March 26, 1957 R. R. RICHTER 2,786,413

WASHUP ATTACHMENT FOR PRINTING PRESSES AND THE LIKE

Filed Nov. 17, 1953 2 Sheets-Sheet 1

Fig. 1

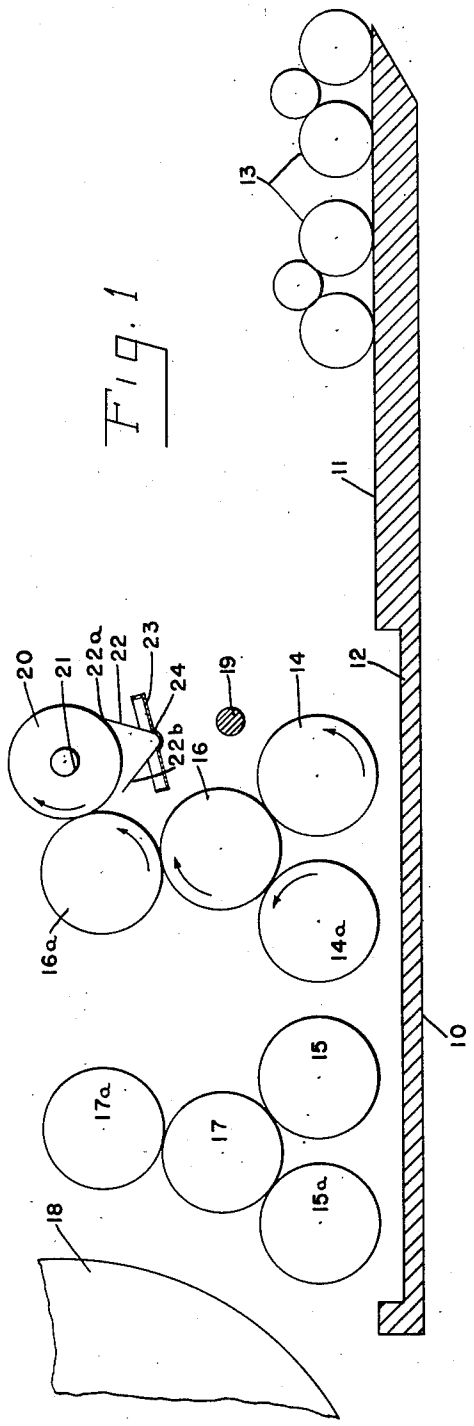
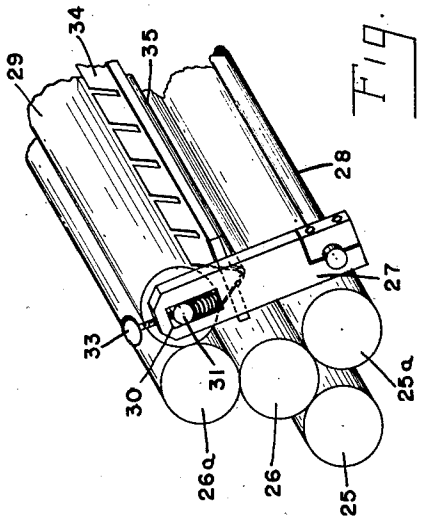


