Oct. 16, 1945. R. F. HLAVATY 2,387,150

MATERIAL HANDLING APPARATUS

Filed Sept. 26, 1940 4 Sheets-Sheet 1

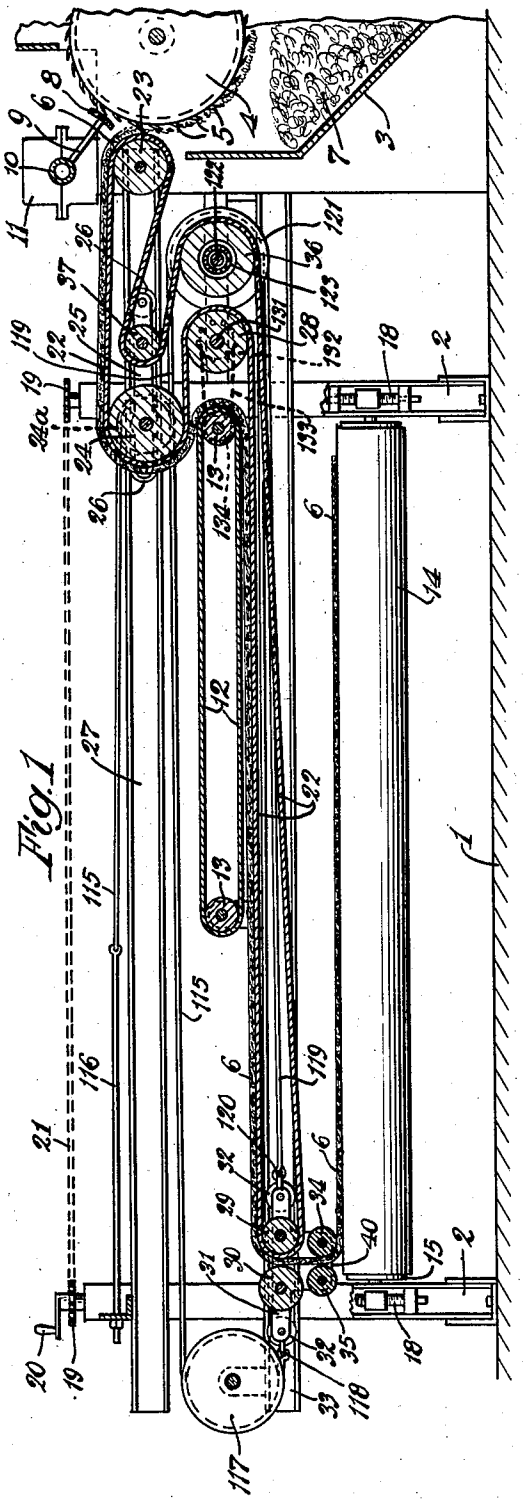


Fig. 1

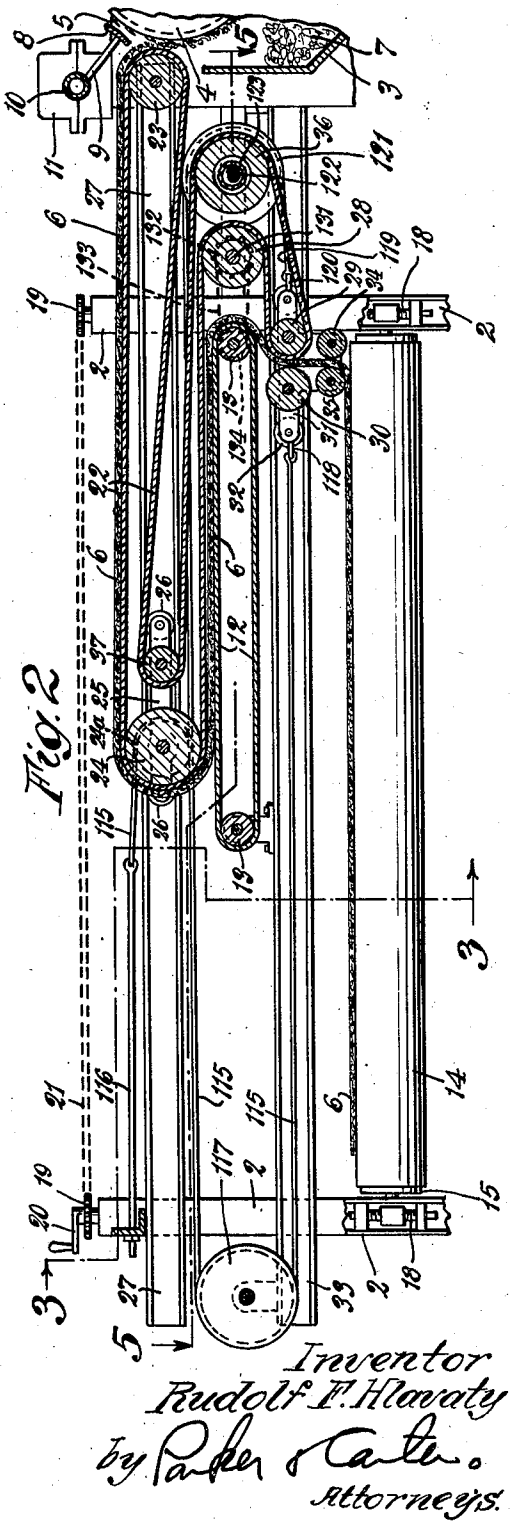


Fig. 2

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MATERIAL HANDLING APPARATUS

