May 12, 1953 A. A. TUNLEY 2,638,388

ADJUSTMENT MEANS FOR THE ROLLS OF MULTIROLL CHOCOLATE AND LIKE REFINING MACHINES

Filed March 25, 1950 3 Sheets-Sheet 1

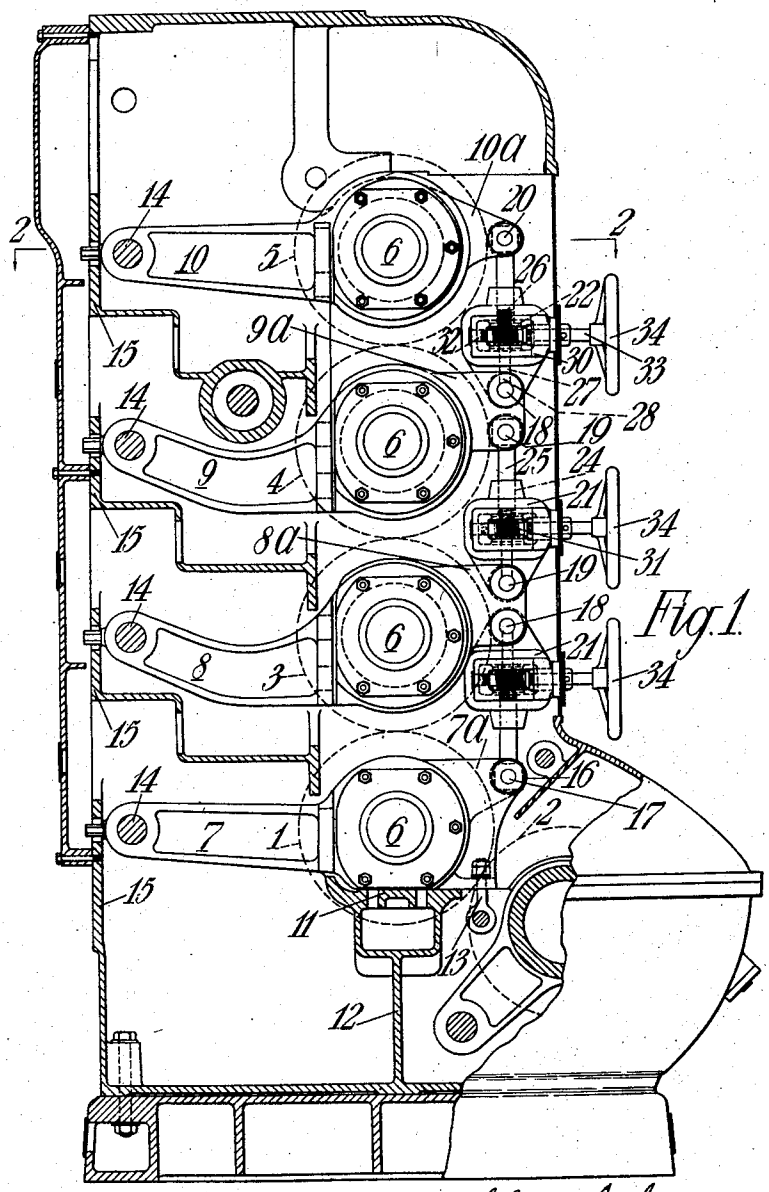


Fig. 1.