Fig. 2



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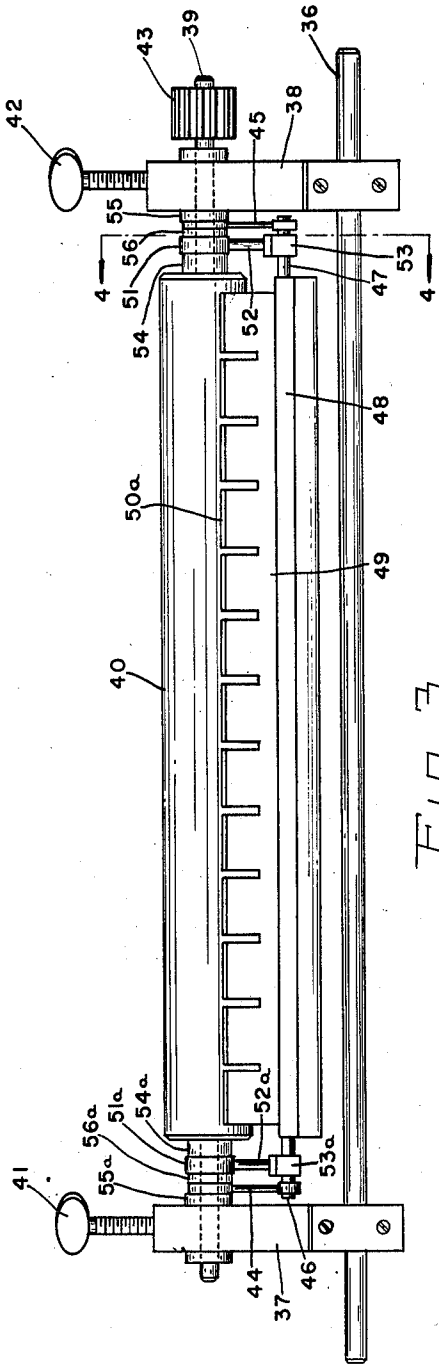


Fig. 3

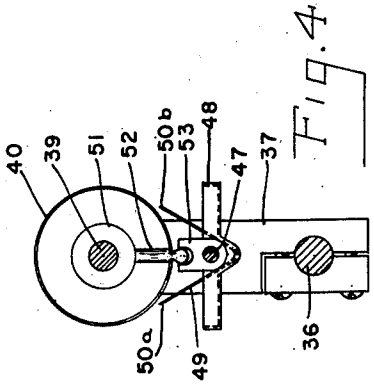


Fig. 4

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2,786,413

WASHUP ATTACHMENT FOR PRINTING PRESSES AND THE LIKE

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Application November 17, 1953, Serial No. 392,655

9 Claims. (Cl. 101—425)

The present invention relates to a novel apparatus for cleaning or washing up coating rollers or inking rollers such as are commonly used in printing presses and the like and is a continuation-in-part of applicant's copending application No. 328,110 filed December 26, 1952.

In particular, the present invention relates to the cleaning of a train of printing rollers, all of which are rotating in tangentially contacting sequence and more especially to an improved wash-up mechanism for flatbed presses wherein the ink transfer and printing rollers alternate in the direction of their rotation.

In coating machines, it is necessary that, from time to time, the coating material which is usually used in liquid form, be completely removed and cleaned from the coating or distributing roll. In the case of printing presses, the ink is usually applied or removed through the use of a steel distributing roll cooperating with other rolls in a train. Since there are usually a great many cylinders to be so cleaned in any one such apparatus, it has been found desirable to clean the rollers while they remain in their operating position on the machine, rather than to remove the rollers therefrom to be cleaned individually. To effect this desired objective, it has become the practice to remove the coating material from all of the rotating cylinders in the coating chain simply by wiping, scraping or otherwise removing the coating material from only one or two of the rotating cylinders. This procedure is capable of achieving the desired result of cleaning all of the rollers in the train because of the fact that the inherent cohesive properties of the coating material cause it to flow continuously to the point anywhere within the train of rollers at which it is being drawn therefrom. In order that the coating cylinders may be cleaned in this manner, it is, of course, necessary that the supply of the coating material to the train of cylinders must be shut off; and this may be accomplished in any of the well known manners such as simply breaking the contacting sequence between the cylinders to be cleaned and the cylinders supplying the coating material.

