Oct. 12, 1948. L. A. HAWTHORNE 2,450,957

ROLL STRIPPING MECHANISM

Filed Feb. 17, 1945 2 Sheets-Sheet 1

Fig. 1.

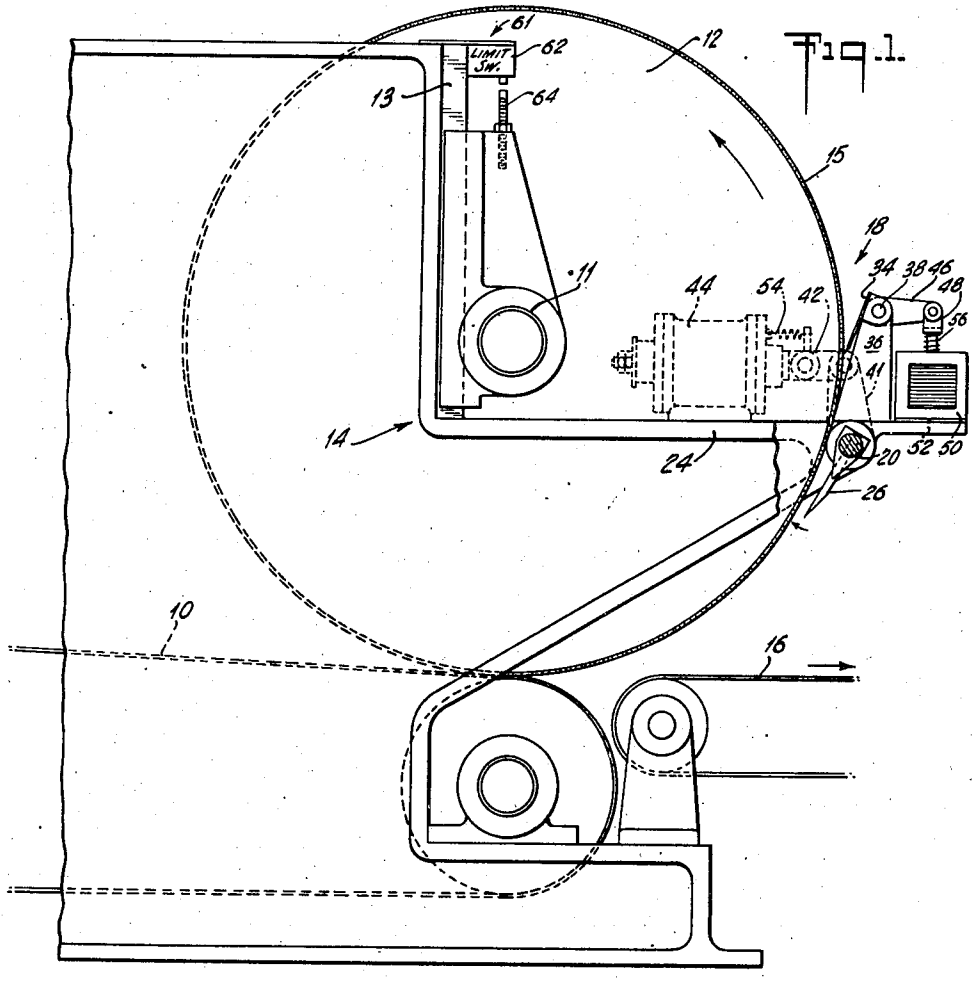
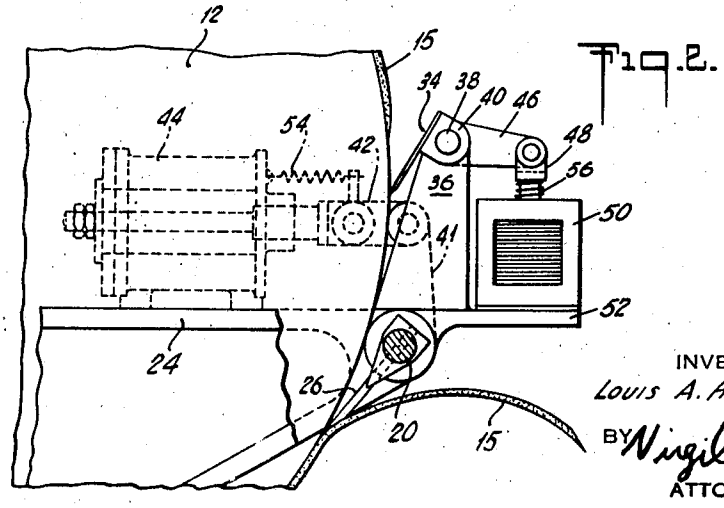


Fig. 2.



