June 6, 1939. G. W. VON HOFE 2,161,325

ROLL ADJUSTING MEANS

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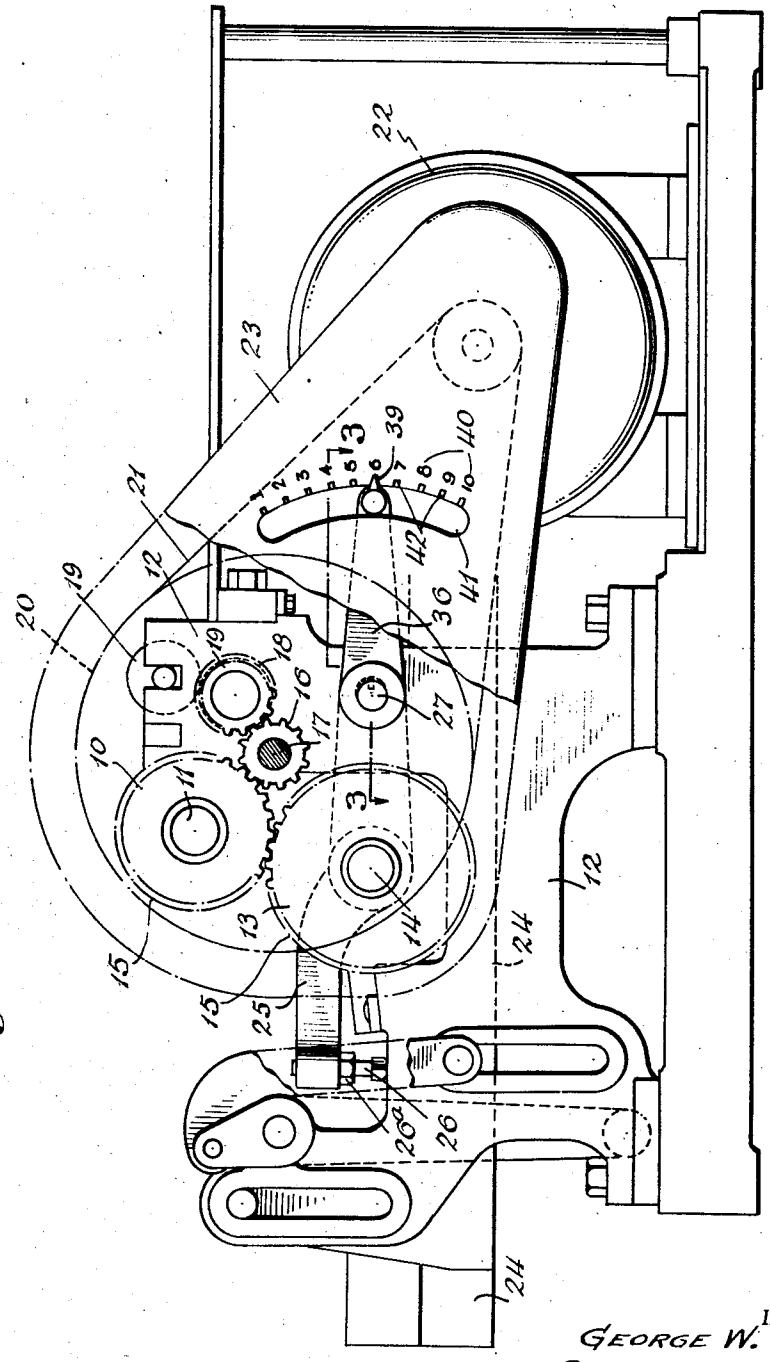


Fig. 1.