The problem of cleaning a complete train of coating cylinders has thus been reduced to the problem of swiftly and completely removing the coating material from any one roller or cylinder in the contacting sequence. In previous attempts to accomplish this expedient, however, considerable difficulty has been encountered in providing means for so removing the coating material from any one cylinder so as to achieve the uniformity and thoroughness of cleaning that is demanded. Contributing to this difficulty has been the fact that either the roller from which the coating material is to be drawn, or the blade or similar device which is to do the drawing, will have surface irregularities which, although they are imperceptible and not important so far as the coating operation is concerned, prevent the wiping or drawing off member from contacting the cylinder uniformly at all points. Wherever upon the surface of the cylinder the drawing off device fails to make operative contact, the coating material will remain on the roller, and the continuity of its

flow which is necessary for the complete cleaning of all of the rollers, will be destroyed.

To improve the uniformity of contact between the blade and the train of cylinders, it has previously been proposed to provide either a flexible deformable surface about the cylinder from which the coating material is to be drawn, or a flexible deformable scraping member. The disadvantages inherent in these proposals include the fact that, where a flexible wiping or drawing off member is used in connection with a hard surface cylinder or where a rigid drawing off member is used in connection with a cylinder having a flexible surface, the wearing and deteriorating effect of the hard or rigid member upon the flexible member has proven excessive resulting in premature failure of the device and much loss of time in repairs and replacements thereof. If, on the other hand, a cylinder having a flexible surface has been brought into contact with a flexible drawing off device, the necessary rigidity required for a complete and thorough cleaning action has been lost. Indeed, it has usually developed that even where only one of the members involved in the drawing off process was of a flexible nature, the flexibility necessary for the desired uniform contact between drawing off member and coated cylinder has been so great that the necessary rigidity for a thorough and complete cleaning action has been lost. Furthermore, both rigid and flexible scrapers as used by the prior art become distorted or sag during use so that uniform wiping action over the length of the roll is not obtained.

It is accordingly an object of the present invention to provide a cylinder cleaning apparatus capable of effecting thorough and uniform removal of a coating material from a train of coating rollers.

It is a more particular object of the present invention to provide such a wash-up attachment capable of operating upon printing presses wherein the ink transfer rollers alternately reverse their direction of rotation.

It is yet another object of the present invention to provide a washup attachment for printing presses comprising a chain of ink transfer rollers, the only accessible ones of which are characterized by a soft surface of a flexible material, wherein there will be no sacrifice of the necessary rigidity between scraping member and roll surfaces such as is necessary for a complete and efficient cleaning action.

To achieve the above enumerated objects and others to be apparent from a reading of this disclosure, the present invention provides a unitary scraping or wiping member having a continuous base portion and a flat-toothed cylinder-contact portion, the teeth of this latter portion being of such depth and spacing as to allow for their independent contact with one of the cylinders in the coating train. The overall length of this blade member will be equal to the length of the cylinder from which the coating material is to be withdrawn, and the blade will be positioned substantially parallel to the rotational axis of such roller. It is further provided that this blade member will be so mounted that it may be rotated or otherwise moved into tangential contact with such roller whereupon each of the individual flat teeth will be resiliently urged against the cylinder to be evacuated. In this manner, each of the individual teeth will be free to firmly engage its respective portion of the cylinder from which the coating material is to be removed and any protrusions or depressions in such cylinder will not prevent the remaining blades from similarly establishing uniform contact with their respective portions of the cylinder. The nominal spacing that will separate each of the teeth will be of an inconsequential magnitude, in most cases not to exceed 1/16", such that the cohesive force of the coating material will not be overcome as it is removed

from the cylinder by the several teeth and the continuous flow of this coating material will not be interrupted.

Since it will usually be preferred that the toothed portion of the blade member shall be of a relatively thin metal, it will be necessary in order to obtain the necessary rigidity throughout the overall length of the scraping member to provide added stiffness or rigidity in the base portion thereof.