Filed Sept. 26, 1940 4 Sheets-Sheet 2

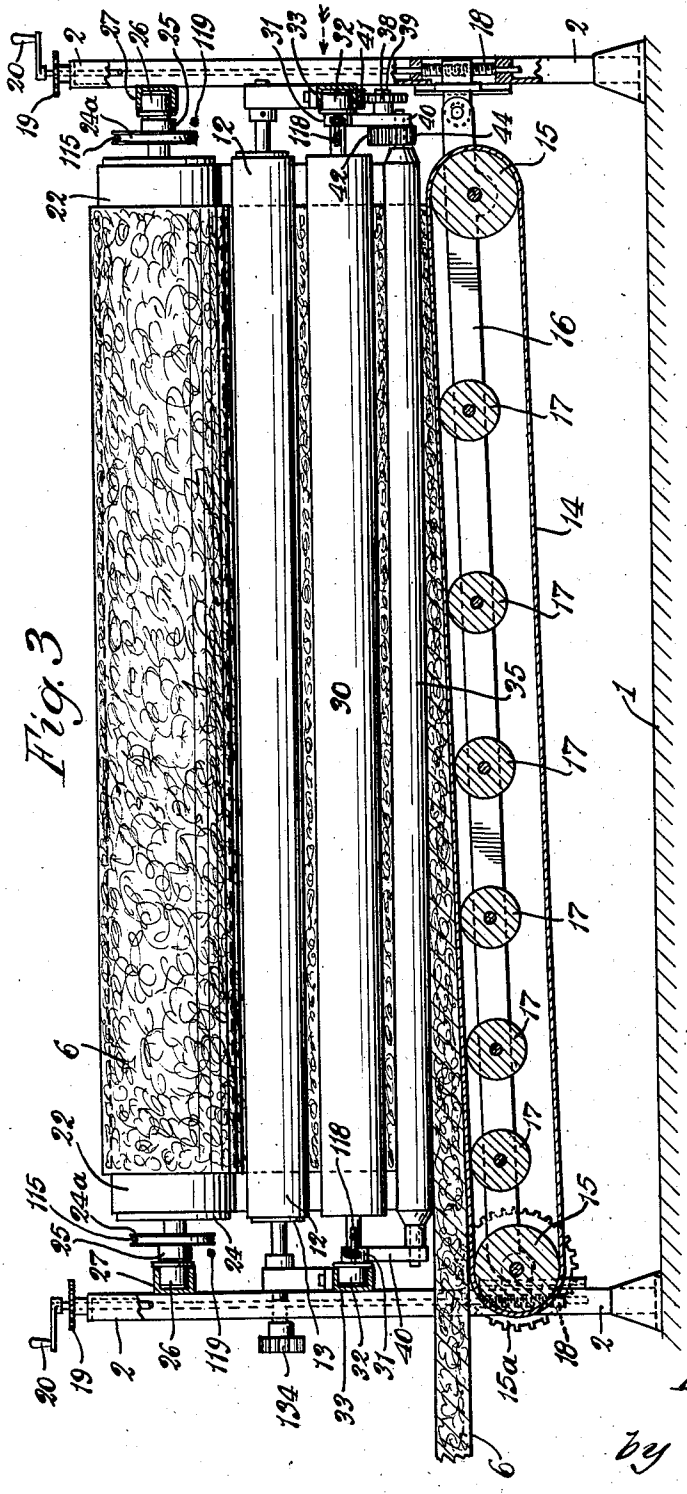


Fig. 3

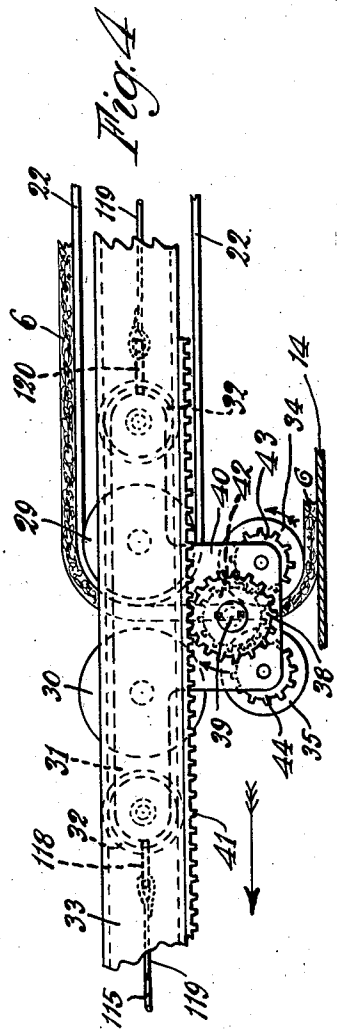


Fig. 4

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MATERIAL HANDLING APPARATUS

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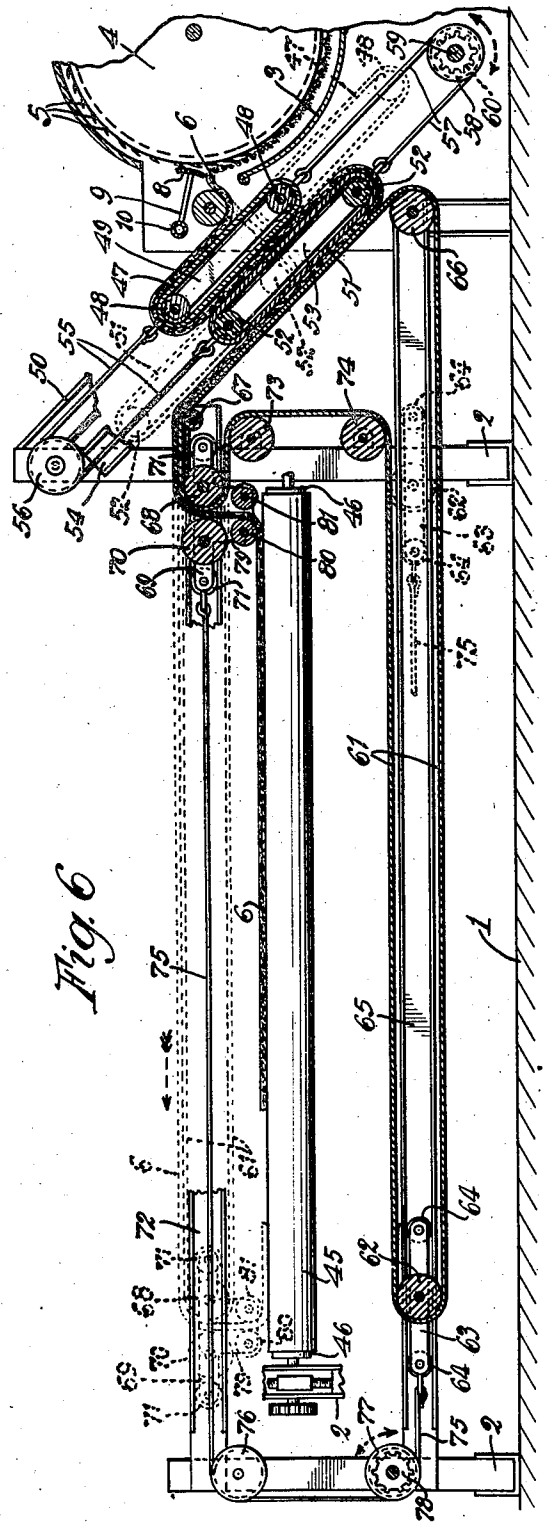


