Aug. 10, 1926. 1,595,337

C. H. BRADLEY

SHEET WIPING MECHANISM FOR COLD ROLL MILLS, ETC

Filed July 30, 1923 3 Sheets-Sheet 1

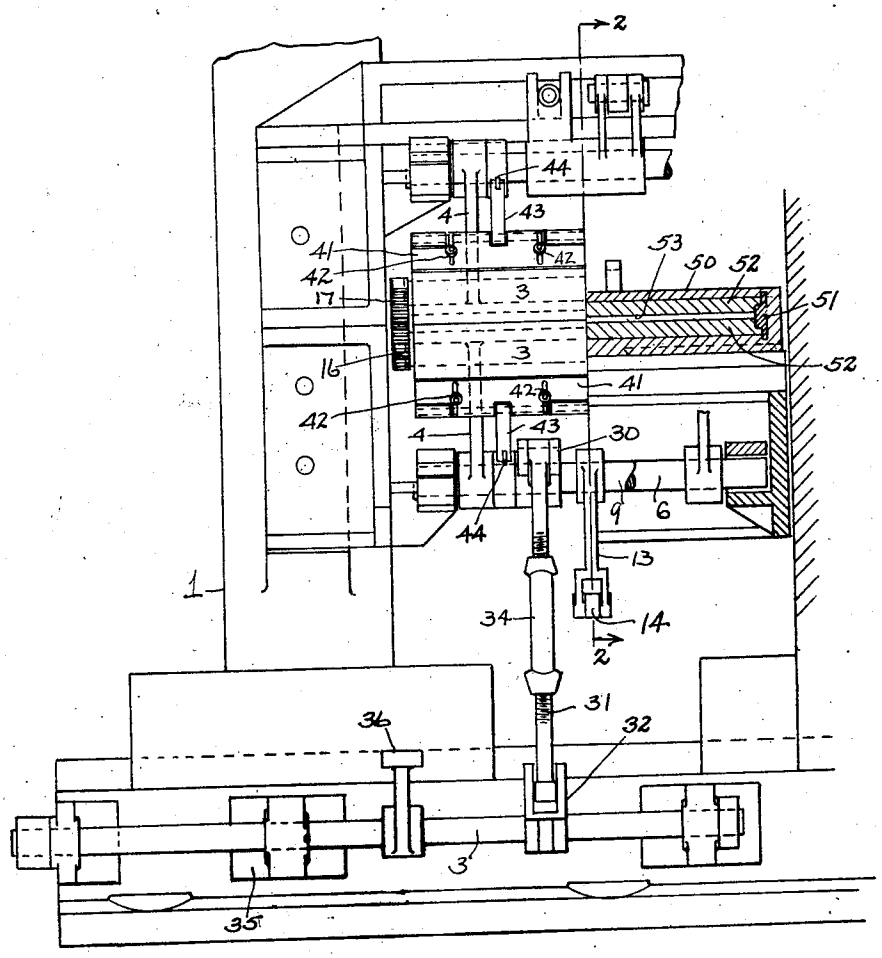


Fig. 1.