According to this invention, the necessary rigidity may be provided by bending a part of this base portion away from the plane of the teeth so that a beam will be formed. In addition to providing the necessary blade rigidity without the addition of more metal or additional reinforcing parts to the base portion, this feature of the invention provides an additional improvement when it is desired to employ the wash-up attachment herein described upon a train of coating cylinders which will operate from time to time in reverse rotational direction. When such a situation is encountered, the bent portion of the base of the blade may be continued on to form a U-shaped or similar two-sided blade member which may be so pivotally mounted in juxtaposition to one of the rollers that first one side and then the other side of the trough-shaped blade may be brought into contact with the same cylinder at opposite points thereof. In this situation, both edges of the two-sided blade assembly will, of course, be provided with the flat teeth above described so that the desired uniform cleaning of the cylinder may be achieved notwithstanding certain departures of the surface thereof from true cylindrical proportions. Thus, there is provided a pair of longitudinally spaced blades which are alternately contacted with opposite sides of the roll in response to reversal of direction of rotation thereof.

Where a U-shaped blade member is employed on presses involving rollers capable of operating in reverse direction, additional blade stiffening means may be provided according to the present invention by securing the base of the trough-shaped blade to a catch pan which will be coextensive with the length of the blade and project laterally from the base of the same a sufficient distance to catch the ink or other coating material as it is removed from the printing or coating rollers.

A further refinement of the present invention providing yet another improvement for wash-up devices to be used in conjunction with reversally rotating roller trains such as are encountered in flatbed presses, is provided in the form of means associated with the blade of U-shaped cross-section and the catch trough fastened thereto for regulating the angular relation between the blade member and the cylinder from which the coating material is being drawn off. Such means are made responsive to the direction of rotation of the roller to be first evacuated such that that side of the two-sided blade member toward the direction of rotation of the roller will be in contact with the surface to be cleaned and the scraping force of the blade will be substantially opposed to the rotational force of the cylinder.

Where, as is often the case, particularly in flatbed presses, the only accessible rollers in the transfer chain have a soft or flexible surface, the desired rigidity of both the blade member and the roller surface necessary for an efficient cleaning action as above described may be preserved according to this invention by the provision of an additional roller of metallic surface operating in conjunction with the blade and trough members and the pivoting control mechanism cooperating therewith. This local roller is preferably directly associated with the wash-up assembly, and the assembly must, of course, be mounted so that the local roller is in tangential contact with one of the rollers in the train of transfer rollers so that it may draw the coating material from these rollers.

From the foregoing objects and brief description of the present invention it can be seen that it may be most advantageously employed on flatbed presses or the like having transfer rollers capable of reverse rotation, the only accessible ones of which are of a soft surface which is undesirable from the standpoint of efficient cleaning or washing up. The present invention shall therefore be described in greater detail in connection with this preferred embodiment and adaptation of the present invention; and for purposes of this detailed description reference may be had to the appended drawings in which:

Figure 1 is a schematic diagram of a wash-up device according to this invention as it is applied to a typical flatbed press.

Figure 2 is a perspective of a wash-up attachment according to this invention operating in contact with a train of printing rollers wherein the components of the wash-up attachment are shown in greater detail.

Figure 3 is an elevational view of a complete wash-up assembly incorporating the features of the present invention.

Figure 4 is a cross-section on line 4—4 of Figure 3 showing more clearly the construction of the scraper blade reversing means.

Referring now to Figure 1, there is shown in schematic fashion, a typical flatbed press wherein the reciprocating bed 10 is composed of an inking surface 11 and a type or form bed 12. The illustration of Figure 1 shows this reciprocating bed as it is passing through its inking phase during which the inking surface 11 comes into contact with the angle rollers 13 which spread the ink from a source of supply such as a typical fountain (not shown) upon the inking surface of the press bed. As the bed reciprocates to the left, the ink thus deposited upon the inking surface 11 is carried to the type bed or form inking rollers 14, 14*a*, 15 and 15*a*. This inking contact of the rollers 14, 14*a*, 15 and 15*a* with the inking surface 11 while the latter is in motion, causes the rollers to rotate, and they, in turn, impart a similar rotation to the distributor rollers 16, 16*a*, 17 and 17*a*. These last described ink distributor rolls are provided in the printing operation to insure an even distribution of the ink over all of the inking rollers and to provide a limited reserve of ink to guarantee a continuous flow of the same to the impression plate carried in the type bed 12. For the most efficient distribution of the ink, it is usually preferred that the inking and certain of the distributor rollers operate in tangential contact with a steel drum or hard surfaced roller. In a typical arrangement as shown in Figure 1, the rollers 14, 14*a*, 15, and 15*a*, 16*a* and 17*a* have a soft or flexible surface of a rubber-like material; whereas the intermediate distributor rollers 16 and 17 would be composed of a metallic substance. In certain cases these steel rollers oscillate axially, thereby further spreading the ink over the surfaces of the adjoining rollers.

