

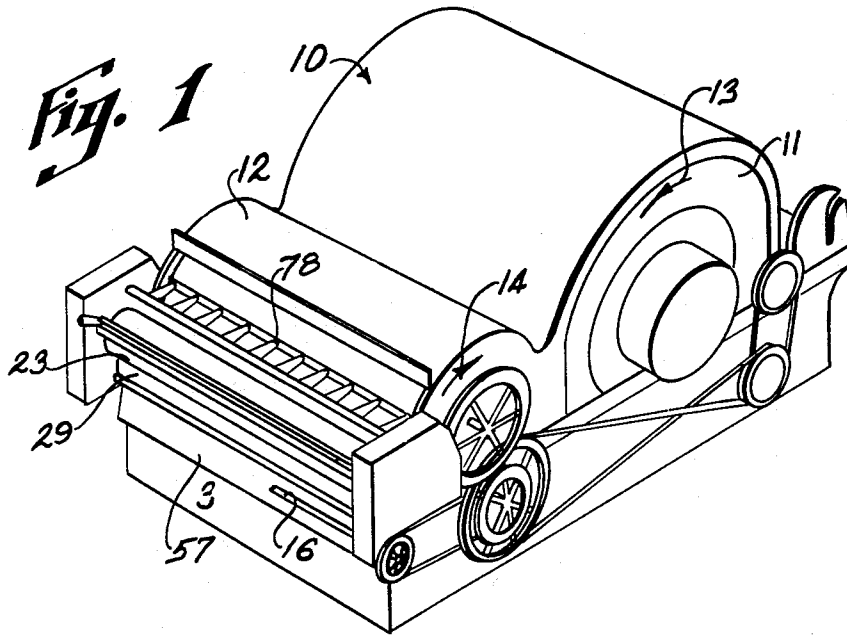
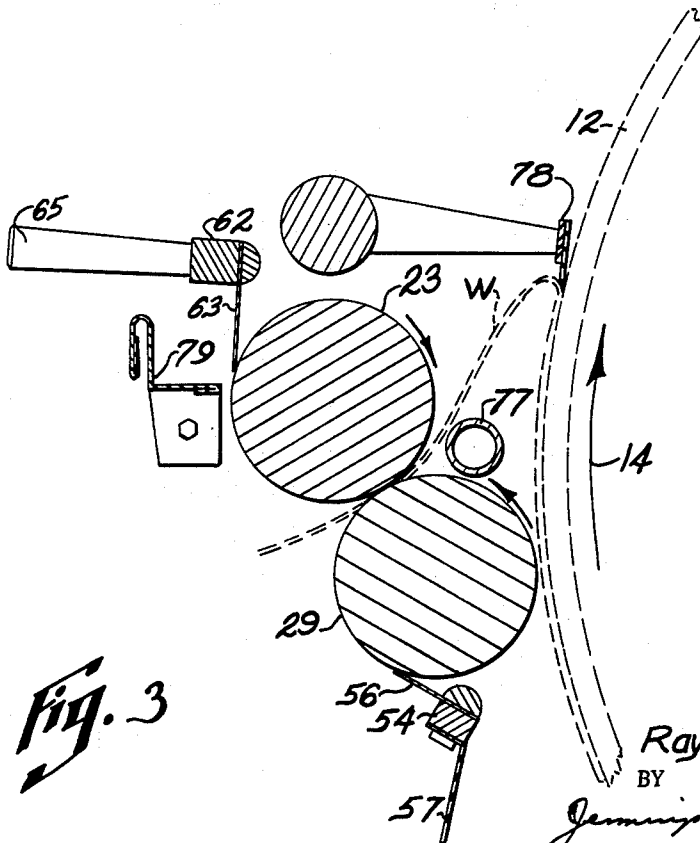
July 12, 1966