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Fig. 3.

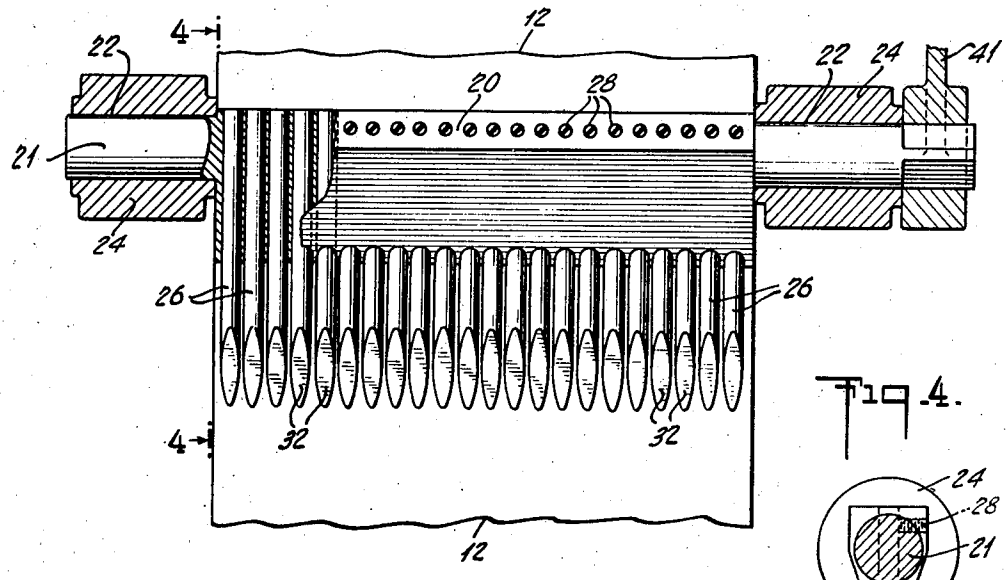


Fig. 4.

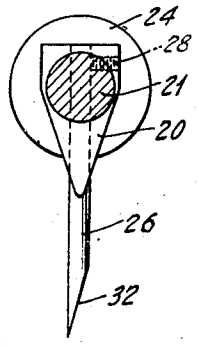
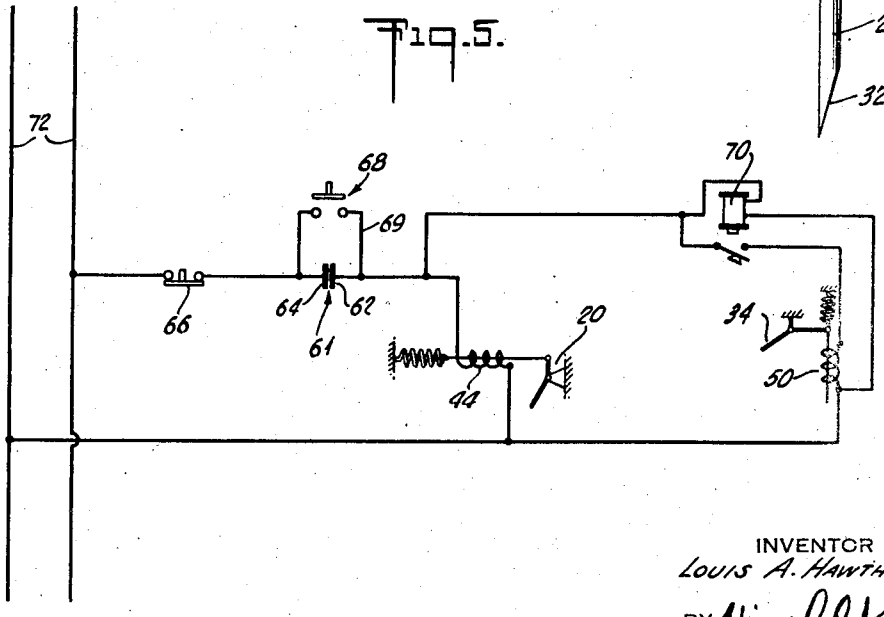


Fig. 5.