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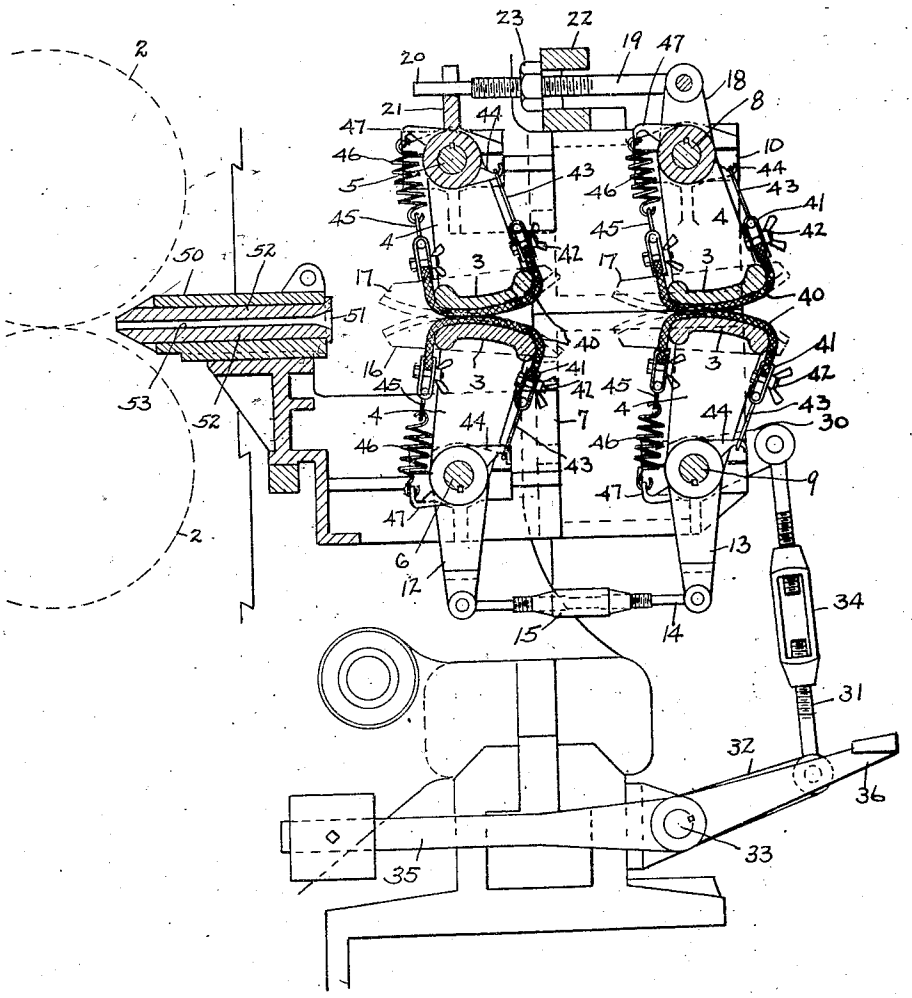


Fig. 2.

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Filed July 30, 1923 3 Sheets-Sheet 3