Fig. 6

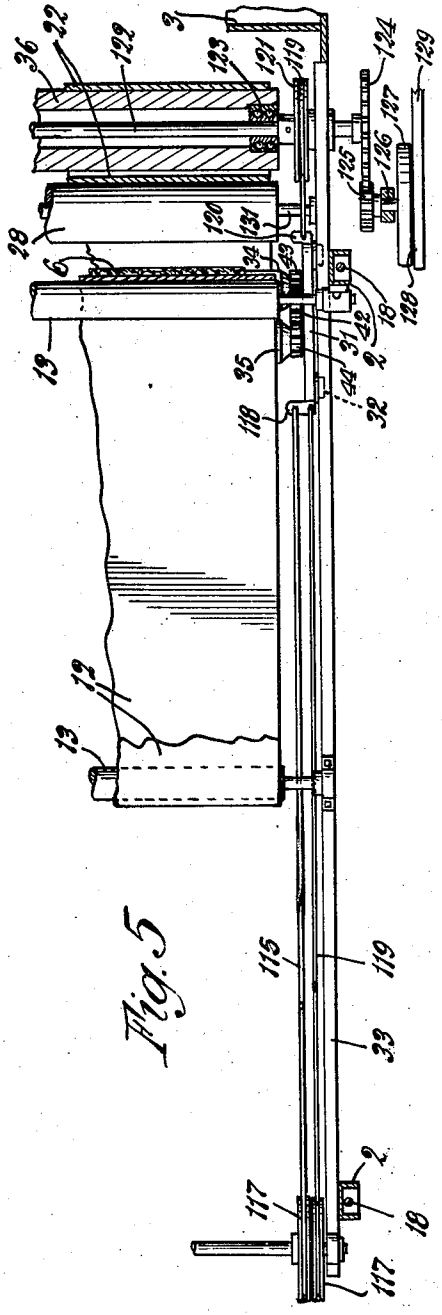


Fig. 5

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MATERIAL HANDLING APPARATUS

Filed Sept. 26, 1940 4 Sheets-Sheet 4

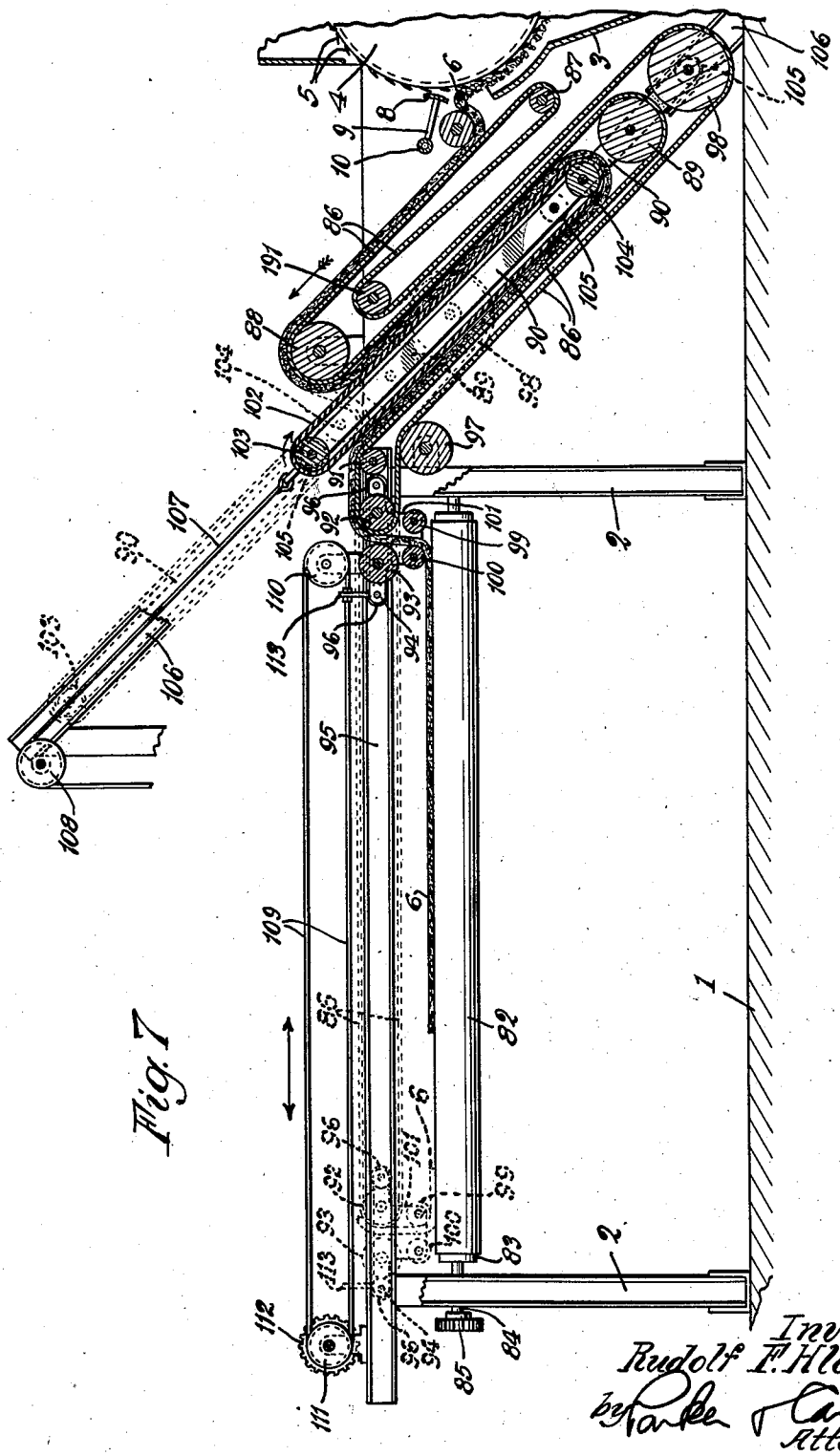


Fig. 7

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Patented Oct. 16, 1945 2,387,150

UNITED STATES PATENT OFFICE

2,387,150

MATERIAL HANDLING APPARATUS

Rudolf F. Hlavaty, Cicero, Ill.

Application September 26, 1940, Serial No. 358,463

16 Claims. (Cl. 19—163)

This invention relates to an apparatus and method of handling material. It has for one object to provide means for forming a web and for lapping the web to form a "batt." As illustrated herewith, the invention is, therefore, embodied in a lapper which is combined with means for forming the web—for example, about a cylinder—and with means for removing the web from the cylinder. This latter means is generally known as a doffer. Another object is to provide a machine which occupies a relatively small space and which at the same time is of high capacity. Another object is to provide a machine in which a minimum of parts and other mechanisms is used.

Other objects will appear from time to time throughout the specification and the claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a vertical longitudinal section of a lapper with parts shown in elevation.

Figure 2 is a similar view showing the parts in a different position.

Figure 3 is a transverse vertical section taken at line 3—3 of Figure 2 on a somewhat enlarged scale. In all three figures a floor apron is shown. The web, after having been formed by the lapper, is deposited on the floor apron which is shown in elevation in Figures 1 and 2 and in longitudinal section in Figure 3.

Figure 4 is an enlarged detail of the ironing rollers and their carrying assembly looking in the direction of the broken arrow of Figure 3.

Figure 5 is a horizontal longitudinal section taken at line 5—5 of Figure 2, illustrating, among other features, the driving means for the ironing rollers.

Figure 6 is a longitudinal vertical section of a modified form of lapper.

Figure 7 is a longitudinal vertical section of a further modified form of lapper.

Like parts are designated by like characters throughout the specification and the drawings.