R. M. ZOCH
APPARATUS FOR CRUSHING IMPURITIES IN
COTTON CARD WEBS AND THE LIKE

3,259,945

Filed Sept. 3, 1963

3 Sheets-Sheet 1



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Fig. 4

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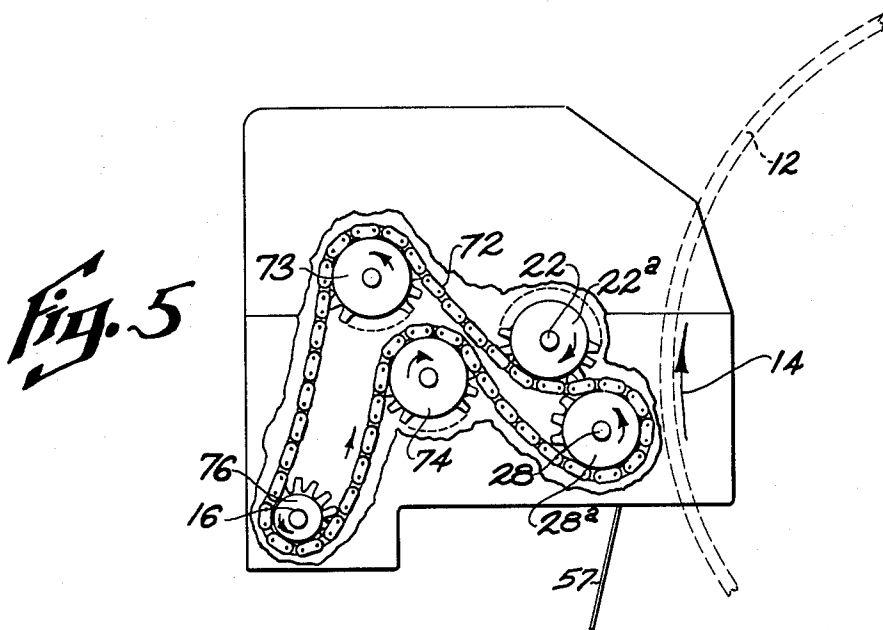
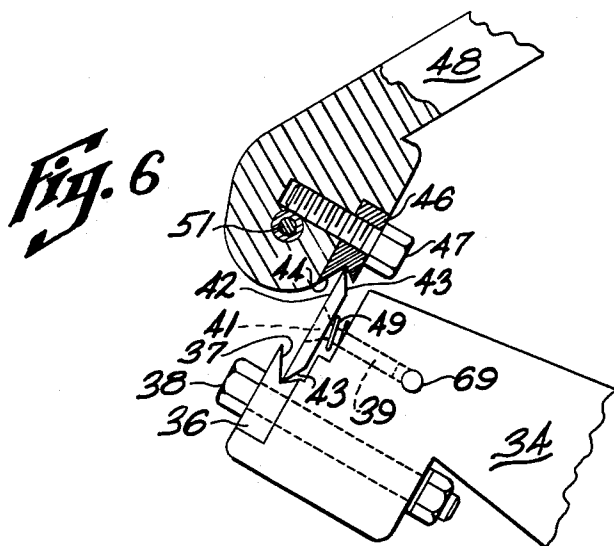
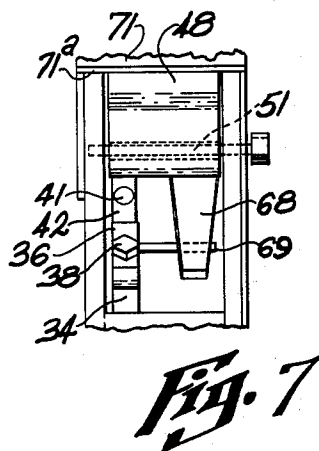
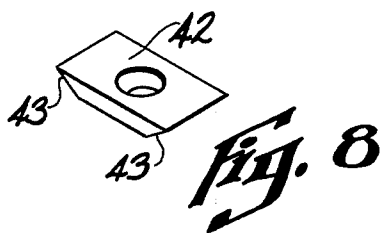
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APPARATUS FOR CRUSHING IMPURITIES IN COTTON CARD WEBS AND THE LIKE

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Filed Sept. 3, 1963, Ser. No. 306,064
3 Claims. (Cl. 19—106)

This invention relates to improved apparatus for crushing the small impurities which are present in the webs of fibers coming from a card, such for instance as impurities found in carded cotton webs.

