Sept. 1, 1936. C. A. MEISEL 2,053,223

MECHANISM FOR CONDITIONING PAPER

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Fig. 1.

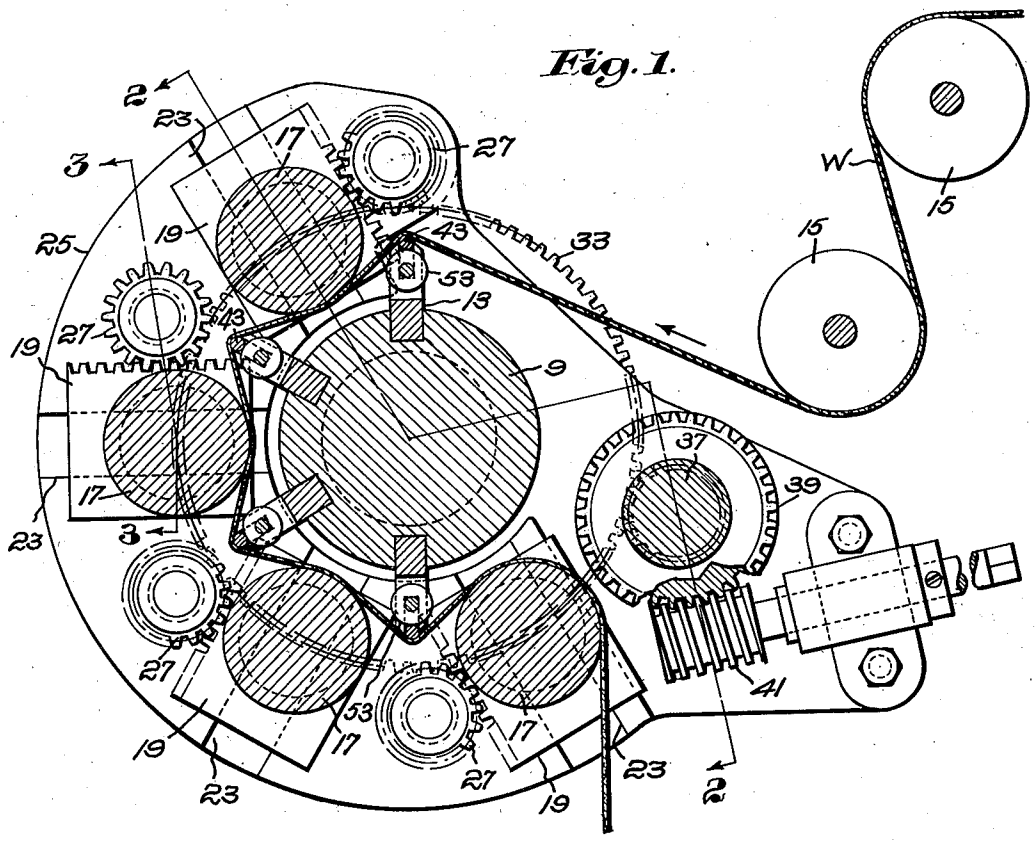
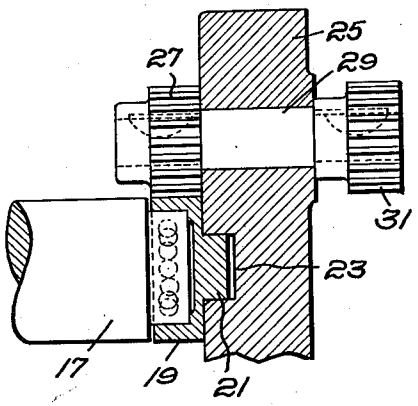


Fig. 3.



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Fig. 2.