INVENTOR.
GEORGE W. VON HOFE

BY Fitch & Kehlenbeck

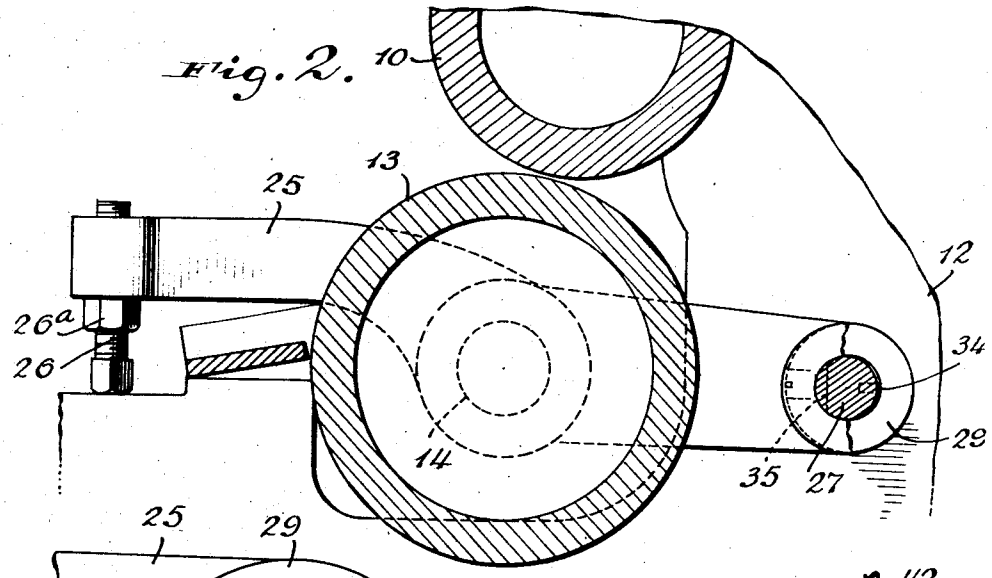
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Fig. 2.



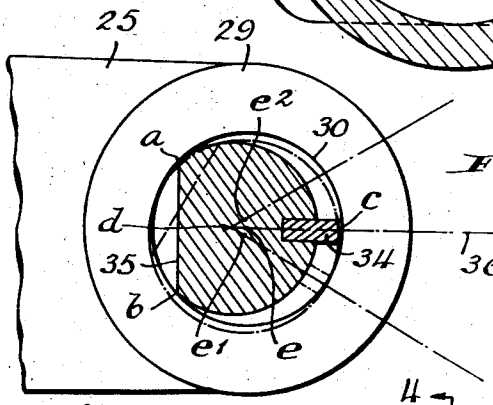


Fig. 4.

Fig. 3.

INVENTOR.
GEORGE W. VON HOFE

BY

ATTORNEYS

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ROLL ADJUSTING MEANS

George W. von Hofe, Bound Brook, N. J., assignor to New Jersey Machine Corporation, Hoboken, N. J., a corporation of New Jersey

Application November 18, 1937, Serial No. 175,241

9 Claims. (Cl. 91—50)

The invention relates to mechanisms including rolls arranged in co-operative relation to each other, and more particularly to arrangements of rolls such as exemplified by adhesive distributing and adhesive applying rolls whereby coatings of adhesive are applied to labels or other sheets of material. Such roll arrangements are embodied in many existing types of labeling machines and their equivalent and are also present in many conventional forms of so-called gumming machines.

In order to insure operative efficiency and to meet the requirements of varying conditions, it is desirable and even necessary to provide for the relative adjustment of said rolls in directions toward and away from each other. To secure the best results, it is generally desirable to maintain the rolls in accurate axial or surface parallelism throughout the range of adjustment.

The object of the invention is to provide a novel adjusting means whereby at least one roll is selectively movable toward and away from a co-operating roll in a simple manner, and whereby the desired axial or surface parallelism of said rollers is automatically maintained at all times without the need for any special operations to insure this result.

Other more specific objects will appear from the description hereinafter and the features of novelty will be pointed out in the claims.

In the accompanying drawings which illustrate an example of the invention without defining its limits, Fig. 1 is a side elevation of the novel adjusting means embodied in a conventional roll arrangement; Fig. 2 is an enlarged detail view partly in section; Fig. 3 is a fragmentary section approximately on the line 3—3 of Fig. 1, and Fig. 4 is a detail section on the line 4—4 of Fig. 3 on a still larger scale.