In the art to which this invention relates it has long been known and recognized that small impurities such as specks of seed hull from ginned cotton, small particles of leaf trash, and similar minute, frangible impurities can be conditioned for removal from the fibers by crushing the same while the fiber is being delivered in web form from the card. Thus, the Peralta rolls which were used commonly on wool cards and to some extent on cotton cards were known to crush such impurities and the impurities were removed in subsequent processes such as spinning, drawing and the like.

Apparatus for carrying out the general concept of crushing the impurities of a moving, carded web have been proposed and are in commercial use. One of the problems present in such apparatus is to make the same compact enough to fit within the original, overall outline of the card apparatus itself. Further, it is highly desirable in this type of apparatus that the crush roll weighting or loading system apply a fixed, non-varying load to the crush rolls to provide uniform pressure along the length of such crush rolls. Heretofore this problem has not been solved in satisfactory manner. Still further, it sometimes is desirable to operate the card without using the crush rolls. Some prior apparatus has involved means merely to release the pressure on the top crush roll without actually raising the top roll. Other such mechanism as heretofore designed does not always return the top roll to the precise and desired operating pressure that existed before being raised.

With the foregoing in mind some of the principal and secondary objects of my invention are as follows:

(1) To provide an apparatus which may be attached to existing cards and which is so designed as not to extend the overall length of the card, thus providing a compact machine, saving valuable floor space in the mill.

(1a) A subsidiary object to (1) above is to provide such apparatus in which the crushing rolls are arranged beneath the oscillating comb of the card.

(1b) Subsidiary to (1) above also, an object of my invention is to locate the crush rolls both underneath the comb and extremely close to the doffer cylinder and in such position that the trajectory or normal path of the web is directed toward and into the nips of the rolls.

(2) To provide a compound lever for applying pressure to the topmost one of the crushing rolls which includes a floating knife-edged block serving to maintain constant lever arm length under all conditions of operation. Such arm has the advantage of being virtually friction free and is substantially free of errors in weighting due to wear of the parts.

(3) To provide apparatus of the character designated in which the lower crushing roll is mounted in pivoted bearings at each end thereof together with means accurately to adjust and hold such lower roll in adjusted position relative to the upper roll. By such adjustment I provide means to compensate for production errors in the rolls or other parts of the device as well as to compensate for any wear on the rolls or other parts.

(4) To provide trash crushing means for cotton webs

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and the like so designed, overall, as to permit the use of negative mechanical draft between the doffer surface and the crusher rolls. The advantage of this lies in the fact that in installing my improved apparatus on an existing card it is not necessary to change any of the draft gears whatever or any of the other gears which drive the doffer in relation to any other part of the apparatus.

(5) Other objects are to provide a clearer blade on the uppermost roll and to associate therewith a small elongated trough spaced slightly away from the roll and also slightly below the blade, whereby the occasional wads or lumps of trash which fall from such clearer blade fall into the trough where they may be removed, thus eliminating contamination of the web by such wads or lumps; to provide a pivoted clearer blade for the lower roll which has associated therewith a plate extending downwardly therefrom between the operator and the doffer, which plate serves the dual purpose of preventing the operator from getting his fingers caught between the lower roll and the doffer and also acts as a handle by means of which the clearer blade may be swung away from the lower roll for cleaning purposes; to provide a safety bar, located just above the nips of the crushing rolls and below the oncoming web, whereby such bar is located out of the trajectory of the web, but at the same time is sufficiently close to the nips of the rolls to prevent an operator's fingers from becoming caught between the rolls.