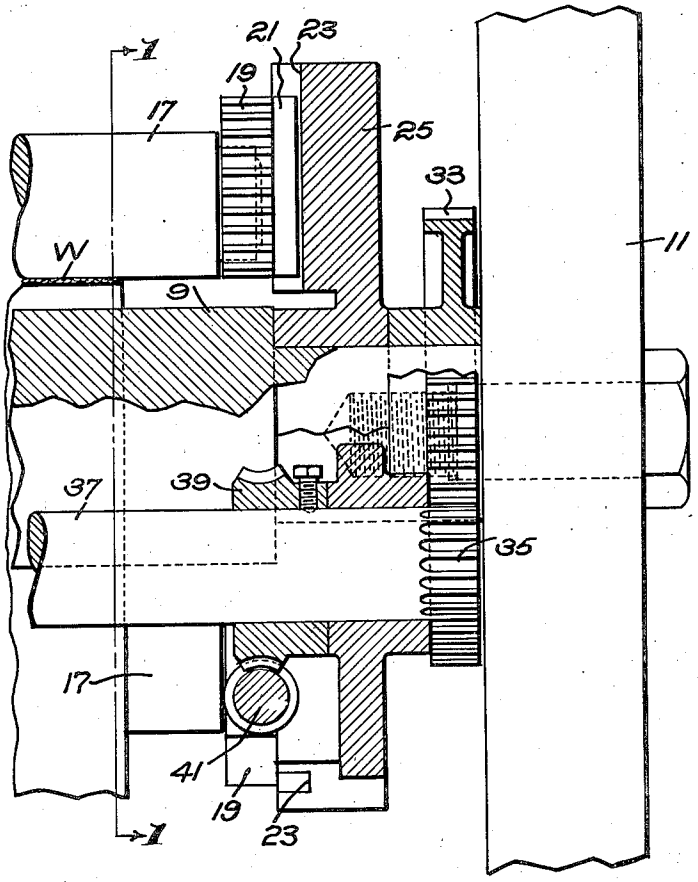


Fig. 5.

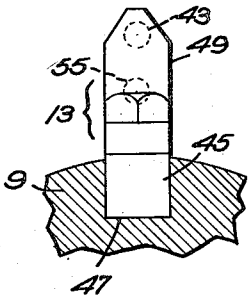


Fig. 6.

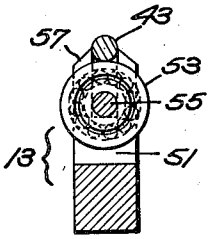


Fig. 7.

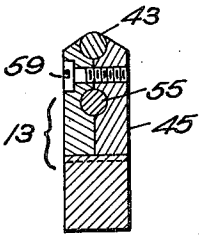
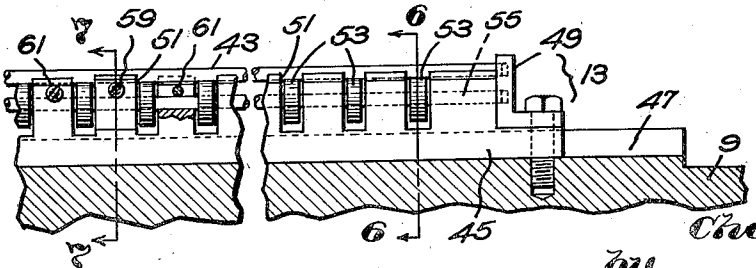


Fig. 4.



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MECHANISM FOR CONDITIONING PAPER

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Application May 29, 1934, Serial No. 728,115

12 Claims. (Cl. 91—18)

This invention relates to a mechanism for conditioning paper applicable more particularly to the treatment of gummed paper of which the gummed surface has been broken to remove objectionable curl by action on the gummed face thereof in the usual manner. When applied to this use the mechanism embodying my invention permits the paper to be treated to compensate for the curl given by the gum breaking action and by contact with the gummed face thereof without objectionable deterioration of the gum coating.

My invention will be well understood by reference to the following description of the illustrative embodiment thereof shown by way of example in the accompanying drawings, wherein:—

Fig. 1 is a longitudinal section of the mechanism on the line 1—1 of Fig. 2;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a broken section illustrating the breaking blade in elevation;

Fig. 5 is a fragmentary end view of Fig. 4 on an enlarged scale; and

Figs. 6 and 7 are enlarged sections on the lines 6—6 and 7—7 of Fig. 4 respectively.