The mechanisms shown may be assembled wherever necessary. As shown, they are mounted on a floor or base 1. They might, however, be supported from above, if desired. The various parts may be carried upon vertical supports 2, 2. Such supports are shown in all of the figures. As shown in several of the figures and as ordinarily used, the lapper and associated parts are used in connection with means for forming a web. Material, usually fibrous, may be put into a bin 3 which may be of any desired shape and is shown in several different shapes. One or more cylinders 4 are used and, as shown, the cylinder is mounted within the bin on suitable bearings and is suitably driven. The cylinder has inclined teeth 5 as shown. As the cylinder is rotated, a web 6 is picked up from a body of material 7 within the bin. The web is removed from the cylinder by a doffer plate 8 which is carried upon one or more arms 9 fastened to a shaft 10. The shaft is caused to rock or vibrate and the doffer blade removes the web from the cylinder and it is then picked up by other conveyors, as will be described shortly. The means for moving the shaft 10 are not shown in detail as they are well known in the art. They may be partly enclosed within a housing 11. As shown in the forms shown in Figures 1 to 5, inclusive, several belt conveyors are used. One belt conveyor is stationary within the lapping assembly. It includes a belt 12 mounted upon rotary members 13 which are supported in bearings which are themselves supported upon the frame members 2 or otherwise. The belts may be flat and relatively extended or they may include narrower belts and slats. The shaft upon which one of the rotary members 13 is secured may have a sprocket 134 by means of which it may be driven. A second fixed conveyor is the so-called "floor" conveyor 14. This is the conveyor upon which the material is lapped and ironed and which serves to carry it away to a point of deposit or further treatment. As shown, the floor conveyor includes a flat belt or apron which is mounted about two rotary members 15, 15. One of these members is provided with a sprocket 15a by means of which it is driven. Positioned upon frame members 16 are a plurality of additional rollers 17. As shown particularly in Figure 3, these rollers are mounted so that they ordinarily contact and support the upper run of the belt 14.