Apparatus illustrating features of my invention is shown in the accompanying drawings forming a part hereof in which:

FIG. 1 is a wholly diagrammatic isometric view of a card having my improved apparatus in place thereon;

FIG. 2 is an enlarged detail vertical sectional view through one end of the weighting mechanism, the doffer cylinder being in dotted lines and the weight being shown in dotted lines in inoperative position;

FIG. 3 is an enlarged fragmental detail vertical sectional view showing the relationship of the comb and crush rolls to the doffer cylinder, the doffer cylinder being in dotted lines;

FIG. 4 is a detail sectional view taken generally along line 4—4 of FIG. 2;

FIG. 5 is a detail side elevational view showing the drive for the crush rolls and calender rolls, certain of the parts being broken away and the doffer cylinder being shown in dotted lines;

FIG. 6 is an enlarged detail side elevational view, partly in section, of the floating linkage between the weight arm and the bearing housing extension arm for the top crushing roll;

FIG. 7 is a detail view taken along line 7—7 of FIG. 2; and,

FIG. 8 is a view of the knife-edged pressure link block.

Referring now to the drawings for a better understanding of my invention I illustrate in FIG. 1 a somewhat conventional carding engine indicated generally by the numeral 10. As will be understood, the carding engine 10 embodies the main card cylinder 11, a doffer 12, and suitable drive mechanisms and gearing, only partially shown. As illustrated in the drawings the main cylinder turns in the direction of arrow 13 and the doffer turns in the direction of arrow 14. For the sake of clarity I have omitted certain parts of the card such as the flats, infeed mechanism and the like. I illustrate at 16 the driven shaft for the calender rolls, not shown, which as will be understood pull the web hereafter to be described from the crush rolls hereafter also to be described through a trumpet, not shown, thus to form the web into a sliver for delivery to the usual can, likewise not shown.

My invention comprises suitable framework in the form of head plates 17 which are bolted or otherwise

secured generally vertically to the card, forwardly of the doffer 12. In view of the fact that much of the mechanism, including the plate 17 at each end of my improved apparatus is substantially identical, a description of one end will generally suffice for both.

Projecting outwardly from the sides of the end plates 17 are pins 18. Pivotaly mounted on such pins are bearing housings 19. Bearings 21 are mounted in the housings and rotatably mounted in the bearings is a shaft 22 for rotatably supporting a top web crushing roll 23.

In similar manner there are pins 24 outstanding from the heads or plates 17. Pivotaly mounted on the pins 24 are bearing housings 26 carrying bearings 27 which in turn receive the shaft 28 of the lower rotating crushing roll 29.

The lower crushing roll housings are provided with arms 31. These arms have outward ends 32 which are engaged both top and bottom by means of positioning screws 33 threaded into a suitable part of the end plates 17. It will thus be apparent that by adjusting the screws 33 relative to each other, the entire bearing housings 26 pivot about the pin 24, thus to raise or lower the roll 29 toward or from the top roll 23.

Somewhat in similar manner the bearing housings 19 are provided with arms 34. See particularly FIG. 6. The outer ends of the arms 34 are provided with hardened blocks 36 having a V-notch 37 cut along one edge thereof. The blocks are secured to the ends of the arm by means of nut and bolt combinations indicated at 38.

Driven into the ends of the arms 34 are wedge pins 39 which have a conical head 41 therein. Fitting about the pins 39 and restrained against outward movement by the head 41 are floating, sharp-edged pressure link blocks or plates 42. The blocks 42, as stated, have sharpened edges 43 one of which fits in the V-shaped notch 37 of the blocks 36 and the other of which fits in a V-shaped notch 44 of hardened blocks 46 secured by bolts 47 to the ends of weight arms indicated generally by the numeral 48. The blocks 42 are biased outwardly into engagement with the heads 41 of the pins by means of small springs 49. As best shown in FIG. 2 the weight arms 48 are pivoted at 51 to the end plates 17. The weights indicated at 52 are integrally formed with arms 48.