In the manufacture of gummed paper, to obviate the curling and cockling which would otherwise arise consequent to the drying of the gum coating it is usual minutely to break up that coating by drawing the paper with the gum side outward and at a sharp angle over breaking bars, there usually being two of such bars disposed successively at opposite angles to the length of the web. The tension of the dried coating on the paper which otherwise would cause it objectionably to curl is thus released. This treatment, however, gives a curvature to the paper itself. Thus if a short section of a web treated in this manner were laid on a table it would not lie flat but, with the gum side up, would tend to rest in bowed position supported at its opposite corners. In other words, it has been given a transverse and longitudinal curvature. Since the paper is usually packaged in rolls, the longitudinal curvature does not cause difficlty in practice. To remove the transverse curl the paper might be sharply bent in the opposite direction over a transverse edge but since such an edge contacts with the gum coating the latter would be injured.

The mechanism herein shown, which might form a part of a machine in which the first described treatment of the paper by bending it with the gummed face outward was effected, operates efficiently to remove the objectionable transverse curl given the paper by such treatment without injuring the gum coating.

Referring to the drawings, the mechanism herein shown is organized about a central stationary shaft 9 which may be supported at its ends in the main frames 11 (Fig. 2) of the machine. From this shaft 9 extends in radial positions a series of blades 13 over the edges of which the gummed face of the paper is passed, the paper web *w* being herein shown as leading from rolls 15 to loop about the various blades and thence to pass to be disposed of in any desired manner. The path of the paper is bounded outwardly by the chords between the edges of the several blades 13. Thus while not sharply bent across any single blade, it is bent slightly across each one and the direction of travel progressively changes so that the total effect is of a folding of the web on itself in the opposite direction to the curl therein to straighten out this curl.

For many purposes I have found that the paper is efficiently treated when it passes directly along the chords from the edge of one blade to the edge of another, but the sharpness of the engagement of the paper with the several blades may be adjusted by utilizing guide rolls 17 disposed between adjacent bending blades 13 for depressing the run of paper to paths within the chords. Herein these rolls 17 are rotatably mounted in plates 19 having the ribs 21 which slide in suitable radial ways 23 in end frames 25 supported at the ends of shaft 9. The sides of these plates 19 are formed with rack teeth with which gear pinions 27 on pinion shafts 29 journalled in the frames 25 and these shafts carry pinions 31 (Fig. 3) which mesh with a common central gear 33 at the outside of one of the frames. This gear may be turned by the pinion teeth 35 on a shaft 37 carrying a worm wheel 39 driven by worm 41 adapted to be turned by any suitable means, herein diagrammatically indicated by the showing of a squared end of the worm shaft in Fig. 1. By rotation of this worm shaft the several rolls 17 are simultaneously and equally adjusted in and out.

Referring now more particularly to Figs. 4 to 7, the effective paper engaging edge of the bending blade 13 consists of a thin, rotatable rod 43 which acts to bend the paper without undue sharpness and with little or not scraping action thereon. For instance, in practice I have found that a rod $\frac{3}{16}$ of an inch in diameter is suitable. This rod is loosely, rotatably received in a groove cut longitudinally in a bar 45 secured in a suitable groove 47 in shaft 9, as best seen in Fig. 6. To retain the rod in position against falling out when no

paper web is present, the ends may be loosely received in suitable end brackets 49 (Figs. 4 and 5).

To support rod 43 rigidly, yet to permit it to turn without scraping action on the gummed face of the paper, it is supported by suitable roller bearings. Herein the bar 45 is provided with the notches 51 at intervals and in these notches are disposed rollers bearings on which rod 43 rests for support in the groove through the tops of the projecting portions between the notches. This groove may be cut sufficiently deep to permit the assembly therewith from above of the shaft 55 supporting the rollers 53, which shaft may be retained by engagement with the end brackets 49. Conveniently the shaft 55 is a dead shaft from which the rollers 53 are supported by ball bearings, as seen in Fig. 6. In fact these rollers may be in the form of standard ball bearings, their supporting surfaces which contact with the rod 43 being the outer race of such bearings while the inner race fits about the shaft 55. This arrangement is simple and inexpensive and provides sturdy and easily turning supports for the rod 43. Any fragments of gum which might be displaced and scraped off from the paper are readily discharged through the notches 51.

