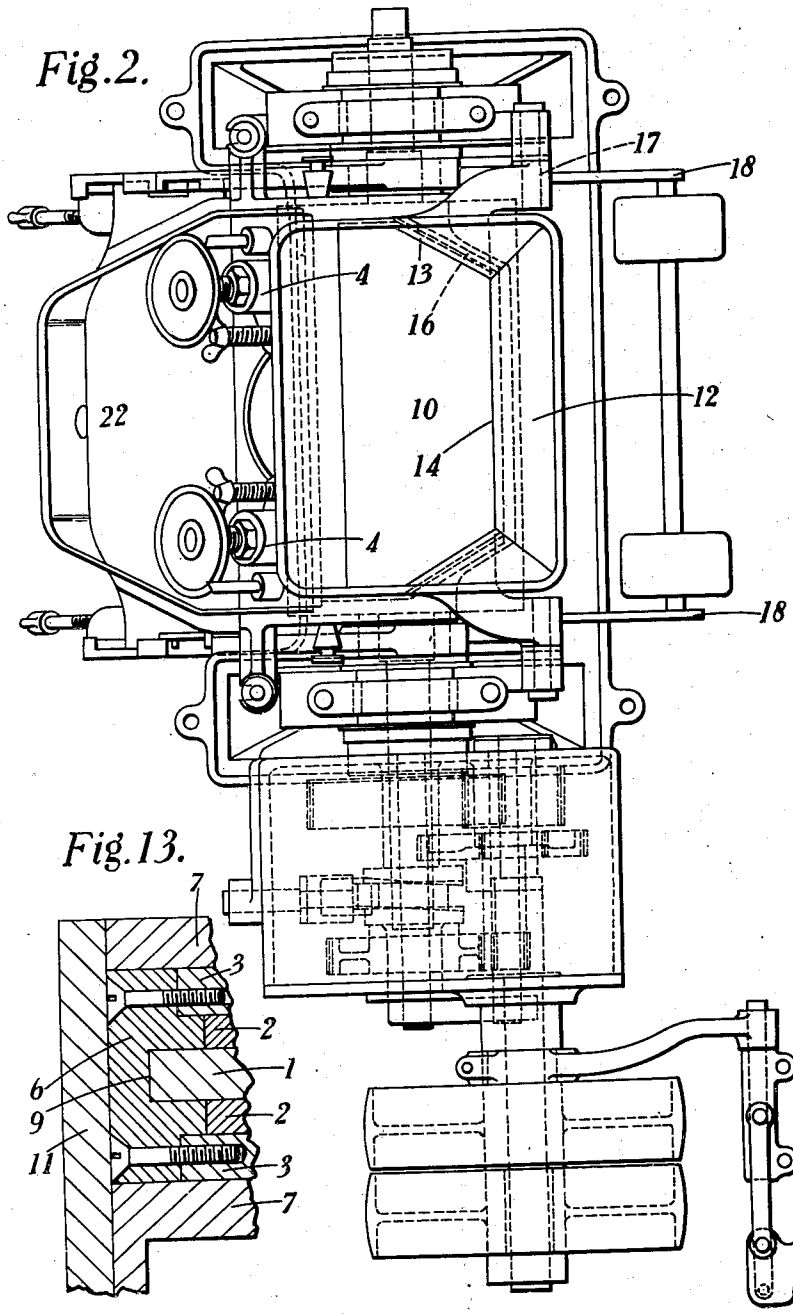


Fig. 13.

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REFINING MILL OF THE ROLL AND ADJUSTABLE BREAST BAR TYPE

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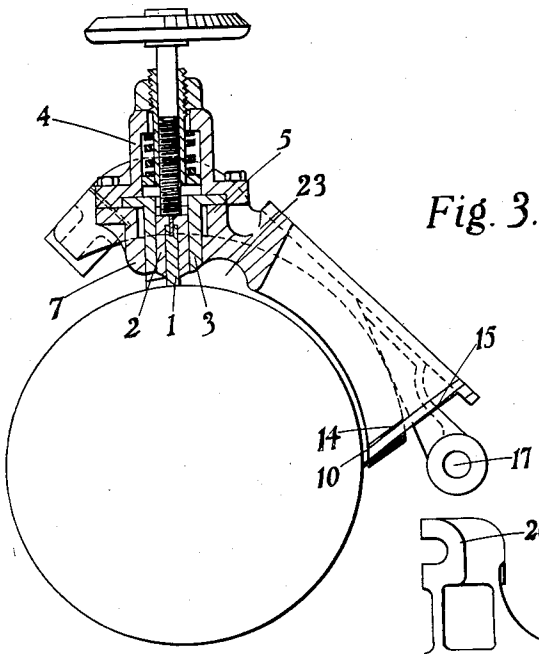


Fig. 3.