As the bed 10 again reverses its direction and moves to the right to allow the inking surface 11 to again come in contact with the angle rollers 13 the ink which has been previously carried to the inking rollers 14, 14*a*, 15 and 15*a* is drawn from these rollers on to the impression plate or form within the type bed 12. This form, thus inked, will then come in contact with the medium upon which the printing is to be effected which is mounted upon the printing roller 18 while the bed 10 continues moving to the left at the same time bringing more ink from the fountain to the form rollers via the inking plate 11.

A wash-up attachment according to the present invention is shown applied to this sequence of ink transfer and distributor rollers at the soft surfaced roller 16*a*. The wash-up assembly may be attached by suitable means (not shown) to a bar or other mounting bracket forming an integral part of the press, such bar being designated as 19. The wash-up attachment as shown in the schematic representation of Figure 1, comprises simply a steel drawing off tube or drum 20 which is rotatably mounted upon the axle 21 and is rotated as a result of its contact with the roller 16*a*. The wash-up attachment shown in

Figure 1 also comprises the two-sided blade in the form of a U-shaped blade member **22** having a catch pan **23** mounted to the blade member **22** along the dished portion **24** of the former which is contoured to conform to the base of the U-shaped member.

From the mechanism shown and described in connection with Figure 1, it can be seen that the arrangement of the rollers and the operation of the press is such that the inking rollers will rotate in clockwise fashion as the bed moves to the left and will subsequently operate in counter-clockwise fashion as the bed reciprocates and returns to its inking position by moving to the right. Additionally, it can be seen that, because of the roller arrangement, it would be impractical to apply the scraping member **22** directly to the centrally located steel roller such as **16** or **17** in order to provide the desired contact with a hard-surfaced ink carrying cylinder. To circumvent this impracticability, the present invention provides a wash-up device having its own local drawing off roller **20** which is composed of metal and is so positioned upon the press that it will form a linear contact longitudinally of one of the ink rollers such as **16***a* so that for wash-up purposes, the hard surface of the former roller will replace the soft surface of the latter.

Since in the illustration of Figure 1 the bed is shown after it has moved toward the right, the inking surface **11** having left the form rollers, the rotation of these rollers immediately prior to their separation from the ink surface **11** was in a counterclockwise direction. This counterclockwise rotation accordingly imparted a clockwise rotation to the central steel roller **16** which in turn imparted a counterclockwise rotation to the soft surfaced roller **16***a* which in turn was imparting a clockwise rotation to the local steel drawing off roller **20**. In order that the most efficient scraping action could take place during this clockwise rotation of the local roller **20** means are provided for causing the right side of the U-shaped blade member **22***a* to contact the surface of the cylinder **20** so that the scraping effect of the blade would be substantially opposed to the rotational effect of the cylinder. Immediately upon the return of the reciprocating bed moving to its left into contact with the form rollers the rotation of all of the rollers will be reversed and the left side **22***b* of the blade **22** will be resiliently urged against the surface of the drawing-off roller **20**.