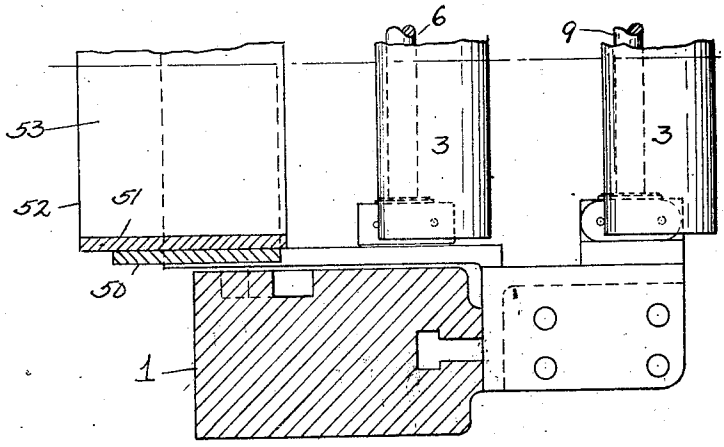


Fig. 3

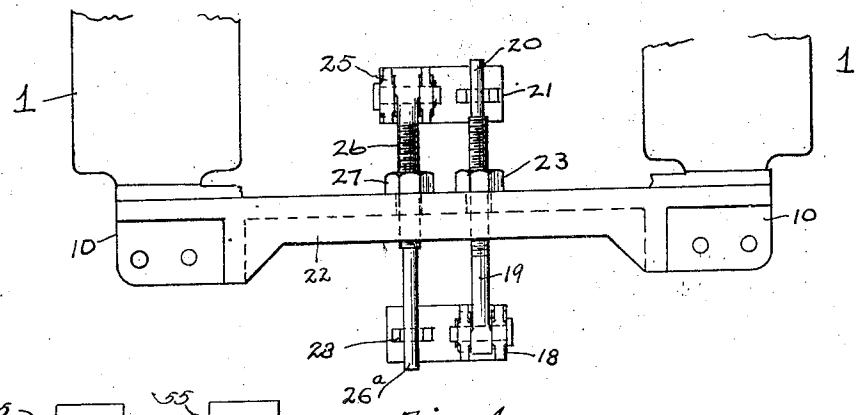


Fig. 4

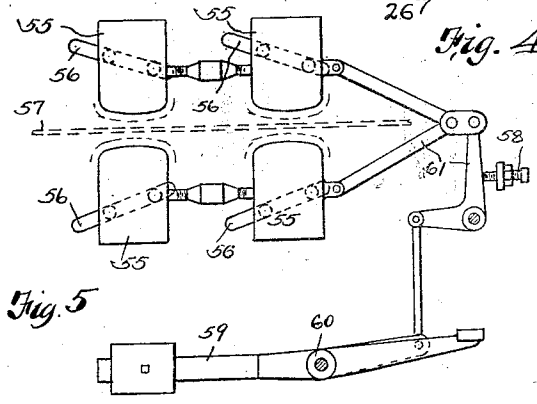


Fig. 5

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Patented Aug. 10, 1926. 1,595,337

UNITED STATES PATENT OFFICE.

CHARLES H. BRADLEY, OF CLEVELAND HEIGHTS, OHIO, ASSIGNOR OF ONE-HALF TO FRANK S. GORDY, OF CLEVELAND, OHIO.

SHEET-WIPING MECHANISM FOR COLD-ROLL MILLS, ETC.

Application filed July 30, 1923. Serial No. 654,651.

In the operation of so-called cold strip mills it is necessary to wipe both sides of the plates or strips before they are passed through the rolls, in order to remove any scale or other adhering foreign matter, which would, if not removed, injure the surface of the plates. Various devices have heretofore been provided for use in this connection, but all such devices, so far as I am aware, are of such construction as to require them to be located at some distance from the rolls so that a considerable piece of each sheet or strip goes through the rolls without being wiped. Furthermore, wiping devices currently in use are more or less cumbersome to operate and difficult to repair. The objects of the present invention accordingly include the provision of a wiping mechanism that will be more or less automatic in character, and that may be located close up to the rolls so that a minimum amount of material will be wasted due to its passage through the rolls in unwiped condition. The mechanism is also arranged so that it can be readily adjusted to vary the wiping pressure and so that it can be readily repaired, particularly so that the felt pads, which constitute the wiping elements proper, may be quickly and easily removed and replaced with fresh ones. For use in conjunction with my improved wiping mechanism I furthermore have devised a guide box of improved construction.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims; the annexed drawings and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a front elevation of my improved wiping mechanism; Fig. 2 is a vertical section thereof, the plane of the section being indicated by the line 2—2, Fig. 1; Fig. 3 is a broken plan view showing the relation of the mechanism of the wiping rolls and housing wherein such rolls are mounted;

Fig. 4 is a broken plan view showing a detail of the wiping mechanism; and Fig. 5 is a diagrammatic representation of a modification.

In the illustrative form shown in the aforesaid drawings, the wiping mechanism, it will be noted, comprises two sets or pairs of wiping elements. Two such pairs of wipers will ordinarily be employed in advance of the last mill, it being understood that a number of mills, usually four, with a set of finishing rolls, are arranged in tandem. Only a single pair of wipers will, as a rule, be required in connection with the other mills of the series. It will be understood accordingly that where but a single pair of such elements is employed, the construction of the elements, and the manner in which they are interconnected and operated, will remain substantially the same.

As best shown in Figs. 2 and 3, the inner pair of wiping elements is wholly included between the side members 1 of the mill frame or housing. The latter being of standard construction, only the rolls 2 are illustrated, (see Fig. 2), in addition to such housing member. Each of the wiping elements consist of an oscillatorily mounted transversely disposed plate 3, with its outer face curved eccentrically with respect to the axis of oscillation of the plate. Each such plate is joined integrally with side members 4, which are mounted, in the case of the upper element, on a rock shaft 5, and in the case of the lower element, on a rock shaft 6, such shafts being suitably journaled in a frame 7 located as aforesaid between the side members 1 of the mill housing.