The novel adjusting means is illustrated in the drawings and is described hereinafter in connection with a gumming machine, it being understood that this type of machine has been selected merely to simplify the description and without any intention of restricting the range of usefulness of the novel features.

In the illustrated roll arrangement, an adhesive applying roll 10 of conventional type is carried by a shaft 11 journalled in the side members 12 of the gumming machine, and is located in operative relation to an adhesive distributing roll 13 mounted upon a shaft 14. The shafts 11 and 14 of the respective rolls 10 and 13 may carry gears 15 in mesh with each other and with a pinion 16 fixed upon a shaft 17 rotatably mounted in the side members 12; the pinion 16 may also be operatively connected with the gear 18 whereby conventional feed rollers 19 are actuated. As shown, the shaft 17 may carry a pulley 20 connected by means of a belt 21 with an electric motor 22 whereby the rolls 10 and 13 and the feed rollers 19 are operated; a guard or protecting cover 23 may be suitably mounted in place to enclose the gearing, pulleys and belt.

In the operation of the illustrated type of roll arrangement, whether embodied in a gumming machine, a labeling machine or other mechanism, the adhesive distributing roll 13 receives a surface supply of adhesive, for instance by dipping into an adhesive container 24 and distributes said adhesive upon the surface of the adhesive applying roll 10. The latter in turn applies a coating of such adhesive to labels or other sheets of material which are fed into engagement with said roll 10, for instance by the feed rollers 19. In order that the coating of adhesive applied by the roll 13 may be even and uniform throughout, it is essential to have said roll 13 in exact axial or surface parallelism with the roll 10 so that the distribution of adhesive by the latter to the applying roll 13 may be correspondingly even and uniform. Obviously, the thickness of a coating of adhesive, or in other words, the amount thereof which is applied by the roll 13 to the labels or their equivalent, will be determined by the amount of adhesive transferred to said roll 13 by the distributing roll 10. This in turn is determined by the positions of the surfaces of the rolls 10 and 13 relatively to each other; if said rolls 10 and 13 are in contact with each other, the amount of adhesive transferred to the surface of the roll 13 will be in the nature of a light or thin coating, and if the surfaces of said rolls 10 and 13 are spaced from each other, the amount of transferred adhesive will be in the form of a heavier or thicker coating.

To enable the coatings of adhesive applied by the roll 13 to the labels or their equivalent to be varied within a given range to provide lighter or heavier coatings of adhesive on said labels or their equivalent, it is generally the practice to adjust the distributing roll 10 toward and away from the applying roll 13. The range of such adjustment depends upon the character of and the work being done by a given machine, and in gumming or labeling machines in which the distributing and applying rolls are geared together,

as by the gears 15, is such that said gears will remain in operative mesh throughout said adjustment range.

The aforesaid roll adjustment is easily effected by the instant novel adjusting means which at the same time automatically maintains said rolls in accurate axial or surface parallelism throughout without requiring any independent operations or adjustments to bring about this condition.

In the illustrated example, the adjusting means comprises levers 25 in which the shaft 14 of the distributing roll 10 is journalled, said levers 25 being fulcrumed at one end upon suitable portions of the side members 12 of the machine. To enable the levers 25 to be independently adjusted for the purpose for instance of initially setting the roll 10 in accurate axial or surface parallelism with the roll 13, the fulcrums of said levers 25 are preferably adjustable. For this purpose said fulcrums, as shown in Fig. 1, may consist of supporting screws 26 in threaded engagement with and depending from the levers 25, the heads or equivalent ends of said screws 26 resting upon the aforesaid suitable portions of the side members 12; any conventional means may be provided for fixing the fulcrum screws 26 in adjusted positions, this means being exemplified in the illustrated example by lock nuts 26^a.