The particular construction of the wash-up attachment as it is applied to the inking rollers is shown in greater detail in Figure 2 wherein the soft-surfaced form rollers are designated at **25** and **25***a*, the steel distributor roller at **26** and the soft-surfaced distributor roller at **26***a*. The wash-up attachment itself is mounted upon the press by suitable bracket **27** clamped at one end to a mounting bar **28** and holding at its other end the steel drawing-off roller **29**. In one preferred form of the invention, the upper portion of the mounting bracket **27** is provided with the longitudinally extending slot **30** in which the axle **31** of the drawing-off roller **29** is slidably mounted. Acting upon this axle **31** within the slot **30** are a compression spring **32** acting against the bottom of the axle and thumb screw **33** acting against the top thereof. When it is desired that the washing operation be performed, the thumb screw **33** is loosened so that the compression spring **32** acts upon the axis of the roller to resiliently urge it into the above-mentioned desired tangential contact with the soft-surfaced distributor roller **26***a*. Since the surface of the roller **26***a* is soft, the rigid local roller **29** may be pressed into a uniform linear contact therewith in spite of certain irregularities which might occur on the surface of either of the rollers. When it is desired to discontinue the wash-up operation, as for example, when it is desired to print upon the printing roll **18** of Figure 1, the wash-up attachment may be conveniently removed from operative engagment with the ink transferring roller train by tightening the thumb screw **33** and forcing the roller **29** downward and away from contact with the roll **26***a*. In the embodiment illustrated in Figure 2, the movement of the roller **29** relative to roll **26***a* is attended by a change in the relative position of roller **29** and blade member **34**. A considerable range of distances separating these members is available in view of the resilience and pivotal mounting of the latter. The particulars of the construction and operation of the flat-toothed blade member **34** and the catch pan **35** associated therewith will be more fully explained in connection with Figures 3 and 4 below.

In Figure 3 a wash-up attachment of the type described above is shown mounted on a bar **36** by brackets **37** and **38** supporting opposite ends of the axle **39** of the steel drawing-off roller **40**. Acting upon this axle and cooperating with the compression springs (not shown) to control the slidable position of this axle in each of the mounting brackets are thumb screws **41** and **42**. The drawing-off roller **40** may be rotatably mounted so that it will be freely driven by the friction of its contact with the rotating rollers of the press such as those previously described in connection with Figures 1 and 2. In the alternative, the rotation of the axle of this roller **40** may be provided by a driving gear **43** connected to the overall gearing of the roller train.

Associated with the axle **39** of the roller **40** at each end thereof are depending hangers **44** and **45** having openings at each end to allow the same to be slidably positioned about the axle **39** at the top and similarly positioned about the supporting shafts **46** and **47** of the catch pan **48** on the bottom thereof. In this particular embodiment, the fixed association of the blade catch pan combination with the axle of the roller **40** is important in that the position of the blade-pan member relative to that of the drawing-off roller **40** will remain constant notwithstanding vertical movement of the axle **39** in the slots of the brackets **37** and **38**. As shown in Figure 3, this spacing of the blade-pan assembly and the roller is such that, upon partial rotation of the U-shaped blade member **49**, the flat-toothed cylinder contacting portion **50***a* thereof will come into contact with the roller **40**.

The means by which the partial rotation of the U-shaped blade member **49** having the ink catch pan **48** associated therewith is controlled and made responsive to the rotational direction of the drawing-off roller **40** are best shown in Figure 4 wherein there is shown mounted slidably about the roller axis **39** a pivot washer **51** having a depending pawl **52** the lower end of which engages a slotted rocker hub **53** which is fixedly mounted to the shaft **47** which, in turn, is an integral part of the blade catch pan assembly to be hereinafter more fully described. While the pivot washer **51** may be said to be slidably mounted upon the axle **39**, the fit of the same is sufficiently snug that the friction at the contacting surfaces of the axle and washer will cause the washer to turn until the pawl **52** has moved the rocker hub **53** to the stop position at which the blade portion **50***a* or **50***b* will be in contact with the drawing-off roller **40**. Once such a stop position has been reached, the friction at the contacting surface between axle **39** and washer **51** will be overcome and the washer will continue to slide about the axle while constantly urging the particular blade portion into contact with the drawing-off roller. As shown in Figure 3, the pivot washer **51** may be properly positioned upon the axle **39** relative to the brackets **37**, **38**, the hangers **44** and **45** or the ends of the drawing-off rollers by means of spacer washers such as **54** and **55**. To control the friction characteristics of the mounting of the pivot washer, a thrust washer such as **56** may be employed on either side of the same. A similar pivoting arrangement comprising pivot washer **51***a* having a pawl **52***a* engaging a rocker hub **53***a* and appropriately arranged spacer washers **54***a* and **55***a* and thrust washer **56***a* may be provided at the other end of the axle **39**, but such additional pivoting means are not necessary.