For some purposes it is desirable to adjust the floor apron or conveyor up and down with respect to the remainder of the conveying system. This is accomplished by screws 18 mounted in the supports 2. At the upper end of each screw is mounted a sprocket 19 and one member of each pair of screws is provided with a handle and crank 20. The sprockets 19 of each pair engage a chain 21 and thus rotation of one handle rotates both screws of its pair and thus raises and lowers one end of the floor apron assembly. By utilizing both screws the floor apron assembly may be raised or lowered to adjust the floor apron. The purpose of this adjustment will be described below.

The form of the invention illustrated in the first five figures includes one conveyor belt which is driven and parts of which are bodily moved back and forth. In the lapper of the present invention the discharge point at which the web is discharged upon the floor apron is moved back and forth to accomplish the lapping of the web upon the floor apron to build up the "batt." Whatever the direction of the movement of the discharge point and whatever its distance from the doffer, it is essential that the length of the path through which the web passes in moving from the doffer to the discharge point shall remain constant. The arrangement of the moving conveyor, which is about to be described, is such as to accomplish that result.

The moving conveyor includes, therefore, a conveyor belt 22. At the end closest to the cylinder 4 and the doffer, the belt 22 passes about a roller or pulley 23 which rotates in a fixed bearing of any desired type. The uppermost run of the belt 22 passes also about a roller or rotary member 24 which is mounted for rotation in a truck or dolly 25. The dolly is provided with pairs of wheels 26 which run in tracks 27 supported by the frame members 2. The belt 22 passes about the roller 24 and downwardly and passes thence to a roller 28 which rotates about a fixed pivot. It passes thence between two rollers 29 and 30, which are themselves mounted in a dolly 31 provided with wheels 32 which run in tracks 33 carried by the frame members 2. This dolly carries also a pair of so-called "ironing rollers" 34 and 35. The web 6 passes through these ironing rollers when it is deposited upon the floor apron 14. The belt 22, after passing about the roller 29, returns and passes about a roller 36 which rotates about a fixed pivot, and the belt thence runs upwardly to pass about a roller 37 carried in the dolly 25 and finally returns to pass about the roller 23.

Means are provided for moving the dollies 25 and 31 back and forth across their respective tracks 27 and 33.

In all of the forms of the invention means are provided for moving the point of discharge of the web upon the floor apron back and forth. These means will be described later.

They all have at least one feature in common; namely, that as the discharge point, which in each case is the pair of ironing rollers, moves back and forth substantially the full width of the floor apron, another point in the conveyor moves back and forth a distance approximately equal to one-half the distance traveled by the floor apron. The purpose and effect of this is to establish and maintain at all times a path for the web from the point at which it is removed from the cylinder to the point at which it is deposited on the floor apron, which path remains of the same length; that is, no matter what the position of the ironing rollers; so that on the movement of the rollers to the right no doubling up or undesired accumulation of the web occurs.

The problem involved in moving the point of discharge includes not only the provision of a path of proper length through which the web moves but also the maintenance of suitable tightness for the belt. In the form illustrated in Figures 1 to 5, inclusive, this is accomplished as follows: a cable 115 is secured to a fixed and adjustable support 116. This cable extends about a sheave 24a and thence about the pulley 117 and is secured to one end of the dolly 31 as at 118. A second cable 119 is secured to the opposite end of the dolly 31 as at 120. This cable extends about a pulley 121 which is fixed on a shaft 122. It will be noticed that the roller 36 is concentric with the shaft 122 but it is free to rotate with respect to it since the roller bearings 123 are positioned between the shaft 122 and the roller 36. The roller 36 idles in response to movement of the belt 22 while the shaft 122 is driven, as will be described below. After passing about the pulley 121, the cable 119 is secured to the cable 115. Where it has been stated that the members 115 and 119 are cables, it is to be understood that they may equally well be chains or other suitable flexible driving means. The invention is not limited to the use of cables or ropes in this connection.

Fixed on the shaft 122 is a gear 124 which meshes with a gear 125 on a shaft 126. This shaft has mounted on it a reversing pulley 127, which is loose on the shaft 126, and a central member 128 which is tight to the shaft. 129 is a driving belt. The roller 28 is driven from the conveyor belt 22; the member 28 or the shaft 131 upon which it is fixed, carries a sprocket 132 which by means of a chain 133 drives a sprocket 134 fixed to the righthand roller 13 as shown in Figures 1, 2 and 3, and thus the conveyor 12 is driven from the member 28 which is itself driven from the belt 22. The roller or pulley 23 is driven from any suitable source of power and by its rotation this roller 23 drives the conveyor belt 22.

Means are provided for reversing the drive of the gear 124 to reverse the movement of the cable or chain 119 so that the dolly 31 is moved back and forth. Any suitable reversing means may be used. It may be responsive to the movement of the dolly and actuated by the dolly as it reaches the limit of its excursion or it may be electrically actuated by rotation of some part of the drive or otherwise. The details of the reversing mechanism are not an essential part of the present invention.

In the form of the device shown in Figures 1 to 5, inclusive, an ironing means is provided. The purpose of this is to iron and to flatten or compact the "batt" upon the floor apron. It is for that reason that the floor apron is provided with the supporting rollers 17.