An adjusting shaft 27 is journalled in bearings 28 provided at the proper points on the side members 12 and extends through the levers 25 at their opposite ends so as to be rotatable relatively to said levers 25, the latter preferably being provided with bearing heads 29 having openings 30 for the accommodation of the shaft 27; as shown in Fig. 3, the bearing heads 29 are located between the bearings 28 of the side members 12 and collars 31 secured on the shaft 27 for instance by set screws 32, and accordingly are maintained against shifting lengthwise of said shaft 27. At points in interior registry with the bearing heads 29 of the levers 25, the shaft 27 is provided with surface recesses 33 for the reception of keys 34, preferably of the so-called "Woodruff" type, which keys in their operative positions are in surface engagement with the annular faces of the openings 30, as shown in Fig. 3. The shaft 27 further is recessed to provide flattened portions 35 located preferably at points diametrically opposite the recesses 33 and in some cases extending beyond the same in the direction of the axis of said shaft. In the assembled condition of the parts, the opposite edges of the flattened portions 35 engage the surfaces of the openings 30 of the bearing heads 29 at opposite points *a* and *b* while the keys 34 correspondingly engage said inner surfaces at the point *c*, as shown in Fig. 4; with this arrangement the shaft 27 is eccentric to the bearing heads 29 and in three point engagement therewith at preferably equidistant points *a*, *b* and *c* of the openings 30 for the purpose to be more fully set forth hereinafter.

In practice the shaft 27 is rotated on its axis to effect the desired roller adjustments and accordingly is preferably provided with operating means to facilitate the rotative operation thereof. The said operating means may be of any suitable type and in the example illustrated is shown in the form of an operating crank 36 which is fastened in place on said shaft 27 by a set screw 37 or its equivalent. Suitable provision is made to fix the shaft 27 and its associated elements in adjusted positions, as for instance by locating a spring washer 38 on the shaft 27 between the crank 36 and the contiguous bearing 28 of the one side member 12 as shown in Fig. 3; it will be understood that the crank 36 is fixed on the shaft 27 so as to clamp said washer 38 between itself and the contiguous bearing 28 and to thereby cause said washer 38 to develop frictional pressure upon the opposed surfaces of said bearing 28 and crank 36 sufficient to maintain the latter and consequently the shaft 27 against unintentional rotative movement.

For the purpose of visually indicating the adjustment effected by the adjusting means, it is desirable to provide indicating means of suitable character. In the form shown in the drawings, this indicating means comprises a projection or pointer 39 formed on the handle of the operating crank 36 and co-operating with a scale 40 of predetermined designating significance upon a suitable scale plate. As illustrated in Fig. 1, the scale 40 may be produced upon the guard or protecting cover 23 in contiguous relation to a slot 41 formed therein, and through which the handle of the crank 36 projects. The slot 41 is curved in an arc having the axis of the shaft 27 as its centre and the parts are arranged and dimensioned so that the projection or pointer 39 projects over the surface of the guard 23 or equivalent scale plate as shown in Figs. 1 and 3; if desired, the guard 23 or equivalent scale plate may be provided with notches 42 in registry with the divisions of the scale 40, in which notches 42 the projection or pointer 39 seats itself as a detent when the operating crank 36 is actuated. The inherent elasticity of the materials of which the guard 23 or equivalent scale plate and the crank 36 are made may be relied upon to seat the projection or pointer 39 in the notches 42, or additional means may be provided for this purpose if desired or found necessary.

With the parts as shown in Fig. 2, the rolls 10 and 13 are slightly spaced from each other and may be set to occupy an intermediate position in the range of adjustment. If the operating crank 36 of the novel adjusting means is moved downwardly in Fig. 1, the shaft 27 will be correspondingly rotated to cause the points *a* and *b* thereof and the point *c* represented by the key 34 to rotatively travel along the surfaces of the openings 30; in other words, the keys 34 and the flattened portions 35 will follow the operative movements of the crank 36. This rotative shifting of the points *a*, *b* and *c* will cause the keys 34 in co-operation with the flattened portions 35 to develop an eccentric camming action on the bearing heads 29 which will swing the levers 25 downwardly on the fulcrums 26 and accordingly shift the roll 33 further away from the roll 10. If, on the other hand, the operating crank 36 is moved upwardly in Fig. 1, the shaft 27 will be correspondingly rotated and will cause the keys 34 and flattened portions 35 to develop a camming action on the bearing heads 29 tending to swing the levers 25 upwardly and to thereby move the roll 30 nearer to the roll 10.