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ROLL STRIPPING MECHANISM

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9 Claims. (Cl. 92—66)

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The instant invention relates to appartus for the manufacture of fibrous sheet products and, more particularly, to improvements in apparatus for stripping the built up sheet from an accumulator or build-up roll of a so-called "wet" machine. Conventionally, fibrous sheet products such as asbestos-cement sheets, are formed by depositing a thin film from a wet mixture or furnish of the fiber-cement material onto the endless felt or blanket of the forming machine. A rotatable accumulator roll mounted to have its surface in substantial contact with the felt, picks up the film from the felt, the roll making the necessary turns to build up a plied sheet of the desired thickness. The sheet is then slit and removed from the roll and the operation repeated.

Although various mechanical means have been heretofore proposed for severing the accumulated sheet and removing it from the roll, they have not worked out satisfactorily. It is still common practice to station an operator at both ends of the roll, each of whom inserts the point of a knife into a groove extending across the face of the roll and, using the groove as a guideway, slits from the outer edge of the sheet to the middle where the cuts meet. This operation frees the sheet and permits it to peel from the roll on continued rotation of the latter, the sheet dropping onto a moving conveyor belt or run-out table. The efficiency of operation of the machine is controlled by the skill of the operators in making contact with the groove in the rotating roll during the short interval allowed. Failure of either of them to successfully coordinate their cuts means the loss of the formed sheet.

The mechanical means heretofore proposed for the most part comprise swinging doctor blades or knives. Such expedients have not been satisfactory mainly due to the fact that the sheet is torn rather than cut because of the lapping of the fibers around the cutting edges. As a result, the percentage of damaged sheets is exceptionally high.

A principal object of the instant invention is the provision of an improved mechanical means for effectively stripping the sheet from the accumulator roll without injury to the sheet. The device of the invention may be manually operated but, in the preferred embodiment, its operation is automatically carried out under the control of the thickness of the sheet built up on the roll.

Another object of the invention is the provision of an apparatus of the type referred to above which exerts a parting and wedging action on the sheet as distinguished from a cutting operation.

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More particularly, the invention resides in the provision of a stripping member including closely spaced pointed fingers adapted to be moved into operative position to penetrate the sheet and, as the sheet moves forwardly with the roll, to deflect the sheet from the face of the roll.

A still further object of the invention is the provision of means operating in conjunction with, and in timed relationship to, the operation of the stripping means for scraping the surface of the roll after the stripping operation.

My invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description of the invention which is to follow and to the accompanying drawings in which:

Fig. 1 is an elevational view of a portion of a wet machine showing the device of the instant invention incorporated therein;

Fig. 2 is a detail view on an enlarged scale illustrating the instant apparatus at one stage of the stripping operation;

Fig. 3 is a front elevational view on an enlarged scale of the stripper bar of the apparatus of Figs. 1 and 2 in operative position in relation to the accumulator roll;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3; and

Fig. 5 is a wiring diagram illustrating the control circuit for the stripping device.

Referring now particularly to Fig. 1, a wet machine of the type conventionally employed in the production of fiber-cement sheets and the like, is illustrated in part. The machine includes an endless felt or blanket 10 on which a thin lap or layer of the fibrous furnish is deposited by suitable rolls (not shown). An accumulator roll 12 is supported for rotation in bearings 11 which are mounted for vertical sliding movement on guides 13 of frame structure 14. The roll rests upon the apron, as shown, whereby upon rotation of the roll, the thin layer of the fiber-cement material is transferred from the blanket to the roll and built up thereon in a plurality of convolutions to form a plied sheet or layer 15 (see Fig. 2) of the desired thickness. For this purpose roll 12 is driven in the direction indicated by the arrow by any conventional means. Preferably, and as shown, the blanket 10 serves as the driving means. This has the advantage that the surface speed of the built up sheet is maintained the same as that of the blanket notwithstanding the gradual increase in the effective diameter of the roll as the sheet is built up thereon. A moving

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conveyor or run-out table 16 is located below roll 12 to receive the sheet.