Where, as in the construction illustrated, a second pair of wiping elements is employed, these are of identical construction with that of the inner pair just described, the upper element being carried by a rock shaft 8 and the lower one by a rock shaft 9, which shafts are journaled in a frame 10 that projects forwardly in the fashion of a bracket from such frame 7. It will be noted that all of the wiping elements are of identical construction, and thus interchangeable one for the other in either or both pairs.

Projecting downwardly from the lower shafts 6 and 9 of each pair, respectively, are arms 12 and 13, which are connected by means of a link 14. Such link includes a turnbuckle 15 whereby its length may be varied as desired, thereby correspondingly changing the angular position of the plates 3 about said shaft. Mounted on each such shaft 6 and 9 is a segmental gear 16, and on each of the upper shafts 5 and 8 a similar intermeshing segmental gear 17, whereby it will be seen the two plates in each pair are interlocked, and all such plates caused to move directly in unison.

A short arm 18 projects upwardly from shaft 8, and connected therewith is a guide rod 19 that extends transversely of the axis of said shaft, the inner end 20 of said rod slidably resting in a notched arm 21 that similarly projects upwardly from shaft 5. Intermediately of its ends the rod passes through an aperture in a transverse bar 22, (such bar, in other words, lies parallel with the axes of the several shafts), and a nut 23, threaded on said rod, is adapted to engage with said bar and thus act as an adjustable stop, the disposition of parts being such that said stop serves to limit the inward rocking movement of the outer pair of wiper plates 3, and thus determines the degree of pressure which the wiping elements exert upon a sheet or strip that is being drawn therebetween. The shaft 5 is provided with a similar upwardly extending arm 25 and rod 26, on which is threaded a nut 27 adapted to engage with bar 22, said rod 26 having its outer end 26[a] guided in a slotted arm 28 that projects upwardly from shaft 8. Where but a single pair of wiping elements is employed the stop device thus described as being used in connection with each of the pairs in the mechanism in hand, will of course be retained, and in such case the outer end of the rod will be guided in arm 28 suitably mounted as a rocker so as to serve as a guide for such rod.

For the purpose of oscillating the respective pairs of wiping elements, specifically the plates 3, mounted as aforesaid on shafts 5 and 6, and 8 and 9 (a lever arm 30 is provided on one of said shafts, (shaft 9 as shown), and this is in turn connected by means of a link 31 with a corresponding lever arm 32 on an operating shaft 33, a turnbuckle 34 being desirably included in link 31 to permit adjustment of its length. For the purpose of oscillating the shaft 33 to rock the wiping elements into closed position a counterweighted arm 35 is provided on said shaft, or any other suitable means whereby the latter is normally caused to rotate in a counter-clockwise direction, as viewed in Fig. 2; while for the purpose of oscillating said shaft in the opposite direction, and thereby causing the wiping elements to open, a foot pedal 36, mounted on said shaft 33, or other equivalent device may be provided.

The plates 3 of course constitute merely the bases of the wiping elements, each such plate being equipped with a pad 40 of felt or equivalent material, such as is regularly used for wiping and polishing cold strips or sheets. While such pads may be attached in any suitable way to said plates I have devised improved means, as shown, whereby a fresh pad may be easily and quickly substituted for one that has become worn by use, or otherwise proves defective. It will be understood that in the steady operation of a mill such pads regularly require to be changed two or three times daily, and inasmuch as the mill has to be shut down pending such change it becomes a matter of importance that the change be effected with a minimum loss of time.

According to my present improved construction the pads consist of rectangular pieces of felt of approximately the same length as the plates 3, and of a width sufficient to permit their edges to be turned down past the edges of said plates, which are suitably beaded to avoid any sharp angles which might cut the material. To each edge of such pad is secured a gripping strip 41 of U-shape in cross-section, which at the same time serves as a reinforcement for the edge and as a means for holding the same in place on the corresponding plate 3. The edges of such strip are inturned and preferably serrated to provide gripping teeth that firmly engage with the material of the pad, and a series of short clamping bolts 42, preferably fitted with wing nuts as shown, is provided to draw such edges toward each other and thus hold the strips in engagement with the material. The one strip 41 in the case of each pad has pivotally attached thereto in suitably spaced relation two or more keepers 43, the free ends of which are adapted to engage with a corresponding series of hook-like lugs 44 that project forwardly from the corresponding shaft; while shorter keepers 45 are similarly pivotally attached to the other strip, the free ends of such keepers being adapted to hook over one end of a tension spring 46, the other end of which is suitably secured to a rearwardly projecting lug 47 on such shaft.