As explained above, the U-shaped blade member is preferably fastened to the catch pan **48**, and this fasten-

ing may be achieved by means of rivets or other well known means along the base of the blade member which in the preferred example of Figures 3 and 4 is shown to be positioned in and partially surrounded by a contoured depression within the catch pan 48. Since the catch pan and the blade member are thus an integral unit, the support shafts 46 and 47 may be fixedly associated with the catch pan which is of a sturdier construction than the blade member so that the rocking motion which is imparted to the rocker link 53 by the rotation of the pivot washer 51 and which is responsive to the rotation of the roller 40, will be efficiently transferred to the blade member resulting in the desired scraping action herein described.

The blade 49 as above described is preferably composed of relatively thin material such as tempered steel, rubber, plastic or the like, with a preferred thickness, in the case of steel, of about 0.004 to 0.010 inch. Other materials such as plastic or rubber may be somewhat thicker, and, in this particular embodiment, is shown to be of a U-shaped cross-section. The scraping or cylinder contacting edges 50*a* and 50*b* of this blade portion are shown to be serrated or divided into flat-toothed segments to achieve the desired results herein set forth; to wit: a uniform scraping action resulting from an independent contact of each of the serrated segments with the drawing-off roller 40 so that accentricities and irregularities in the surface 40 will not prevent a thorough scraping action by each of the individual segments. As stated in the disclosure of the above-mentioned application Serial No. 328,110, of which the present application is a continuation-in-part, the length of the individually acting scraping or wiping edges is relatively small compared with the overall length of the rollers in connection with which the blades are operating and in comparison with the overall length of the scraping assembly as a whole. The preferred length of the individual scraping or wiping edges is on the order of 2 inches, and the same are spaced by a nominal distance on the order of 1/16 inch. In keeping with this individual action of each of the teeth of the scraping edges, it is important that the greatest resiliency be introduced to their contact with the cylinder. In this invention, the desired resiliency is provided by the construction of the blade member from a thin resilient metal, the serration of this metal at its edges, and the availability of the thin metal blade which results from the fact that the thin blade may be reinforced by its contoured fit in the more rigid catch pan. The resiliency thus provided by the present invention is most capably utilized by the provision of the pivot washer mounting described in connection with Figure 4 in that the same provides a constantly urging force acting to bring the proper scraping edge of the blade member into contact with the surface of the cylinder 40 to be evacuated. An examination of Figure 4 will disclose that, as the roller 40 is rotated through the driving gear 43 or its contact with a rotating ink distributing roller in a clockwise direction, the friction of the fit between the axle 39 of the roller and pivot washer 51 will cause the latter to rotate in a similar clockwise direction with the result that the pawl 52 will act upon the rocker link moving the same to the left thereby forcing the right-hand edge 50*b* of the U-shaped blade member 49 into contact with the roller. Conversely, when the roll 40 is operating in a counter-clockwise direction, the pawl 52 will be moved to the right and the left edge 50*a* of the scraping member will be brought into contact with the roller surface. It is thus provided that that edge of the blade member 49 which will most directly oppose the direction of rotation of roll 40 will always be in contact with the surface to be evacuated.

While the present invention has been described in particular detail with reference to one preferred modification thereof, it is to be understood that reference to such modification is for purposes of description only and is intended in no way to limit the scope of this invention as more particularly defined in the subjoined claims.