In accordance with the instant invention, stripping mechanism, indicated generally at 18, is employed to sever the sheet and strip it from the roll when it has reached the predetermined thickness, the stripping mechanism including a scraping member to remove any residue left on the roll. This mechanism includes a stripper bar 20 of modified triangular cross-section (see Fig. 4) having pintles 21 rockably supported in bearings 22, carried by brackets 24, of the frame structure 14 at opposite ends of the roll. Stripper bar 20 carries a plurality of rod-like fingers 26 suitably formed of round stock. The fingers are secured to the bar, preferably by being received in sockets or bores formed therein and retained by set screws or the like 28. It will be appreciated, however, that the fingers may be secured to the bar in any other suitable manner.

Fingers 26 are chamfered (see Figs. 3 and 4) to provide pointed lower ends 32 and are arranged in the bar to have their chamfered faces lying in substantially a single plane. The fingers are placed at close intervals whereby their chamfered faces provide, in effect, a relatively continuous blade having a serrated or notched lower edge defined by the plurality of points 32.

Located to the rear of the stripper bar, that is at a point further along in the rotation of roll 12, is the scraper 34 constituting preferably a sharpened blade, adapted to have its scraping edge moved into contact with the stripped roll. Scraper 34 is mounted for rocking movement on supports 36 extending upwardly from brackets 24 on opposite sides of the machine. Suitably, the rockable supporting means may comprise pins 38 fixed to ears 40 which extend from the rear side of the blade. The pins are rotatably mounted in bearings in the supports 36.

Stripper bar 20 and scraper 34 may be moved from their inoperative positions to their operative positions for performance of their respective stripping and scraping operations at the proper times by manual manipulation but preferably, and as shown, automatic means are provided for this purpose.

The control means includes a rocker arm 41, fixed to a projecting end of bar 20 at one side of the machine. The outer end of the arm is pivotly connected to core extension 42 of a push solenoid 44 supported on the horizontal arm or bracket 24, as illustrated. One of the pins 38 supporting the scraper is extended through its bearing in support 36 and the projecting end secured to an arm 46 pivoted to a core extension 48 of a pull solenoid 50 supported on an extension 52 of the horizontal arm or bracket 24. Solenoids 44 and 50 are provided with spring means 54 and 56, respectively, to restore their cores to starting positions after operation.

As previously pointed out, roll 12 is carried in bearings 11, mounted for vertical sliding movement on guides 13 to permit the roll to move upwardly as the thickness of the layer on the roll increases. This vertical movement of the roll is made use of to cause operation of the solenoids and, hence, movement of the stripper member and scraper blade into operative positions, at the time that the sheet has reached its proper thickness. For this purpose a limit switch 61 is used, the switch including a fixed contact 62 carried by the frame structure, and a movable contact member 64, carried by the vertically slidable support for one of the bearings 11. The latter contact preferably comprises an adjustable screw or stud, as shown, whereby the distance through which the roll has to be raised before closing of the contacts, and hence the thickness of the sheet formed on the roll may be varied as desired.

Referring now to Fig. 5, a wiring diagram for the control circuit is illustrated in which the several operating elements are shown diagrammatically. In addition to the elements previously described and illustrated in other figures of the drawing, the circuit includes suitable manually controlled switches, illustrated at 66 and 68, and a time delay relay 70. Switch 66, which may be of any conventional type, provides a master control whereby the entire circuit may be disconnected from the power lines 72. The second switch 68 is included in a by-pass 69 around limit switch 61 whereby the stripping mechanism may be operated at any time without waiting for the pre-determined thickness of sheet to be built up. That is, when switch 68 is closed the circuit is energized irrespective of the position of contacts 62 and 64 of the limit switch. Time delay relay 70 is included in the control of solenoid 50 which operates scraper 34. The time delay relay, which may be of any conventional type, is adjusted to require the current to flow in the circuit for a predetermined period of time before the solenoid 50 is energized. In the present case the adjustment of the relay is such that operation of the solenoid and, hence, movement of the scraper into contact with the roll will be prevented until the end of the sheet has passed the point of impingement of the scraper blade against the roll, as illustrated in Fig. 2.