It will be noted that the keys 34 and the associated flattened portions 35, or in other words, the three point contacts *a*, *b* and *c*, remain in the same relationship to each other throughout any given operations of the adjusting means. Thus as the operating crank 36 is moved in one direction or the other to correspondingly rotate the shaft 27, the keys 34 will describe circular paths about the centre *d* thereof, which paths are eccentric to openings 30. The keys 34 will accordingly develop a camming action on the bearing

heads 29 whereby the centers e of the latter are shifted for instance to the points e' or e^2 dependent upon the direction of movement of the operating crank 36; obviously, if the latter is moved through an arc of less than the degree indicated in Fig. 4, the centres e will be shifted to a point between e and e', or e and e^2, as the case may be. In any event, the necessary relative shifting of the parts during such operations is readily permitted by the flattened portions 35; similarly, any lengthwise or other movement of the levers 25 which may be necessary to enable the latter and the roll 13 to accommodate themselves to the changing positions of the point e is easily possible because of movability of the fulcrum screws 26 on their supporting surfaces.

As the operating crank 36 is actuated in the manner described above, the pointer 39 in cooperation with the scale 40 will indicate the adjustment, and at the same time said indicator 39 by snapping into the notches 42 will maintain the operating crank 36 in its adjusted position. Concurrently with these operations the friction developed by the spring washer 38 on the opposed surfaces of the bearing 28 and the crank 36 will prevent any unintentional rotation of the shaft 27 which might disturb the desired adjustment of the roll 13 relatively to the roll 10.

Because of the fact that the shaft 27 and its associated keys 34 and flattened portions 35 are concurrently active upon both levers 25, the surface of the roll 13 will be maintained in accurate relation to the surface of the roll 10 throughout the range of adjustment without requiring any independent operations to be performed to effect this result. The roll 13 may be initially adjusted into any desired surface relation with the roll 10, by suitably manipulating the fulcrum screws 26 and securing them against unintentional movement by means of the lock nuts 26a or their equivalent; it will be noted as the fulcrum screws 26 are manipulated that the roll 13 is tilted on its axis toward and away from the roll 10 until the desired relative surface adjustment has been attained.

From the above it is clear that the novel adjusting means is of maximum efficiency in operation and that it requires no particular skill in its operation. At the same time the adjustment of the roll 13 relatively to the roll 10 may be effected in a minimum period of time by simply actuating the operating crank 36 in a manner to bring about the desired results.

The arrangement of the flattened portions 35 and the surface recesses 33 and the use of keys 34 of the "Woodruff" type enable the parts to be readily assembled as will be apparent. While keys 34 of the type indicated are preferred, it is obvious that other forms of keys as well as equivalent devices may be substituted therefor without affecting the efficiency of the adjusting means as a whole.

Various changes in the specific forms shown and described may be made within the scope of the claims without departing from the spirit of the invention.

I claim:

1. The combination of two co-operating rolls, a pair of levers for rotatably supporting one of said rolls, adjustable fulcrums at one end of said levers, bearing heads at the opposite ends of said levers, an adjusting shaft extending through and rotatable in said bearing heads in eccentric relation thereto, keys carried by said shaft in internal engagement with said heads, said shaft having flattened portions at points diametrically opposite said keys, and an operating crank for rotating said shaft to adjust said keys and flattened portions eccentrically of said bearing heads whereby said levers are pivotally actuated on said fulcrums to shift said one roll toward and away from the other roll at will.

2. The combination of two co-operating rolls, a pair of levers for rotatably supporting one of said rolls, adjustable fulcrums at one end of said levers, bearing heads at the opposite ends of said levers, an adjusting shaft extending through and rotatable in said bearing heads in eccentric relation thereto, keys carried by said shaft in internal engagement with said heads, said shaft having flattened portions at points diametrically opposite said keys, an operating crank for rotating said shaft to adjust said keys and flattened portions eccentrically of said bearing heads whereby said levers are pivotally actuated on said fulcrums to shift said one roll toward and away from the other roll at will, a detent carried by said operating crank, and a plate slotted to movably accommodate said operating crank and having notches for receiving said detent to thereby restrain said operating crank against unintentional movement.