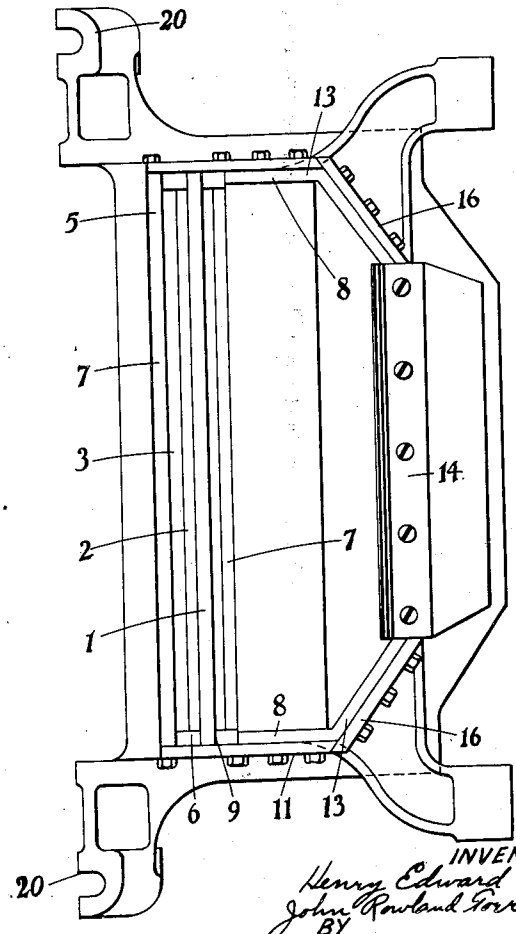


Fig. 4.

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Patented Oct. 2, 1934 1,975,389

UNITED STATES PATENT OFFICE

1,975,389

REFINING MILL OF THE ROLL AND ADJUSTABLE BREAST BAR TYPE

Henry Edward Cox, Bristol, and John Rowland Torrance, Bath, England

Application January 22, 1932, Serial No. 588,067
In Great Britain January 31, 1931

11 Claims. (Cl. 83—22)

The present invention relates to improvements in or relating to refining mills of the roll and adjustable breast bar type particularly for treating fluids or semi-fluids such as paint, enamel, ink, soap, chocolate, and the like.

Hitherto in mills of this type, one usual method of housing the bar is by inserting this from the underside of the saddle into a slot provided to receive it; another method is to insert the bar from the front into a recess in the saddle casting and to secure it in position by means of tensioned arms or fingers pressing against the bar.

These methods are open to objections, as in the former case the bar has to be inserted or withdrawn from the underside for cleaning or inspection, etc., and it is difficult to maintain a proper seal at the ends of the bar owing to the slot being cut through to the ends to facilitate machining of the slot.

End sealing of the bar has been attempted by a plate screwed to the end of the saddle, but as the bar must be free to rise and fall in the slot in the saddle for the purpose of adjustment, an effective end seal is difficult to obtain and in consequence a certain amount of crude material is permitted to pass between the end of the bar and the plate.

When the bar is inserted from the front, these defects are further aggravated as the pressure fingers allow the bar to tilt off the inside face of the recess, thus militating against fine finish of the material and further increasing leakage of crude material at the ends of the bar.

An object of the present invention is to obviate these disadvantages.

By the present invention there is provided a roll and breast mill, having a breast bar which for adjustment with respect to the roll and/or for yielding working co-operation therewith, is guided in machined or slotted slide-guides which seal the bar fluid tightly or substantially so both longitudinally and endwise thereof.

By the present invention the bar and housings can be withdrawn from the top of the saddle.

In order that the invention may be the more readily understood, reference is made to the accompanying drawings, in which:—

Fig. 1 is a side elevation of a mill incorporating the present improvements.

Fig. 2 is a plan view thereof.

Fig. 3 is a part sectional elevation of the breast bar and its mounting.

Fig. 4 is an under plan view thereof.

Fig. 5 is a longitudinal sectional plan view of the breast bar and mounting, and Figs. 6 and 7 show the end seals therefor.

Figs. 8, 9, 10 are similar views to Figs. 5 to 7 of a modified end seal and Figs. 11 and 12 views of a further modification.

Fig. 13 is a sectional part longitudinal plan of a further modification of the end seal.

Referring to the drawings the breast bar 1 which may be conveniently and advantageously of flat rectangular section is fixed in a channel section sheath 2 of brass or other suitable metal or alloy which in turn is mounted with a machined sliding fit in a similarly formed guide 3 that is attached to the saddle cap plate 4 and machined to fluid tightly fit the saddle 5 on longitudinally machined surfaces, thus providing an effective longitudinal seal to the bar and its housing.