In the operation of the apparatus described above, threaded contact 64 of the limit switch 61 is adjusted relatively to the fixed contact a distance equal, or substantially equal, to the thickness of the sheet which is to be built up on the roll 12. Upon rotation of the roll, thin laps of the asbestos-cement or other wet, fibrous furnish are wound thereon, and the roll raised by the accumulated laps until contacts 62 and 64 of limit switch 61 are closed, whereupon current is permitted to flow through the windings of solenoid 44, causing its core and core member extension 42 to move outwardly and swing fingers 26 inwardly against, or substantially against, the surface of roll 12. As the fingers swing toward the roll they penetrate the sheet and, upon continued forward movement of the sheet on the continuously rotating roll, the material of the sheet is pushed aside by the oval contour of the chamfered faces of the pins until the sheet reaches the substantially continuous blade formed by the chamfered faces at their widest parts. At this point severance of the sheet is completed and its freed end is deflected away from the face of the roll to fall by its own weight upon the conveyor or run-out table 16. In the event the sheet end is not sufficiently deflected by the chamfered ends of the pins and slides up the pins, it will be deflected by the sloping face of bar 20. The sheet is drawn off the roll as rotation of the roll and travel of the conveyor is continued. As the rotation of the roll continues the other end of the sheet is carried with it and finally passes through the bight between the roll and apron or felt 10. When this occurs roll 12 will drop again against the apron, opening contacts 62 and 64 and de-energizing the solenoid which allows spring 54 to pull the solenoid core and extension 42 to the left, as viewed in Fig. 1. This causes fingers 26 to be swung away from the roll to permit the building up of a new sheet.

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At the time that the windings of solenoid **44** were energized by the closing of the limit switch, solenoid **50** was not affected due to the time delay relay **70** which was adjusted, as previously pointed out, to permit a sufficient time interval to pass before operation of the solenoid to permit the end of the severed sheet on the roll to pass scraper **34**. Upon the completion of this time interval, solenoid **50** becomes energized and scraper **34** is swung into contact with the roll where it acts to remove any residue of material left thereon. When the circuit is opened by the breaking of contacts **62** and **64**, as previously described, the windings of solenoid **50** will be de-energized and scraper **34** retracted from contact with the roll under the influence of spring **56**.

As will be readily understood, in the event that, for any reason, it is desired to remove the sheet from the roll before contacts **62** and **64** would normally close, this may be accomplished by manually closing switch **68**.

The invention as described above provides for continuous operation of the sheet forming mechanism with a minimum of attention and, furthermore, permits the machine to operate at higher speeds than are possible where manual stripping operations are employed. Due to the accuracy of the stripping operation, the sheets may be formed to a closer tolerance than heretofore possible. Also the life of the felts is lengthened because of the straight cuts and more uniform stripping. In addition it has been found that a thinner sheet may be produced than is possible by the hand stripping method. That is, under the prior methods it was necessary to rely on the weight of that portion of the sheet freed from the face of the roll by the splitting operation to start the peeling action, such weight, in the case of relatively thin sheets, being insufficient for the purpose. In the operation of the instant apparatus the fingers stay in contact with the face of the roll until sufficient length of the sheet has been removed from the roll that the remainder will be easily peeled by the pull of the previously removed portion. In this connection it will be understood that by the time the limit switch is opened and the fingers **26** swing into inoperative position, their stripping action is no longer required, the peeling taking place solely by the pull of the deposited sheet.

The contour and character of the stripping fingers provide a parting or wedging action, rather than a cutting one, and the difficulties heretofore met where mechanical cutting blades have been attempted are not in evidence. It will be noted that the contour of the pins leaves no place for fibers to cling and succeeding sheets will push off the pins any accumulation which might build up thereon.

Having thus described my invention it will be appreciated that changes and modifications may be made without departing from the scope of the invention as defined by the sub-joined claims. For example, a hydraulic or pneumatic control system may be employed in lieu of the electrical system shown. Also, the shape of the fingers may vary to meet particular conditions.

What I claim is:

1. In combination with an accumulator roll adapted for constant rotation, stripping mechanism for removing at intervals a plied fibrous sheet built up thereon, said mechanism comprising a stripper bar extending lengthwise of said roll, a plurality of closely spaced pointed fingers carried thereby, and means controlled by the thickness of the sheet on said roll to cause said fingers to move from a position away from said roll to a position substantially against said roll with said fingers pointing substantially opposite to the direction of rotation of the roll whereby said fingers penetrate said sheet and, upon continued rotation of the roll, the sheet moves along said fingers and is parted thereby and removed from said roll.