From the foregoing description of the construction of the pads and mode of securing same to the bases of the wiper elements it will be seen that the pads may be made up in advance of their being required for use and kept in stock with the strips 41 and their keepers or clips 43 and 45 all ready to be attached when required. The pads are the same for all the wiping elements, and in order to replace one it is merely necessary to stretch the springs 46 sufficiently to permit the clips 45 to be unhooked therefrom,

whereupon the pad may be stripped from the plate 3 and clips 43 unhooked from lugs 44. A new pad is then secured in place by a reversal of the operation just described. It will be understood of course that when thus replacing a pad the wiper elements are opened or swung forwardly by depressing, for example, the pedal 36.

The improved guide box which I provide for use in connection with the foregoing wiping mechanism is in general of familiar form, the main element thereof consisting of a flat rectangular housing 50, open along its front and back edges to guide a strip or sheet inserted therein between rolls 2. Such housing is interiorly fitted with lateral guide strips 51, preferably of brass, which strips are rabbeted to interlock with top and bottom liners 52, preferably of wood. It will thus be seen that such wooden liners are held in properly spaced relation by the strips 51 so as to leave an opening 53 of just the proper width to permit passage of the strip or sheet therethrough and into the rolls. The space 53 of course lies in the same plane as that in which the wiping elements meet and the edges of the liners 52 directed toward such wiping elements are preferably beveled so that the space widens out towards such wiping elements, as shown in Fig. 2.

The operation of my improved wiping mechanism as a whole should be readily understood from the foregoing description of the construction of its component parts and their individual action. Assuming the plates 3, that constitute the bases of the wiping elements, to be properly fitted with pads 40, and link 14 to be adjusted to properly correlate the movement of the two pairs of such elements, the stops 23 and 27 are adjusted so that when the plates 3 are allowed to swing inwardly they will bear on the upper and lower faces respectively of a sheet placed therebetween, with a sufficient degree of pressure to insure the desired cleaning and polishing effect. The stops, it will be observed, effectively prevent such wiping elements from swinging so closely together as to unduly grip the sheet and thus prevent or retard its feeding movement. It will also be observed that as the pads 40 wear down, by changing the adjustment of said stops the plates 3 may be allowed to swing in further and thus bring fresh portions of the pads to bear against the sheet or strip, until such pads are worn down entirely across the faces of plates 3. In order to introduce a strip the operator has merely to depress pedal 36 with his foot, both hands being left free to manipulate the strip and introduce same into guide box 50, and thus between the rolls 2. Upon the rolls seizing the strip the wiping elements are thrown instantly into action by simply releasing the pedal, whereupon counterweight 35 rocks the interconnected shafts 5, 6, 8 and 9 to bring the wiping elements together as previously explained. The operation of the mechanism accordingly interferes in no way with the feeding of the sheet into the mill and permits of a considerable reduction in the operating force heretofore necessary where the wiping elements have had to be manually adjusted or brought into operative position every time a fresh strip was fed into the mill. Furthermore, by locating the inner set of such wiping elements between the side members of the mill housing, and thus immediately in front of the guide box, only a relatively short portion of the strip passes into the mill without being cleaned, and the amount of waste material is correspondingly reduced. Finally, by reason of the ease and expedition with which a worn-out pad may be replaced on the wiping elements, the loss of time due to this necessary operation is cut down to a minimum.

It will be understood that the counterweight need not necessarily be heavy enough to impose the desired maximum pressure under which the wiping elements contact with the strip or sheet since by reason of the construction of the mechanism, and more particularly the manner in which such wiping elements are mounted, the friction of the strip as it is drawn between the elements serves to draw the latter together, the degree of closure being determined by the position of the adjustable stops therefor provided in connection with the respective pairs of wiping elements. It accordingly will suffice if the counterweight is merely heavy enough to bring the wiping elements into contact with the strip, although if desired, such counterweight may be relied upon to impose the maximum pressure permitted by said stops.