I claim:

1. In an apparatus for removing a coating material from a train of fluid transfer rollers that improvement which comprises an elongated blade member of substantially U-shaped, trough-like cross section having a length corresponding to the length of said rollers and having the sides thereof divided into a plurality of closely spaced, relatively short flat teeth, said blade member being a unitary structure composed of a relatively thin resilient metal and the teeth thereof being capable of individual resilient action, means for mounting said blade member substantially parallel to the rotational axis of at least one of said rollers and means for alternately resiliently urging the individual teeth on each of said sides into substantially linear contact with one of said rollers whereby uniform contact between blade and roller will be established notwithstanding irregularities in the roller or the blade member mounting means.

2. An apparatus according to claim 1 wherein said teeth are substantially 2 in. in length.

3. An apparatus according to claim 2 wherein said teeth are axially spaced by a distance of approximately 1/16 in.

4. An apparatus according to claim 3 wherein said teeth are composed of a tempered steel having a thickness ranging from 0.004 in. to 0.010 in.

5. In an apparatus for removing a coating material from a train of fluid transfer rollers, that improvement which comprises an elongated blade member of substantially U-shaped, trough-like cross section having a length corresponding to the length of said rollers and having the sides divided into a plurality of closely spaced, relatively short flat teeth, said blade member being a unitary structure composed of a relatively thin resilient metal and the teeth thereof being capable of individual resilient action, a relatively rigid catch pan coextensive with said blade member and mounted thereto at the base thereof whereby rigidity is imparted to the blade member as a whole without affecting the resiliency of the individual teeth thereof, means for mounting said blade and said catch pan substantially parallel to the rotational axis of at least one of said rollers, and means for alternately, resiliently urging the individual teeth on each of said sides into substantially linear contact with one of said rollers, whereby uniform contact between blade and roller will be established notwithstanding irregularities in the roller, the mounting means, or the catch pan mounted to said blade member.

6. A cylinder cleaning device according to claim 5 wherein said catch pan has a contoured depression and said blade member is mounted within said depression to form an integral unit.

7. In a wash-up attachment for a printing press, the only accessible ink transfer rollers of which have a relatively soft surface, that improvement which comprises a hard-surfaced roller rotatably mounted parallel to and in axially tangential contact with one of said accessible soft-surfaced rollers along substantially the full length thereof, an elongated blade member of substantially U-shaped, trough-like cross section having a length corresponding to the length of said hard-surfaced roller and having sides divided into a plurality of closely spaced, relatively short flat teeth, said blade member being a unitary structure composed of a relatively thin resilient metal and the teeth thereof being capable of individual resilient action, pivotally mounted parallel and in partially surrounding relationship to said metallic roller, and means responsive to the direction of rotation of said metallic roller for bringing alternate scraping edges of said U-shaped blade member into substantially uniform linear contact with the surface of said metallic roller longitudinally thereof as the rotation of said roller changes direction wherein the individual resilient action of said teeth will result in substantially uniform contact between

blade and hard-surfaced roller notwithstanding certain irregularities in the roller or the mounting means.

8. In a wash-up attachment for a printing press, the only accessible ink transfer rollers of which have a relatively soft surface, that improvement which comprises a slidably mounted hard-surfaced drawing-off roller, an elongated blade member of substantially U-shaped, trough-like cross section having a length corresponding to the length of said rollers and having sides divided into a plurality of closely spaced, relatively short, flat teeth, said blade member being a unitary structure composed of a relatively thin resilient metal and the teeth thereof being capable of individual resilient action, means for regulating the angular position of said blade and the individual teeth thereof relative to said hard-surfaced drawing-off roller operable to cause the teeth to form substantially linear contact with the drawing-off roller, and means for urging said drawing-off roller into uniform linear contact with one of said accessible ink transfer rollers.

9. A wash-up attachment according to claim 8 wherein said urging means comprise a compression spring acting to force said hard surfaced roller against said accessible ink transfer roller.

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