2. In combination with a rotatable accumulator roll adapted for constant rotation, stripping mechanism for removing at intervals a plied fibrous sheet built up thereon, said mechanism comprising a stripper bar extending lengthwise of the roll and adjacent thereto, a plurality of closely spaced rod-like fingers forming a relatively continuous blade carried by said bar, said fingers having chamfered ends with the points thereof toward said roll, and means controlled by the thickness of said sheet to actuate said bar to cause said fingers to move from a position away from said roll to a position substantially against said roll with said fingers pointing substantially opposite to the direction of rotation of the roll whereby said fingers penetrate said sheet and, upon continued rotation of the roll, the sheet moves along said fingers and is parted thereby and removed from said roll.

3. In combination with a rotatable accumulator roll, stripping mechanism for removing a plied fibrous sheet built up thereon, said mechanism comprising a stripper member extending lengthwise of the roll, a scraper positioned above said stripper member, and means to cause said stripper member to move into stripping relationship to said roll for severing said sheet and removing it therefrom and for causing said scraper to move against the stripped roll in timed relationship to the movement of said stripper member, said last-named means including electrically controlled actuating devices for said stripper member and scraper respectively, mechanism operatively connecting said stripper member and scraper with their respective actuating devices, a switch for controlling the operation of said actuating devices, said switch including a fixed contact and a movable contact carried by the roll and arranged to be moved into position to engage said fixed contact upon the building up of a sheet on said roll, and means operatively connected with said switch and actuating device for said scraper to delay the operation of such actuating device until the severed end of the sheet passes the scraper.

4. In combination with a rotatable accumulator roll having means for rotating it in a given direction, stripping mechanism for removing a fibrous sheet built up on the roll, said mechanism comprising a stripper bar extending lengthwise of the roll, said bar including a plurality of closely spaced fingers projecting therefrom, and means mounting said bar for rotation to swing said fingers toward said roll and into stripping position with the fingers pointing substantially opposite to said direction of rotation of the roll and penetrating said sheet whereby rotation of the roll causes said sheet to move along said fingers and to be parted thereby and removed from the roll.

5. In combination with a rotatable accumulator roll having means for rotating the roll in a given direction, stripping mechanism for removing a fibrous sheet built up on the roll, said stripping mechanism comprising a stripper bar extending lengthwise of the roll, a plurality of

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closely spaced fingers forming a relatively continuous blade on said bar, said fingers including pointed ends, and means mounting said bar for rotation to swing said fingers toward said roll and into stripping position with the fingers pointing substantially opposite to the given direction of rotation of the roll and penetrating said sheet whereby rotation of the roll causes said sheet to move along said fingers and to be parted thereby and be removed from said roll.

6. In combination with a rotatable accumulator roll having means for rotating it in a given direction, stripping mechanism for removing a fibrous sheet built up on the roll, said mechanism comprising a stripper bar extending lengthwise of the roll, a plurality of closely spaced fingers forming a relatively continuous blade carried by said bar, said fingers including pointed ends, means mounting said bar for rotation to swing said fingers toward said roll into stripping position with the fingers pointing substantially opposite to the said direction of rotation of the roll and penetrating said sheet, and means controlled by the thickness of the sheet to rotate said bar into said stripping position.

7. A stripping mechanism for a rotatable accumulator roll having means for rotating it in a given direction, said mechanism comprising a stripper bar extending lengthwise of the roll, a plurality of closely spaced rod-like fingers forming a relatively continuous blade carried by said bar, said fingers having chamfered ends with their points toward said roll, means mounting said bar for rotation to swing said fingers toward said roll into stripping position with the fingers pointing substantially opposite to the direction of rotation of the roll, and means for rotating said bar to swing said fingers into said stripping position.

8. In combination with a rotatable accumulator roll, a stripper bar extending lengthwise of the roll, a plurality of closely spaced fingers carried by said bar, means mounting said bar for rotation to swing said fingers toward said roll into stripping position with the fingers pointing substantially opposite to the direction of rotation of the roll, means to rotate said bar into stripping position, a scraper blade supported above said stripper bar for movement toward and away from said roll, and means to move said scraper blade against the roll in timed relationship to the movement of said fingers into stripping position.

9. In combination with a rotatable accumulator roll, a stripper bar extending lengthwise of the roll, a plurality of closely spaced fingers carried by said bar, means for mounting said bar for rotation to swing said fingers toward said roll into stripping position with the fingers pointing substantially opposite to said direction of rotation of the roll, a scraper supported above said stripper for movement toward and away from said roll, means controlled by the thickness of the sheet built up on the roll to rotate said stripper bar and move said fingers into stripping position, and means to cause said scraper to move against the roll in timed relationship to the movement of said fingers.

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