It will also be understood that the elements may be otherwise than oscillatorily mounted and still secure the effect last described. Thus, as shown in Fig. 5, the elements 55 of each pair may be slidably mounted on converging guideways 56, i. e. guideways that incline towards the plane of movement of the strip or sheet 57, so that as said elements are moved in the direction in which the sheet moves, they at the same time approach such plane from above and below respectively. The method of mounting thus illustrated in Fig. 5 lends itself readily to the same mode of operation previously described, in that an adjustable stop 58 may be employed to limit the closing movement of the elements, while a counterweighted lever 59 on a rock shaft 60 with link and lever connections 61 to said elements, (or to one pair thereof where more than one pair is employed), serves to simultaneously open the elements to permit the introduction of a fresh strip of material, the

counterweight serving as before to close the elements upon the strip.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the character described, a pair of wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said elements being positively interconnected so as to be conjointly movable towards and from the plane of such article and means limiting movement of said elements towards such plane.

2. In mechanism of the class described, a pair of wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said elements being positively interconnected so as to be conjointly movable towards and from the plane of such article, and adjustable means limiting movement of said elements towards such plane.

3. In mechanism of the character described, a pair of wiper elements having opposed transversely curved faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said elements being positively interconnected so as to be conjointly movable towards and from the plane of such article, and means limiting movement of said elements towards such plane.

4. In mechanism of the character described, a pair of wiper elements having opposed transversely curved faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said elements being positively interconnected so as to be conjointly movable towards and from the plane of such article, and adjustable means limiting movement of said elements towards such plane.

5. In mechanism of the character described, a pair of wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said elements being positively interconnected so as to be conjointly movable towards and from the plane of such article and being simultaneously movable in a direction approximately parallel with such plane, whereby frictional contact of such article with said elements tends to draw the latter towards such article.

6. In mechanism of the character described, the combination of a pair of wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said members being positively interconnected so as to be conjointly movable towards and from the plane of such article, and means normally tending to move said elements towards such plane.

7. In mechanism of the character described, the combination of a pair of wiper elements having opposed transversely curved faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said members being conjointly movable towards and from the plane of such article, means normally tending to move said elements towards such plane, and means for moving said elements out of such contacting position.

8. In mechanism of the character described, the combination of a pair of wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said members being conjointly movable towards and from the plane of such article, means normally tending to move said elements towards such plane, and means limiting such movement of said elements.

9. In mechanism of the character described, the combination of a pair of wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said members being conjointly movable towards and from the plane of such article, means normally tending to move said elements towards such plane, and adjustable means limiting such movement of said elements.

10. In mechanism of the character described, the combination of a pair of wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, said members being conjointly movable toward and from the plane of such article and being simultaneously movable in a direction approximately parallel with such plane, whereby frictional contact of such article with said elements tends to draw the latter towards such article, means normally tending to move said elements towards such plane, and adjustable means limiting such movement of said elements.

11. In mechanism of the character described, a wiper element having a transversely curved face adapted to contact with the strip or like article to be cleaned, said element being movable towards and from the plane of such article, and means adapted automatically thus to operate said element.

12. In mechanism of the character described, a wiper element having a transversely curved face adapted to contact with the strip or like article to be cleaned, said element being movable towards and from

the plane of such article and simultaneously in a direction approximately parallel with such plane, whereby frictional contact of such article with said element tends to draw the latter towards such article.

13. In mechanism of the character described, the combination of a wiper element having a face adapted to contact with the strip or like article to be cleaned, said element being movable towards and from the plane of such article and simultaneously in a direction approximately parallel with such plane, whereby frictional contact of such article with said element tends to draw the latter towards such article, and means limiting such movement of said element.

14. In mechanism of the character described, the combination of a wiper element having a face adapted to contact with the strip or like article to be cleaned, said element being movable towards and from the plane of such article and simultaneously in a direction approximately parallel with such plane, whereby frictional contact of such article with said element tends to draw the latter towards such article, and adjustable means limiting such movement of said element.