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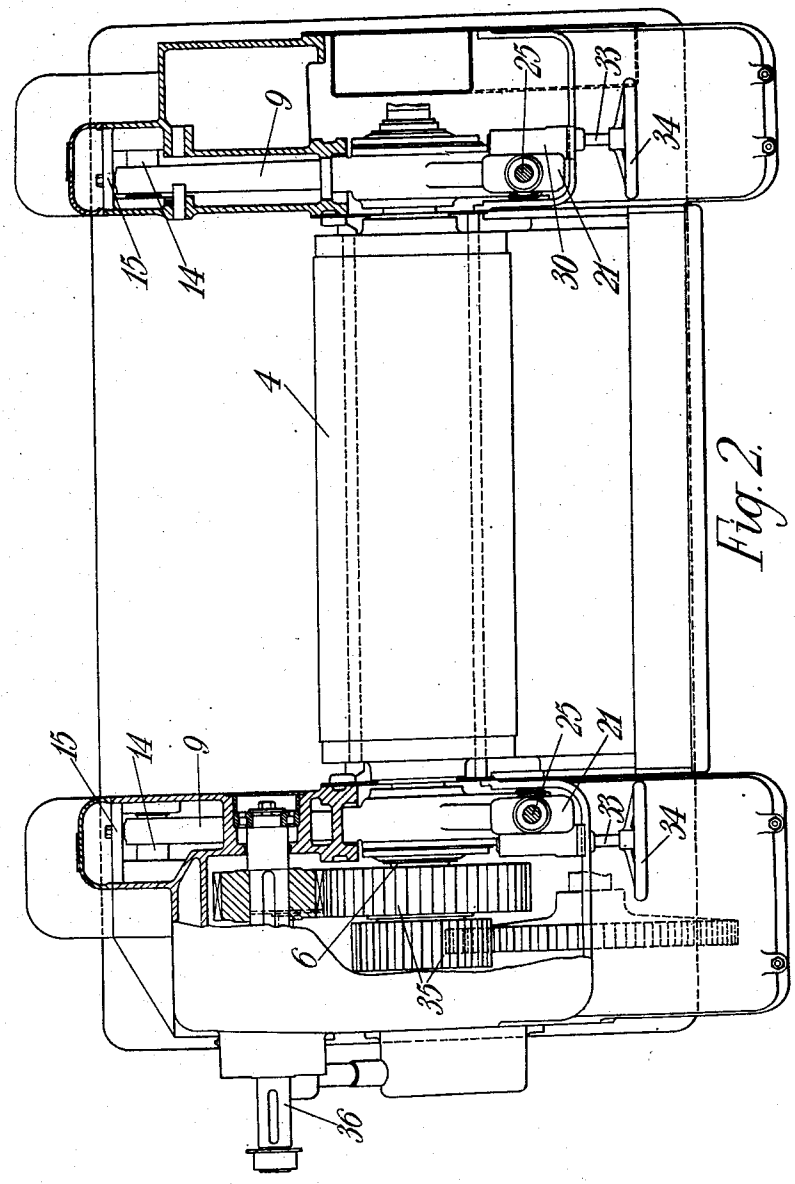


Fig. 2.

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Filed March 25, 1950 3 Sheets-Sheet 3

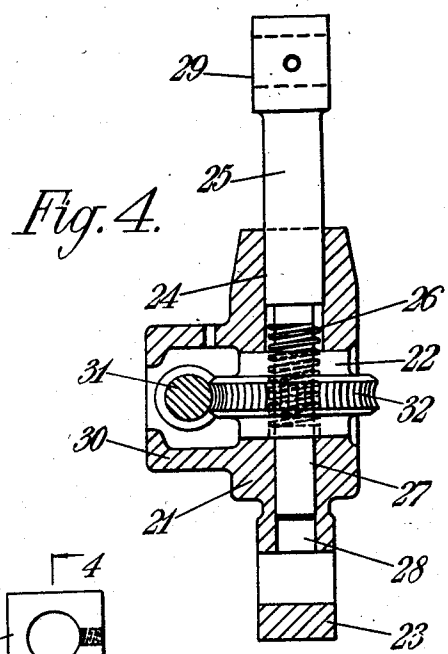


Fig. 4.

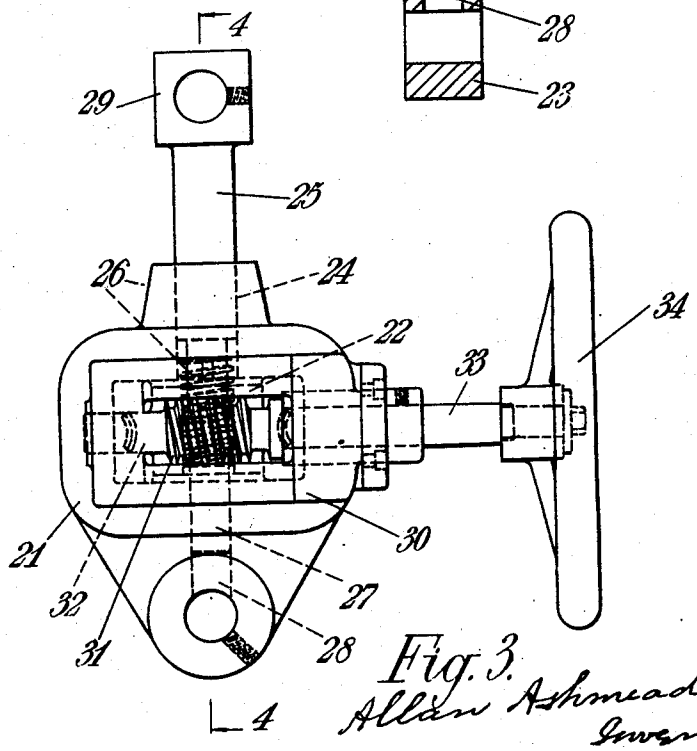


Fig. 3.