As shown generally throughout the drawings, the ironing mechanism is substantially the same. It comprises a dolly, as shown in the first three figures, which has conveying rollers 29 and 30 and ironing rollers 34 and 35. These latter are positively driven by a sprocket 38 carried on a suitable shaft 39 mounted in bearings in the extension 40 of the dolly 31. The sprocket 38 meshes with a rack 41 which may be secured to any part of the frame but is here shown as supported from one of the tracks 33. Instead of a rack, a chain may be used. Any means for causing rotation of the member 38 is within the contemplation of the invention.

A gear or sprocket 42 is secured on the shaft 39 and meshes with gears or sprockets 43 and 44 which are, respectively, secured to the ironing rollers 34 and 35. Thus, rotation of the shaft 39 in response to movement of the gear or sprocket 38 with respect to the rack or chain 41 causes positive rotation of the ironing rollers. As the dolly 31 is moved back and forth, therefore, the shaft 39 is rotated first in one direction and then in the other.

The distance between the ironing rollers 34

and 35 and the distance between the feed rollers 29 and 30 is normally greater than the thickness of the web 6. This is shown particularly in Figure 4. The parts shown in that figure are in the position which they assume when the dolly is moving to the left as indicated by the straight arrow. When that occurs, the web is in contact with the roller 29 and out of contact with the roller 30. It is in contact with the ironing roller 34 and out of contact with the ironing roller 35; and the ironing roller 34 is driven in the direction of the curved arrow shown on it. It thus serves to feed the web downwardly and to iron and press it against the floor apron 14.

In the modified form of the invention shown in Figure 6, the frame members, the hopper, the cylinder, the doffer and similar parts are substantially the same as described in connection with the earlier figures and need not be redescribed. In other respects, the position of the floor apron and the details of the lapper differ from those described above. Thus, a floor apron 45 is connected on rollers 46 and supported in the frame members 2. The floor apron is provided with supporting rollers similar to the rollers 17. Their showing has been omitted to avoid repetition. The lapper includes three separate but coordinated conveying assembles. The first includes the conveying belt 47 which includes rollers 48, 48 supported in a dolly 49. This dolly runs on a track 50 and may be supplied with wheels or runners. A cooperating conveyor includes the belt 51, supported on rollers 52 which are mounted in a dolly 53. This latter is arranged to move along a track 54 and may engage the track by wheels, runners or otherwise. At their one ends, the dollies 49 and 53 are joined by a flexible member 55 which passes over the pulley 56. At their opposite ends they are joined by a flexible member 57 which passes over a pulley 58 mounted on a shaft 59 to which a sprocket or gear 60 is mounted. By means of this the member 58 may be rotated.

A third conveyor includes a belt 61. This belt passes about a roller 62 mounted on a dolly 63 which has wheels 64, 64. These wheels run in a track 65. Moving to the right from the roller 62, the belt 61 passes about a roller 66 which rotates in a fixed axis and may be driven by any suitable power means, as for example the drive which is shown in Figure 5, to drive the shaft 122, upon which the roller 36 is freely mounted. Any other suitable driving means might be used for rotating the roller 66 to cause the belt 61 to be driven about it. From the roller 66, the belt passes upwardly to a roller 67 which rotates about a fixed axis. It moves thence about a feed roller 68 which is mounted in a dolly 69. This dolly also carries a second feed roller 70 and wheels 71, 71 by means of which it engages a track 72. The belt 61, having passed about the roller 68, passes thence about two rollers 73 and 74 which rotate about fixed axes and thence returns to the roller 62. A cable 75 is secured at one end to the dolly 69, passes about a pulley 76, about a pulley 77 and is secured at its other end to the dolly 63. Fixed to the pulley 77 or to the shaft which carries it is a gear or sprocket 78 by means of which it may be rotated.

The dolly 69 preferably has an extension 79 in which a pair of ironing rollers 80 and 81 are mounted. The ironing roller assembly and the means for driving it in the form of Figure 6 are essentially the same as shown in Figures 1, 2 and 5 and need not be redescribed.

In the form of the invention shown in Figure 7, the supporting means, hopper, cylinder and doffer may be like those shown in the previous figures and need not be redescribed.

Mounted in the frames 2 is a floor apron 82 which rotates about rollers 83 and is carried by a shaft 84 upon which a gear or sprocket 85 is mounted and by means of which it may be driven. In this form of the invention, as in the previous forms, supporting rollers such as the rollers 17 of Figure 3 are preferably mounted under the floor apron. In all forms of the invention the adjustable means shown in Figures 1, 2 and 3 for raising and lowering the floor apron may be used, if desired. They have not been reillustrated or redescribed in connection with Figures 6 and 7 but may be embodied in those forms.

As the web 6 leaves the cylinder 4, having been removed by the doffer, it passes to a conveyor belt 86. This belt, at one end, moves about a roller 87 which rotates on a fixed axis. It moves thence about a roller 88 rotating on a fixed axis and downward to a roller 89 which is the centermost of three rollers mounted upon a dolly 90. The belt then moves upwardly and about a roller 91 which rotates about a fixed axis, thence to a feed roller 92 which is one of a pair of rollers 92, 93 on a dolly 94, which dolly is supported in a track 95 by wheels 96. The belt then turns and passes about a roller 97 which rotates about a fixed axis. It extends downwardly and about a roller 98 which is the outermost of the three rollers on the dolly 90. It extends upwardly about a roller 191 which rotates on a fixed axis.

The dolly 94 corresponds generally to the dolly 31, 40 shown in the first five figures. It has the two feed rollers 93 and 92 and a pair of ironing rollers 99 and 100 which are similar to the ironing rollers 34 and 35 and are similarly driven. The ironing rollers are carried in an extension 101 of the dolly 94.