Depending from the bearing blocks 26 are ears 53. Pivotaly mounted between the two ears 53 is a holder or carrier 54 for a clearer blade 56 which cooperates with the lower roll 29. Depending from the carrier 54 is a plate 57 which extends entirely across the full width of the doffer and consequently for the full length of the rolls 29. Springs 58 are anchored at one end as at 59 to the pivoted carrier and to the plates 17 at the opposite ends as shown at 61. The blade 56 thus is biased always into contact with the bottom crush roll 26 and, even when the roll 26 is adjusted through the screws 33, the blade, being pivoted to the ears of the housings 26, moves with the roll 26 and stays in proper relation thereto.

Pivotaly mounted between the plates 17 is a carrier 62 for a clearer blade 63 which cooperates with the upper crush roll 23. Tension springs 64 have one end anchored in offset relation to the pivoted carrier 62 as at 66 and their opposite ends anchored to the end plates 17 as at 67. Thus, the clearer blade 63 is biased into contact at all times with the top crush roll 23. A handle 65 is provided for pivoting the blade 63 out of contact with its roll.

Referring again particularly to FIGS. 2 and 7 it will be noted that the weight arms 48 carry portions 68 which extend downwardly and are free to move along the outer sides of the arms 34. Projecting outwardly from each arm 34 is a pin 69 located in position to be engaged by the arm 68 when the weight is swung upwardly and counterclockwise as viewed in FIGS. 2 and 7. Thus, when the weight is swung upwardly and to the left, pivoting about pin 51, arms 68 engage the pins 69, thus to raise the top roll 23 out of contact with the lower roll 29.

This operation is accomplished by removing the slip-on sheet metal cover indicated at 71, raising the weight upwardly, replacing the cover, whereby the edge 71^a of the housing engages and holds the weight in raised position as illustrated in dotted lines, FIG. 2.

Referring particularly to FIG. 5 of the drawings it will be seen that the shaft 28 for the lower roll and the shaft 22 for the upper roll both carry sprockets 28^a and 22^a, respectively. A sprocket chain 72 passes over idler sprockets 73 and 74 and thence over a sprocket 76 fast on the calendar roll shaft 16, which, as will be remembered, is rotated by the drive arrangement illustrated diagrammatically in FIG. 1.

Extending the length of the rolls 23 and 29 and mounted between the end plates 17 is a safety bar 77. This bar is located in such position as to lie below the normal or natural trajectory of the web W shown in dotted lines in FIG. 3 as it is being removed from the doffer 12 by means of a comb or other doffing means 78. It will further be understood that if a comb is used as the doffing means it may be of the oscillating type and that the usual comb box and driving mechanism therefor is provided.

It is also to be especially noted that the rolls 23 and 29 occupy positions substantially below the comb mechanism and substantially within the vertically projected confines thereof. Further, roll 29 is closer to the doffer cylinder 12 than is roll 23. This arrangement affords an upwardly opening entrance to the nip of the rolls 23-29 for the web W so that the web is substantially self-feeding when starting the card. Further, such arrangement locates the nip of the rolls directly in the natural path or trajectory of the web as it leaves the doffer. Thus, with crush rolls 23-29 of about 3 inches in diameter, I place the periphery of roll 29 preferably no more than one-half inch from the teeth of the clothing of the doffer 12. By placing the upper roll 23 so that a line passing through the centers of both rolls is about 30° off the vertical, I not only accomplish the self-feeding feature for the web, but also provide space for the safety bar or rod 77.

Mounted between the end plates 17 is an elongated generally L-shaped trough indicated at 79. This trough is located at such position relative to the clearer 63 that any lumps or wads of trash discharged by the clearer will fall into and be retained by the trough for manual removal.