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UNITED STATES PATENT OFFICE

2,638,388

ADJUSTMENT MEANS FOR THE ROLLS OF MULTIROLL CHOCOLATE AND LIKE REFINING MACHINES

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Application March 25, 1950, Serial No. 151,877
In Great Britain April 11, 1949

2 Claims. (Cl. 308—61)

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This invention relates to multiroll (such as five roll) chocolate refining machines of the kind wherein a fixed abutment (which may be the trunnion housing of one roll) is provided and between the abutment and the next refiner roll and between each succeeding pair of rolls means are provided to vary the distances between the axes of adjacent rolls, the arrangement being such that when an adjustment is made all the rolls on the side of the adjusted roll remote from the abutment or abutment roll are bodily displaced while maintaining their respective clearances or nip intact. A five-roll refiner having the above characteristics is the subject of British Patent No. 417,723.

The aim of the present invention is to provide improved means for adjusting the refiner rolls or to provide alternative adjustment means possessing certain advantages as compared with those described in the above patent specification, whereby positive displacements for increasing and decreasing the roll nip may be effected in contradistinction to the provision of a positive displacement in one direction against the non-positive action of a return spring and/or gravity loading.

The available space in which the adjustment members effecting the roll displacements according to the above patent (i. e. between the roll trunnions) is somewhat limited, and a further aim of the invention is to provide an arrangement which accords increased accommodation for the location of the said adjustment means.

The invention consists in providing positively operating adjustment means comprising screw-threaded spindle means engaging a corresponding screwthreaded nut or member and worm and worm wheel gear for effecting relative rotation between the nut and the spindle means to secure the positive displacement of the roll trunnions in each direction.

The invention also consists in mounting the refiner roll trunnions in levers of the second order with the fulcrum pivot to the rear and adjustment means located between the front ends of the levers.

In the accompanying drawings:

Figure 1 is an end sectional view of a refiner showing the lever mounting and adjustment means.

Figure 2 is a sectional plan view at 2—2 of Figure 1.

Figure 3 is an elevation of one of the adjustable linkage means.

Figure 4 is a sectional elevation on 4—4 of Figure 3.

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In carrying the invention into effect according to one mode, the lowermost refining roll 1 (which may be styled the second roll) to which the feed roll 2 (first roll) delivers and each of the three superposed rolls 3, 4 and 5 have their trunnions 6 mounted in bearings housed in levers 7, 8, 9 and 10 of the second order. The levers 7 of this second roll, however, rest on a fixed part 11 of the casing or base 12 of the machine and are bolted down by bolts 13 so that such may act as a datum abutment for the adjustments. The portions 7a, 8a, 9a, 10a of the levers 7, 8, 9, 10 extending forwardly of the plane containing the roll axes are adapted to be coupled to roll adjustment means as hereinafter described. The levers 7, 8, 9, 10 of each of the refiner rolls are pivoted in rear of the vertical axial plane of the roll and the lever pivot pins 14 may be mounted in the lugs projecting from the back 15 of the casing or structural casting of the machine parallel with the said roll axes, or they may be located on pivots supported from the flank or side wall of the supporting structure at right-angles to the said roll axes.

The forward portions 7a, 8a, 9a, 10a of each lever comprise a fork or slotted reception for link members. As the lever arrangement is the same for both sides of the machine, it will suffice to describe those on one side only. The second roll lever 7 has a fork 16 for a single pivot pin 17 of a link whilst the levers 8, 9 of the third and fourth rolls 3, 4 are forked for accommodation of a pair of pivot pins 18, 19, one for a lower linkage and another for an upper linkage, whilst the uppermost (fifth) roll lever 10 is forked for accommodation of a single pin 20 for the linkage connecting it with the lever 9 of the roll 4 next below it.