The saddle 5 is designed so as to be open at the top but closed across the ends to a point at which the machined longitudinal slide faces commence, the machining of these faces making longitudinal seal for the downwardly projecting sides of the guide 3 of the cap plate 4 and conducing to keeping this in an effective rigid or stable position.

Sealing plates 6 of bronze or other suitable metal or alloy are secured against the ends of the downwardly projecting sides of the guide 3 of the cap plate 4 so as to give this the form of a box-like structure in which the end plates are figured to follow the contour of the roll and form the first end seals, and which is located between the side and end walls 7, 8 of the saddle 5.

The bar sheath 2 is a sliding fit both along its longitudinal and end faces in this box 3, 6, the breast bar 1 projecting at its ends beyond the sheath 2 and the projecting ends fitting into slots 9 in the sealing plates 6 so that any fluid which may get underneath the end sealing plates, 6, within the action of the projecting ends of the breast bar 1 is refined in its passage thereunder. The breast bar 1 is free to slide up and down fluid tightly in the slots 9 in the end sealing plates for the purpose of adjustment.

In the passage of the fluid under treatment beneath the breast bar 1, the material tends to spread along the roll 10, so that the end sealing becomes important, otherwise the material will run down the sides of the roll and a dirty working machine results.

With the aim of further improving the end sealing of the breast bar 1 and more effectively keeping the paint to the desired path another bronze or other suitable end sealing plate 11 is preferably mounted outside each slotted sealing

plate 6 and in close face contact therewith and fitted to the contour of the roll 10 so as to provide a further seal. These further plates 11 may be continued around the roll and hopper base and arranged so as to form the sealing cheeks of the hopper 12.

The end of the breast bar may pass into the sealing plate 6 and lie flush with the outer face thereof as shown in Figs. 5 to 7, or it may fit into a recess or groove 23 in the sealing plate as shown in Figs. 8 to 10, or it may pass through the sealing plate and fit into a recess or groove 24 in the outer sealing plate 11 as shown in Figs. 11 and 12.

The hopper base ends 13 from about the centre of the roll to the back 14 of the base 15 may be splayed, in which case the hopper-sealing plates 11 are preferably divided at the longitudinal centre line or thereabouts of the hopper 12, and the plates 16 forming the splayed cheek seals are preferably separate from the plates 11 which make the seal to the saddle and thence up to the longitudinal centre line or thereabouts of the hopper 12.

In this way the wear is more evenly distributed over the roll and straight radial grooves or scorings are prevented from being cut into the roll, such as takes place when a straight cheek plate is used. The sealing plates for the hopper sides may be slotted vertically on the face for the fixing screws, so that when necessary the plates can be let down to the roll 10 for maintaining the seal.

As shown in Fig. 13 the length of the end sealing of the ends of the bar 1 may be further increased if desired by shortening the bar-sheath 2 in relation to the sides of the guides 3 of the cap plate 4 which houses the sheath 2, and correspondingly stepping the end sealing plates 6 to render the passage of coarse material past the end of the bar 1 still more difficult.

The foregoing arrangements can be so embodied that it is only necessary to remove the screws or other means provided for securing the saddle cap plate 4 to the saddle 5, to permit the cap plate 4, guide 3, sheath 2 and bar 1 to be lifted out, i. e. withdrawn from the top of the saddle, leaving the hopper base 15, saddle 5, and outer sealing plates 11 in position.

The saddle 5, as shown, may be of the hinged type, with the hinge 17 conveniently on the cap of the frame so as to enable the saddle and the cap to be machined in a suitable jig in pairs, for the purpose of ensuring that the hinge holes shall be in good working alignment. The main side frames may be similarly machined in pairs to ensure perfect alignment of the bearing slides and other levels and also of the stay bar lug holes. The hinged saddle 5 may be raised and lowered about its hinges by a system of levers, etc., 18, 19, 19*c* and 19*b*. The moving parts are balanced by the weights 19*d* at the ends of the levers 18 which are pivoted at 18*a*. The top links 19*b* which are connected to the levers 19*c* engage with trunnion pins 19*e* on the saddle. On moving down the weighted ends of the levers 18, the links 19 are moved upwardly and these swing upwardly the levers 19*c* about their pivots 19*a*, by which movement the links 19*b* are raised to swing the saddle 5 about its hinges. It will be noted that the links 19*b* are slotted at 19*x* through the top so that the saddle and hopper can be raised independently of the lever action. The saddle 5 may be conveniently secured to the main side frames at the front by means of slotted lugs 20 cast on the saddle 5 and machined to seat on suitable lugs 21 cast on the side frames and accurately machined.

The hopper 12 may be secured to the saddle hopper base 15 by screws, hinged bolts, or any suitable method, and may slide on and off the hopper base 15 on machined slides.

The roll shaft may be journalled in suitable bearings which may be of the plain bush type or self-oiling, or ball or roller bearings, etc., housed in block housings machined to fit the slides in the frames and adjustable up and down by means of suitable adjustments to secure alignment with the breast bar, etc.