The dolly 90 carries a second conveyor which includes a belt 102 positioned about two rollers 103 and 104, also mounted on the dolly 90. The dolly may be provided with wheels 105 or other means for engaging a track 106 in which the dolly is arranged to slide. At its upper end the dolly has fastened to it a cable 107 which passes about a pulley 108. The cable extends to a means for playing it in and laying it out in order to raise and lower the dolly 90 along the track 106. The details of this means are not shown as they form no essential part of the invention. It is sufficient merely that there be means for raising and lowering the dolly 90 at the right point in the cycle of operations of the lapper.

As a means for moving the dolly 94 back and forth a cable or chain 109 is used. This passes about a pulley 110 and a second pulley 111. To that pulley is secured a driving gear 112 which may be driven by any desired means. The chain or member 109 is secured to the dolly 94 by an arm 113. Thus, the dolly is moved with the movement of the chain, and the drive for the chain is so arranged that it reverses its direction and thus moves the dolly 94 back and forth from the full line position of Figure 7 to the dotted line position of that figure. The relationship of the two dollies 90 and 94 is such that when the dolly 90 occupies the lower full line position of Figure 7 the dolly 94 occupies the righthand full line position of that figure; and when the dolly 90 is raised to the dotted line position of Figure 7 adjacent one end of the track 106, the dolly 94 is

moved to the dotted line position at the left of the track 95.

Although there is shown an operative form of the device, it will be understood that many changes in the form, shape and arrangement of parts might be made without departing from the spirit of this invention, and it is wished that the showing be taken as, in a sense, diagrammatic.

The use and operation of this invention are as follows:

In general, in machines of the type to which the mechanism of the present invention is applicable, some means are provided for supplying material, usually fibrous, to a lapper. In the particular form here shown, the material is drawn out by a cylinder 4, is removed from it by a doffer 8 and passes to a lapper in the form of a web. This web is carried by the lapper to a floor apron, which is, in effect, the means for receiving successive layers of webs to form a "batt" and for carrying the "batt" so formed away for further treatment or for packing or storage as desired. There is added a further operation which is carried out on the floor apron; namely, the use of ironing rollers which pass back and forth with the lapper and thus compress and roll and iron the "batt" as it is formed. For this purpose there is added a number of rollers 17 to give support to the floor apron.

Since the lapper moves back and forth away from and toward the cylinder, it is clear that there would be an accumulation of web on the lapper in the return movement of the lapper unless means were provided to prevent it. If no such means were provided, the length of the path of the web from the cylinder to the point of discharge on the floor apron would vary and an unequal discharge of web would occur. Means have, therefore, been provided for maintaining a path of constant length from the cylinder to the point of discharge on the floor apron no matter what position the ironing assembly may occupy.

As shown in Figure 1, the ironing position is to the far left, the maximum distance from the cylinder 4. As shown in Figure 2, it is to the right, the minimum distance from the cylinder 4, but the arrangement of the two dollies 25 and 31 and the provision of the additional conveyor 12 which operates about fixed centers result in the provision of a path of constant length, and in the supply of the web to the discharge point on the floor apron, at a constant speed. The movement of the dolly 25 is opposite to the movement of the dolly 31 but occurs through a distance only about half as long. Since, however, the web moves on the upper run of the belt 22 about the roller 24 and then moves in the reverse direction along the conveyor 12, a movement of the dolly 25 of one foot away from the position of Figure 1 increases the length of the path by approximately two feet. However, since the web moves only along the top of that portion of the belt which feeds the web directly to the dolly 31, a movement of the dolly 31 only increases or decreases the path through which the web must run by a distance equal to the movement of that dolly. Therefore, in view of the relationship of the dolly 25 to the dolly 31, no matter what their relative position, a path of constant length and a constant supply of web at a constant speed is provided, and this with a minimum of mechanism.

The web, in moving from the roller 4, always moves along the upper run of the belt 22 between the rollers 23 and 24. It is always deposited upon the conveyor 12 and is always deposited by that conveyor upon the upper run of that portion of the belt 22 which moves to the dolly 31. It may, in the position of Figure 1, move only over a very small portion of the conveyor 12 but, as shown in Figure 2, it may move over almost all of the entire surface of that conveyor.

Since the small or short conveyor 12 is driven by the chain 133 from the sprocket 132 on the roller or drum 28, it moves when the roller moves. There are times when this roller does not move, because as the dolly 25 moves in one direction and the dolly 31 moves in the opposite direction, one dolly is in effect taking up slack as the other produces slack. Thus the dolly 25 in its movement to the left, takes up the slack which is produced in the conveyor belt 22 by movement of the dolly 31 to the right, and during the time that the dolly 25 moves to the left there is no rotation of the drum 13, and consequently no movement of the conveyor 12. Since the right hand drum 13 is driven from the drum 28, when the latter stands still the conveyor 12 does not move, and the web 6 is thus deposited on the stationary conveyor 12 by movement of the dolly 25 to the left.

When the dolly 25 has moved approximately to the position of Figure 2, its movement is reversed and it starts back to the right. When this reverse movement has been accomplished, the dollies move from the position of Figure 2 back to the position of Figure 1, and during that movement the roller or drum 28 is operated by friction from the conveyor apron 22, and thus drives the member 13 and the conveyor 12 so that the portion of the web 6 which had been previously deposited on the conveyor 12 during the left-hand movement of the dolly 25 while the conveyor 12 was stationary, is discharged downwardly from the conveyor 12 over the drum or roller 13. While this occurs additional quantities of the web are fed along the upper portion of the apron 22 to the top of the conveyor apron 12, so that the web is not broken and continues in a continuous stream and the speed of movement of the conveyor 12 is more rapid than the speed of movement of the apron 22, because the sprocket 132, which is rotated with the drum 28, by the apron 22, is larger than the sprocket 134 of the drum 13, which drives the conveyor 12, and thus a constant feed of web 6 from the dolly 31 occurs, whichever direction the dollies may be moving.