15. In mechanism of the character described, the combination of a wiper element having a transversely curved face adapted to contact with the strip or like article to be cleaned, said element being movable towards and from the plane of such article and simultaneously in a direction approximately parallel with such plane, whereby frictional contact of such article with said element tends to draw the latter towards such article, and means normally tending to move said element towards such plane.

16. In mechanism of the character described, the combination of a wiper element having a transversely curved face adapted to contact with the strip or like article to be cleaned, said element being movable towards and from the plane of such article and simultaneously in a direction approximately parallel with such plane, whereby frictional contact of such article with said element tends to draw the latter towards such article, means normally tending to move said element towards such plane, and means for moving said element out of such contacting position.

17. In mechanism of the character described, the combination of a wiper element having a face adapted to contact with the strip or like article to be cleaned, said element being movable towards and from the plane of such article and simultaneously in a direction approximately parallel with such plane, whereby frictional contact of such article with said element tends to draw the latter towards such article, means normally tending to move said element towards such plane, adjustable means limiting such movement of said element, and means for moving said element out of such contacting position.

18. In mechanism of the character described, the combination of a pair of oscillatorily supported wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, and means adapted to maintain said elements in predetermined proximate relation to the plane of movement of such article.

19. In mechanism of the character described, the combination of a pair of oscillatorily supported wiper elements having opposed faces adapted to contact with corresponding faces of the strip or like article to be cleaned, and means adapted to maintain said elements in predetermined proximate relation to the plane of movement of such article, said means being adjustable to vary such relation.

20. In mechanism of the character described, the combination of a pair of wiper elements oscillatorily supported about parallel axes and having opposed transversely curved faces adapted to contact with corresponding faces of the strip or like article to be cleaned, and means adapted to maintain said elements in predetermined proximate relation to the plane of such article.

21. In mechanism of the character described, the combination of a pair of wiper elements oscillatorily supported about parallel axes and having opposed transversely curved faces adapted to contact with corresponding faces of the strip or like article to be cleaned, and means adapted to maintain said elements in predetermined proximate relation to the plane of such article, said means being adjustable to vary such relation.

22. In mechanism of the character described, a wiper element including a base, a pad of suitable wiping material adapted to extend across such face, and means securing said pad thus in place, said means being adapted to maintain said pad in properly stretched condition, substantially as described.

23. In mechanism of the character described, a wiper element including a base, a pad of suitable wiping material adapted to extend across such face, and means securing said pad thus in place, said means including tension elements whereby said pad may be maintained in properly stretched condition, substantially as described.

24. In mechanism of the character described, a pair of oscillatorily mounted wiper elements having opposed faces eccentrically curved with respect to the axes of oscillation of said elements.

25. In mechanism of the character described, the combination of a pair of oscillatorily mounted wiper elements having op-

posed faces eccentrically curved with respect to the axes of oscillation of said elements, and means interconnecting said elements, whereby they are caused to rock in unison.

26. In mechanism of the character described, the combination of a pair of oscillatorily mounted wiper elements having opposed faces eccentrically curved with respect to the axes of oscillation of said elements, means interconnecting said elements, whereby they are caused to rock in unison, and a stop adapted to limit rocking movement of said elements in a direction to bring the faces thereof together.

27. In mechanism of the character described, the combination of a pair of oscillatorily mounted wiper elements having opposed faces eccentrically curved with respect to the axes of oscillation of said elements, means interconnecting said elements, whereby they are caused to rock in unison, and an adjustable stop adapted to limit rocking movement of said elements in a direction to bring the faces thereof together.

28. In mechanism of the character described, the combination of a pair of oscillatorily mounted wiper elements having opposed faces eccentrically curved with respect to the axes of oscillation of said elements, means interconnecting said elements, whereby they are caused to rock in unison, a stop adapted to limit rocking movement of said elements in a direction to bring the faces thereof together, and means tending normally thus to rock said elements.