As shown the delivery tray 22 conveniently and advantageously may be of the screw and spring pad adjustment sliding type, operating in slides machined in the supporting arms which are hinged on the necks of the bearings to permit of angular adjustment of the tray with respect to the roll.

A suitable lateral motion is preferably imparted to the roll and a gear drive may be provided from the counter-shaft carried by the side frame and upon which the driving pulleys are provided.

The method of yieldingly opposing recession of the breast bar and roll and applying the working pressure by an adjustable spring action is preferably that described and claimed in our concurrent application, Serial No. 588,066, filed January 22, 1932.

In a machine substantially as above described the frames, bearings, roll and breast bar can be readily correctly aligned to one another. Also the machine is easy to assemble or disassemble, simple to operate and clean, and dependably operatable for high grade work.

As shown in Fig. 3 an expanded or recessed throat 23 may be formed at the base of the hopper to cause the material to partake of a spinning action and prevent or minimize choking of the grinding nip by the coarser material or dross.

It is to be understood that the term "fluid tightly" used in the claims includes substantially fluid-tightly.

What we claim is:—

1. In a roll and breast mill having a breast bar which is adjustable with respect to the roll for the purposes described, the combination with the breast bar of a slide-guide in which the bar slides and grooved or slotted end slide-guides in which the ends of said bar slide, the bar being fluid tightly housed both longitudinally and endwise thereof.

2. In a roll and breast mill having a breast bar which is adjustable with respect to the roll for the purposes described, the combination with the breast bar of a slide guide, grooved or slotted end slide-guides in which the ends of said bar slide, and further end sealing plates mounted outside the said end grooved or slotted slide-guides, the bar being fluid tightly housed both longitudinally and endwise thereof.

3. In a roll and breast mill according to claim 2, in which the further end sealing plates also form the sealing cheeks of the hopper.

4. A roll and breast mill having a breast bar which is adjustable with respect to the roll, having in combination, means for sealing the breast bar longitudinally, grooved or slotted end sealing plates for said bar in which the ends of said bar slide, and further sealing plates covering said end sealing plates, said further sealing plates being grooved to receive the ends of the breast bar.

5. In a roll and breast mill having a breast bar which is adjustable with respect to the roll, the

combination with a saddle open at the top of a longitudinal guide and end guides forming together a box like structure, a breast bar housed within said structure, so that the bar is fluid tightly sealed both longitudinally and end-wise thereof, the bar and its housings being withdrawn from the top of the saddle.

6. In a roll and breast mill having a breast bar which is adjustable with respect to the roll, the combination of a saddle open at the top, a longitudinal side guide and end guides forming together a box like structure, a sheath mounted with a sliding fit in said structure, and a breast bar in the sheath, the ends of said bar sliding in said end guides, so that the bar is fluid tightly sealed both longitudinally and end-wise thereof, the bar and its housings being withdrawn from the top of the saddle.

7. In a roll and breast mill according to claim 6, the addition of further end sealing plates mounted outside the said end slide-guides.

8. A roll and breast mill, comprising in combination, a roll, a hinged saddle, a guide fluid tightly fitting the saddle, a sheath mounted with a sliding fit in said guide and a breast bar therein, whereby an effective longitudinal seal to the bar and its housing is provided, and grooved or slotted end slide-guides in which the ends of the bar slide which end slide-guides seal the bar fluid tightly endwise thereof.

9. A roll and breast mill, comprising in combination, a roll, a saddle, a guide fluid tightly fitting the saddle, a sheath mounted with a sliding fit in said guide, a breast bar therein, whereby an effective longitudinal seal to the bar and its housing is provided, grooved or slotted end slide-guides in which the ends of the bar slide, and further end sealing plates mounted outside the said end slide guides, the ends of the breast bar passing into the slide-guides and lying flush with the outer faces thereof.

10. A roll and breast mill, comprising in combination, a roll, a saddle, a guide fluid tightly fitting the saddle, a sheath mounted with a sliding fit in said guide and a breast bar therein, whereby an effective longitudinal seal to the bar and its housing is provided, end sealing grooved or slotted slide-guides in which the ends of the bar slide, and further end sealing plates mounted outside the said end slide-guides, the ends of the breast bar passing through the slide-guides and fitting into recesses in the further end sealing plates.

11. A roll and breast mill, comprising in combination, a roll, a saddle hinged to the frame caps, means for raising and lowering the same, a guide attached to the saddle cap plate and fluid tightly fitting the saddle, a sheath mounted with a sliding fit in said guide and a breast bar therein, whereby an effective longitudinal seal to the bar and its housing is provided, and grooved or slotted end slide guides in which the ends of the bar slide and which seal the bar fluid tightly endwise thereof.

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