3. The combination of two co-operating rolls, a pair of levers for rotatably supporting one of said rolls, adjustable fulcrums at one end of said levers, bearing heads at the opposite ends of said levers, an adjusting shaft extending through and rotatable in said bearing heads in eccentric relation thereto, keys carried by said shaft in internal engagement with said heads, said shaft having flattened portions at points diametrically opposite said keys, an operating crank for rotating said shaft to adjust said keys and flattened portions eccentrically of said bearing heads whereby said levers are pivotally actuated on said fulcrums to shift said one roll toward and away from the other roll at will, a plate slotted to movably accommodate said operating crank and having a scale produced thereon in contiguous relation to the slot of said plate, and a pointer on said operating crank co-operating with said scale to visibly indicate the adjustment effected by the operation of said operating crank.

4. In a machine including a pair of co-operating rolls, mechanism associated with the operation and functions of said rolls, and a protecting cover for said mechanism, that improvement which comprises the provision of a slot in said protecting cover and a series of spaced notches adjacent to said slot, said cover further having a scale produced thereon in contiguous relation to said notches, adjusting means for adjusting one of said rolls relatively to the other roll, an operating crank projecting through and movable lengthwise of said slot and arranged to selectively operate said adjusting means, and a detent pointer on said operating crank co-operating with said scale to visibly indicate the adjustment effected by said adjusting means and arranged to seat itself in said notches to maintain said operating crank against unintentional movement.

5. The combination of two co-operating rolls, a pair of levers for rotatably supporting one of said rolls, adjustable fulcrums at one end of said levers, bearing heads at the opposite ends of said levers, an adjusting shaft extending through and rotatable in said bearing heads in eccentric relation thereto, means on said shaft adapted to develop eccentrically effective forces on said bear-

ing heads whereby said levers are pivotally actuated on said fulcrums to shift said one roll toward and away from the other roll, and actuating means for rotatively operating said adjusting shaft.

6. The combination of a pair of spaced parallel levers each fulcrumed at one end, a roll journalled in said levers, bearing heads at the opposite ends of said levers, an adjusting shaft extending through said bearing heads and having flattened portions in two point contact therewith whereby said shaft is in eccentric relation to said heads, keys carried by said shaft in internal engagement with said heads at a third point thereof, and means for rocking said shaft on its axis to develop eccentrically effective forces on said bearing heads at said three contact points whereby said levers are pivotally actuated on said fulcrums to shift said roll in an arc curved about said fulcrums as centers.

7. The combination of a pair of spaced parallel levers pivotally mounted at one end and provided with openings having curved camming surfaces at their other ends, a roll journalled in said levers, and adjusting means extending eccentrically through said openings in contact with the curved surfaces thereof at three spaced individual points and adapted to coincidentally actuate said levers pivotally to shift said roll in an arc curved about the pivots of said levers.

8. The combination of a frame, two co-operating rolls, a pair of levers each fulcrumed at one end on said frame for rotatably supporting one of said rolls, bearing heads at the opposite ends of said levers provided with openings having curved camming surfaces, an adjusting shaft journalled on said frame extending through and rotatable in said openings in eccentric relation to the camming surfaces thereof, means on said shaft adapted to develop eccentrically effective forces on said curved camming surfaces whereby said levers are pivotally actuated on said fulcrums to selectively shift said one roll toward and away from the other roll, and actuating means for rotatively operating said adjusting shaft.

9. The combination of fixed bearings, two co-operating rolls, a pair of levers each fulcrumed at one end and provided at their opposite ends with openings having curved camming surfaces, said levers rotatably supporting one of said rolls, an adjusting shaft journalled in said fixed bearings extending through and rotatable in said openings in eccentric relation to the camming surfaces thereof, means on said shaft adapted to develop eccentrically effective forces on said curved camming surfaces whereby said levers are pivotally actuated on said fulcrums to selectively shift said one roll toward and away from the other roll, and actuating means for rotatively operating said actuating shaft.

GEORGE W. VON HOFE.