Under pressure of the paper as it passes over the rod 43 the latter is pressed against one of the edge portions of the groove which receives it, and this edge, as seen in Fig. 6, acts thereon in the manner of a doctor blade to discharge therefrom any gum which might otherwise tend to stick thereto and accumulate and cause difficulty. To facilitate this action and provide a clear path for the paper as in the manner herein described, the sides of the projections between the notches may be relieved or bevelled off as shown at 57 in Fig. 6.

As the rod 43 may be of considerable length corresponding to the width of the web of paper to be treated, it will be subject to a drooping flexure. To retain it between the ends, for example, along the center line of the machine, the construction best shown in Figs. 4 and 7 may be adopted. Here a projection at this place is made of somewhat greater depth, separated from the body of the bar and split. Its ends are formed to embrace rod 43 above the center thereof and they are clamped thereabout by means of clamping screw 59. The shaft 55 likewise passes through the same and the parts are clamped to and held by the shaft 55 and in turn hold the central portion of rod 43. Shaft 55 is end supported by brackets 49 and adjacent the center by overlying pins 61 in the form of screws passing through adjacent projections (see Fig. 4).

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive; reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim:

1. A device of the class described comprising a series of radially disposed blades, guide bars alternating therewith and means for simultaneously adjusting the guide bars in and out to bend more or less over said blades a web trained thereabout.

2. A device of the class described comprising a series of radially disposed blades, guide bars alternating therewith having substantially radially slidable end supports provided with racks, pinions, gearing with the racks and means including a single movable gear wheel for simultaneously turning the pinions.

3. A device of the class described comprising a series of radially disposed blades, each rotatably supporting a rod forming the edge thereof, guide rolls alternating therewith and means for adjusting the rolls substantially radially in and out to bend more or less over said rods a web trained thereabout.

4. In a device of the class described a series of radially disposed blades, each comprising a bar longitudinally grooved and receiving and rotatably supporting in the groove a thin rod to project as an edge, and means for feeding a paper web as a loop about the series.

5. In a device of the class described a series of radially disposed blades, each rotatably presenting as an edge a thin, cylindrical rod and means for feeding a paper web as a loop about the series.

6. A device for the purpose described comprising a bar grooved along its upper edge and receiving loosely in said groove a rod, the bar having transverse notches at intervals and roller bearings received in the notches and underlying the rod to support the same.

7. A device for the purpose described comprising a bar grooved along its upper edge and receiving loosely in said groove a rod to rotate under the drag of paper thereover and means for retaining the rod comprising at the central portion of the bar shaped jaws formed thereon to embrace the rod above the center line thereof and means for holding the jaws together.

8. A device for the purpose described comprising a bar grooved along its upper edge and receiving loosely in said groove a rod to rotate under the drag of paper thereover, the bar having transverse notches at intervals, a portion of the bar at the central portion thereof and between notches being divided and shaped to embrace the rod above the center line thereof and means for clamping together the divided portions.

9. A device for the purpose described comprising a bar grooved along its upper edge and receiving loosely in said groove a rod, the bar having transverse notches at intervals, rolls of relatively great diameter received in the notches and underriding the rod, a shaft extending through the bar and ball bearings supporting the rolls from the shaft.

10. A device for the purpose described comprising a bar grooved along its upper edge and loosely receiving a rod to rotate therein, a margin of the groove engaging the rod under pressure of a web trained thereover and acting as a doctor blade therefor, the bar having notches at intervals and roller bearings received in the notches supporting the rod.

11. A mechanism for conditioning gummed paper by action on the gummed face thereof comprising a series of thin, rotatable rods rigidly supported in spaced relation along a substantial arc and means for training the paper web looped about said rods in a path bounded by the connecting chords.

12. A mechanism for conditioning gummed paper by action on the gummed face thereof comprising a series of thin, rotatable rods rigidly supported in spaced relation along a substantial arc and means for training the paper web looped about said rods in a path bounded by the connecting chords, and means for contacting the paper along the chords to press it inwardly thereof.

CHARLES A. MEISEL.