29. In mechanism of the character described, the combination of a pair of oscillatorily mounted wiper elements having opposed faces eccentrically curved with respect to the axes of oscillation of said elements, means interconnecting said elements, whereby they are caused to rock in unison, a stop adapted to limit rocking movement of said elements in a direction to bring the faces thereof together, means tending normally thus to rock said elements, and other means adapted for external operation, whereby said elements may be rocked in the opposite direction.

30. In mechanism of the character described, the combination of two pairs of rock-shafts, one shaft of each pair being located above and the other below the plane of movement of the strip or like article to be wiped, similar wiper elements mounted on said shafts, said elements having faces eccentrically curved with respect to the axes of said shafts and the faces of each pair of elements being arranged to press against opposite faces of such article, segmental gears positively interconnecting each pair of shafts, and other means similarly interconnecting corresponding shafts of each pair.

31. In mechanism of the character described, the combination of two pairs of rock-shafts, one shaft of each pair being located above and the other below the plane of movement of the strip or like article to be wiped, similar wiper elements mounted on said shafts, said elements having faces eccentrically curved with respect to the axes of said shafts and the faces of each pair of elements being arranged to press against opposite faces of such article, segmental gears positively interconnecting each pair of shafts, and other means, including an adjustable link, similarly interconnecting corresponding shafts of each pair.

32. In mechanism of the character described, the combination of two pairs of rock-shafts, one shaft of each pair being located above and the other below the plane of movement of the strip or like article to be wiped, similar wiper elements mounted on said shafts, said elements having faces eccentrically curved with respect to the axes of said shafts and the faces of each pair of elements being arranged to press against opposite faces of such articles, segmental gears positively interconnecting each pair of shafts, other means, including an adjustable link, similarly interconnecting corresponding shafts of each pair, and stops connected with one shaft of each pair adapted to limit the closing movement of the wiper elements carried by said shafts.

33. In mechanism of the character described, the combination of two pairs of rock-shafts, one shaft of each pair being located above and the other below the plane of movement of the strip or like article to be wiped, similar wiper elements mounted on said shafts, said elements having faces eccentrically curved with respect to the axes of said shafts and the faces of each pair of elements being arranged to press against opposite faces of such article, segmental gears positively interconnecting each pair of shafts, other means, including an adjustable link, similarly interconnecting corresponding shafts of each pair, stops connected with one shaft of each pair adapted to limit the closing movement of the wiper elements carried by said shafts, and a counterweighted shaft connected with one of said paired shafts and tending normally to rock the latter to close said wiper elements.

34. In mechanism of the character described, the combination of two pairs of rock-shafts, one shaft of each pair being located above and the other below the plane of movement of the strip or like article to be wiped, similar wiper elements mounted on said shafts, said elements having faces eccentrically curved with respect to the axes of said shafts and the faces of each pair of elements being arranged to press against opposite faces of such article, segmental

gears positively interconnecting each pair of shafts, other means, including an adjustable link, similarly interconnecting corresponding shafts of each pair, stops connected with one shaft of each pair adapted to limit the closing movement of the wiper elements carried by said shafts, a counterweighted shaft connected with one of said paired shafts and tending normally to rock the latter to close said wiper elements, and a pedal on said counterweighted shaft for rocking same in the opposite direction.

35. In mechanism of the character described, a wiper element including an oscillatory base having a face curved eccentrically with respect to the axis of oscillation of said base, a pad of suitable wiping material adapted to extend across such face, and means for detachably securing said pad thus in place.

36. In mechanism of the character described, a wiper element including an oscillatory base having a face curved eccentrically with respect to the axis of oscillation of said base, a pad of suitable wiping material adapted to extend across such face, and means for detachably securing said pad thus in place, said means including tension elements whereby said pad may be maintained in properly stretched condition.

37. As an article of manufacture a detachable, interchangeable pad for wiping elements in a machine of the character described, such pad comprising a sheet of suitable material, and reinforcing strips detachably gripping opposite edges of said sheet.

38. As an article of manufacture a detachable, interchangeable pad for wiping elements in a machine of the character described, such pad comprising a sheet of suitable material, reinforcing strips detachably gripping opposite edges of said sheet, and attaching clips pivotally secured to said strips.

Signed by me this 26th day of July, 1923.

CHARLES H. BRADLEY.