In view of the foregoing it will be apparent that I have invented an improved apparatus for treating the moving webs of cotton and like fibers as they come from the card for the purpose of crushing impurities therein. My improved apparatus is characterized by its compactness, thus saving valuable card room space. Further, the particular relationship of the crushing rolls to each other and to the point of discharge of the web W from the doffer permits the web simply to drop into the nips of the rolls. In actual practice I have discovered that it is not necessary to change in any way the drive relation between the doffer and other parts of the card and that in fact there exists a negative draft between the crush rolls 23-29 and the doffer. By the provision of the floating sharp-edged bearing blocks 68 the effect of the weights 52 on the roll 23 is substantially constant so that this roll is urged always with constant, uniform pressure toward the lower roll 29. The adjustment of the lower roll by means of the pivoted bearing housing and the set screws 33 provides simple and effective means for compensating for any wear or any inaccuracies in manufacture of the rolls or other parts. By having the roller clearer blade actually move with the bearing housing for the lower roll 29 I eliminate the necessity of adjusting the clearer blade each time the screws 33 are moved. When it is desired to make the crush rolls inoperative it is only necessary to remove the sheet metal protective cover 71, grasp the weight 52 and pull it counterclockwise about its point 51 whereupon the arm 68 engages

the pin 69, lifting the top roll to inoperative, out of contact position with the roll 29. The safety to the operator afforded by the safety rod or bar 77 and the depending plate 57 are important practical details of the invention. With prior apparatus several instances of injury to workers attempting to clean the rolls have occurred at these points. Additionally, the plate 57 provides a simple means for pivoting the lower clearer blade 56 in order to clean it manually as may be required.

In operation my invention has proved to be extremely practical and satisfactory. As of the date of the filing of this application a large number of these units have been installed on various types of cards, principally for carding cotton, and are in day-to-day use. The space-saving feature of my improved apparatus is extremely important. Unlike prior apparatus of this general type all that is necessary in installing my apparatus is simply to bolt it in place, it being so compact that the overall length of the card is in no way increased.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. The combination with a carding engine having a doffer and means to deliver from the doffer a moving web of carded fibers, of

(a) upper and lower cooperating driven web crushing rolls between which the web is delivered from the doffer, said upper roll having end shafts,

(b) weighting means for the upper roll embodying:

(1) roll carrying arms in which the end shafts of the upper roll are journaled and having outer ends extending away from the longitudinal axis of the upper roll,

(2) pivots on which said arms are mounted and laterally spaced from the longitudinal axis of said upper roll,

(3) weight arms disposed for cooperation with the outer ends of each of the upper roll carrying arms and having ends pivotally mounted adjacent said outer ends of the upper roll carrying arms,

(4) weights on on each of the weight carrying arms,

(5) knife-edge members on the outer ends of the upper roll carrying arms, and

(6) seats on the weight carrying arms adjacent the pivoted ends thereof for receiving the knife-edges of said members, whereby the weight carrying arms press the upper roll into contact with the lower roll through said knife-edge members.

2. Means for weighting an upper crush roll toward a lower crush roll comprising,

(a) a pair of bearing housings in which are journaled end shafts of the upper roll,

(b) means laterally offset from the longitudinal axes of the upper roll shafts pivotally supporting the housings,

(c) force transmitting arms extending outwardly from each housing,

(d) other arms having ends pivotally mounted near the outer ends of the force transmitting arms,

(e) floating knife-edged force transmitting links located adjacent the outer ends of the force transmitting arms,

(f) oppositely disposed facing seats on said force transmitting arms and on said other arms in which the knife edges of the links are adapted to fit, and

(g) means for weighting said other arms, whereby the upper roll is pressed evenly adjacent each end with constant force toward the lower roll.

3. In crush roll apparatus for carded webs,

(a) upper and lower driven crush rolls,

(b) bearing housings at each end of each roll supporting the same for rotation,

(c) pivots supporting each housing in such manner that the rolls move independently about said pivots toward and from each other,

(d) means to apply to the upper roll through its pivoted bearing housings a constant force urging the upper roll toward the lower roll comprising

(e) arms on the pivoted bearing housings,

(f) pivoted weight carrying arms having portions which in response to pivotal movement thereof move toward and from said bearing housing arms, and

(g) knife-edged force transmitting floating links interposed between the arms and effective to transmit to the bearing housing arms the force applied to the weight arms.

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