The linkage referred to above is utilised for effecting the positive displacement according to the invention, and each linkage may conveniently comprise a box or cage 21 (Figures 3 and 4) in which a nut member 22 is mounted for rotation but held against axial displacement. The cage 21 has a drilled or bored lug 23 through which one of the pivot pins is passed to connect it with the associated roll trunnion lever and on the opposite side of the nut the cage 21 has an aperture or guideway 24 for a spindle 25 which has a screwthreaded portion 26 traversing the nut 22. The spindle 25 may have a plain portion 27 extending beyond the nut, which is guided in a bore 28 in the lug part 23. The outer end of the spindle terminates in an eye 29 through which one of the pivot pins passes for connecting it to the appropriate lever.

The cage 21 has a lateral extension 30 in which bearings are provided for a worm 31 and the nut 22 referred to above has an external worm wheel 32 which meshes with the said worm. The spindle 33 of the worm is extended forwardly and provided with a handle or handwheel 34 for imparting rotation to the worm.

This screwthread adjustment cage linkage is coupled between the forked ends of the several roll levers, the preferred arrangement being that the screwthreaded spindle 25 of the lowermost cage 21 is coupled to the abutment lever 7 of the second roll 1 by pivot pin 17, the lug 23 of that cage being pivotally connected by pin 18 to the underside of the outer end 8a of the third roll lever 8, whilst the levers 8 and 9 of the third and fourth rolls 3 and 4 are coupled together by a cage linkage, with the cage lug 23 connected to the upper side of the lever 8 of the third roll and the screwthreaded spindle 25 coupled to the lower side of the fork of the lever 9 of the fourth roll. The coupling between the fourth roll 4 and the uppermost (fifth) roll 5 is arranged similarly to that of the cage below, with the screwthreaded spindle 25 connected to the fork of the lever 10 of the uppermost roll.

In operation, the adjustment between any pair of the rolls 1, 3, 4, 5 above the feed roll 2 is effected by turning the appropriate handwheels 34 at each end of the roll to rotate the worms 31 which in turn imparts rotation to the nut 22. Nut rotation positively advances or retracts the screwthreaded spindles 25 to increase or decrease the distance between the pivots of the linkages and at the same time the worm gear constitutes an automatically locking adjustment. It will be seen that adjustment between a pair of rolls alters the nip between such pair whilst giving a displacement to the rolls above without disturbing the nip between such rolls.

The adjustment by the cage linkages is positive in both directions.

The mounting of the feed roll 2 and its adjustment relatively to the roll 1 may be effected in any known manner and does not form part of the present invention.

To maintain alignment of the levers in the vertical planes at right-angles to the roll axes, a vertical guide bar anchored at the top and bottom to the structural casting may be passed between the lever forks or through slots provided for their reception.

The rolls are driven by a train of gear wheels 35 from shaft 36 in known manner.

I claim:

1. In a roll refiner for chocolate and the like, the combination including: a frame; a plurality of pairs of vertically spaced levers pivotally mounted at one end to said frame; horizontally disposed refining rolls rotatably mounted between each pair of levers and intermediate the ends of said pairs of levers, the lowermost of said rolls being fixed against vertical movement; links connecting each pair of said levers with each adjacent pair of said levers at the ends remote from the pivotal ends of said levers; and adjustable self-locking means for varying the length of each of said links and permitting adjustment of the nip between each end of any two selected refining rolls without affecting the nip between other refining rolls.

2. In a roll refiner for chocolate and the like, the combination including: a frame; a plurality of pairs of vertically spaced levers pivotally mounted at one end to said frame; horizontally disposed refining rolls rotatably mounted between each pair of levers and intermediate the ends of said pairs of levers, the lowermost of said rolls being fixed against vertical movement; links connecting each pair of said levers with each adjacent pair of said levers at the ends remote from the pivotal ends of said levers; adjustable self-locking means for varying the length of each of said links and permitting adjustment of the nip between each end of any two selected refining rolls without affecting the nip between other refining rolls; a spindle activating each of said adjustable links extending through the frame of the said refiner nearest the said links; a handwheel on each of said spindles outside of said frame.

ALLAN A. TUNLEY.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
319,634	Salinger	June 9, 1885
401,872	Allfree	Apr. 23, 1889
447,951	Kapler	Mar. 10, 1891
727,177	Montgomery	May 5, 1903
2,080,364	Tunley	May 11, 1937
2,185,150	Jack	Dec. 26, 1939

FOREIGN PATENTS

Number	Country	Date
18,359	Germany	June 6, 1882
452	Sweden	Sept. 25, 1886
151,039	Austria	Oct. 11, 1937