In general, the dolly 31 moves twice as far and twice as fast as the dolly 25, and the conveyor 12 serves as a means for accumulating and redischarging sufficient web 6 so that no matter what the relative positions and speeds of the two dollies may be, the web is supplied to the lower dolly in uniform quantities and at uniform speeds. In a sense, therefore, the conveyor 12 acts as a storage or accumulating means to accumulate web during the time when the relative movements and positions of the dollies would otherwise produce an uneven or broken flow of web to the lower dolly.

The speed with which the roller or drum 28 is driven must be such that when the dolly 25 moves to the left and the dolly 31 moves to the right, the slack which the former takes up and the latter produces, compensates not only for the movement of the dollies but also for the drive of the belt, and hence during the movement of the dollies from the position of Figure 1

to that of Figure 2 the roller 28 is stationary and does not rotate and for that reason does not drive the storage conveyor 12. Thus the conveyor 12 is permitted to remain stationary during that part of the cycle of the machine in which the dolly 25 moves from the position of Figure 1 to the position of Figure 2. This is essential because otherwise the conveyor 12 could not act as a storage capacity.

Where the expression "web" is used, it is not limited to fibrous material, but is to be understood as meaning any sort of material upon which the machine acts.

In moving downward from the dolly 31 to the floor apron 14, the web contacts only one of the rollers 29 or 30 and only one of the ironing rollers 34 or 35. When the dolly 31 moves to the left, as shown in Figure 4, the rollers 29 and 34 are contacted. When the dolly reverses its direction, the roller 29 or 30 may be contacted but only the ironing roller 35 will be contacted.

Means for driving the ironing rollers are shown particularly in Figure 4. The gear 38 meshes with the rack 41. Instead of a gear, a sprocket may be used, and it may mesh with the chain instead of the rack 41. Its direction of rotation changes when the direction of movement of the dolly 31 is changed. When the dolly moves in the direction shown in Figure 4, the ironing roller 43 is driven counterclockwise and thus helps to convey the web 6 and also to iron it. Upon reverse movement of the dolly 31, the gear 38 reverses its direction of rotation, and the ironing roller 35 operates clockwise to convey and to iron the web 6.

In the modified form shown in Figure 6, the dollies 69 and 63 are fastened together and the two moving conveyors carried by the dollies 49 and 53 move up and down in coordination with the reversal of movement of the dollies 69 and 63. When the dolly 69 is in the full righthand position of Figure 6, the conveyors carried by the dollies 49 and 53 occupy a position where they give an increased length to the path of movement of the web. When the dolly 69 is in the dotted line position of Figure 6, the dollies 49 and 53 are also in the dotted line positions of that figure and reduce the length of the path through which the web travels in moving about them, and this reduction corresponds to the increase in the length of path which the web must travel in reaching the full lefthand position shown in dotted lines in Figure 6.

The modified form of Figure 7 accomplishes the same general result as that described above. The dolly 90 travels up and down. In the full line position, it is giving a maximum length to the path of the web because the dolly 94 is in the full righthand position. When the dolly moves to the dotted line position at the left, it increases the length of the path of the web and, correspondingly, the dolly 90 is raised to the dotted line position, decreasing that portion of the path of the web which takes place around the dolly 90.

While fibrous material has been spoken of, it is to be understood that the machine and method of the present application may be utilized in handling almost any sort of material, and they may be used in connection with other machines and they may be used on fibrous material, natural or artificial, or on textile material or plastics or on composite material, metal foil, vegetable fibers, animal fibers and on almost an unlimited number of materials, or on mixtures or compositions of several materials. They may be used in lapping sheets of material such as paper, cloth, metal foil and the like. Consequently, the invention is limited to the handling or treatment of no particular material. The machine may be used separately, as shown, or may be used with other machines. It might, for example, be used with a paper-making machine to take the paper as it comes from the machine and to lap it. It might be used in connection with a textile machine to take a strip or web of textile material to lap that.

I claim:

1. In combination in a lapper, a main conveyor, two dollies movably mounted in said lapper and engaging and moving with said conveyor, means for reciprocating said dollies, means for giving one of said dollies a travel one-half that of the other dolly, said dollies moving in directions opposite to each other, and a second fixed conveyor mounted between the paths of movement of said dollies.

2. In combination in a lapper, a main conveyor, two dollies movably mounted in said lapper and engaging and moving with said conveyor, means for reciprocating said dollies in co-relation with each other, means for giving one of said dollies a travel one-half that of the other dolly, said dollies moving in directions opposite to each other, and a second fixed conveyor mounted between the paths of movement of said dollies.

3. In combination in a lapper, a main conveyor, two dollies movably mounted in said lapper and engaging and moving with said conveyor, means for reciprocating said dollies, means for giving one of said dollies a travel one-half that of the other dolly, said dollies moving in directions opposite to each other, and a second fixed conveyor mounted between the paths of movement of said dollies, and a batt-receiving member positioned below one of said dollies.

4. In combination in a lapper, a main conveyor, two dollies movably mounted in said lapper and engaging and moving with said conveyor, means for reciprocating said dollies, means for giving one of said dollies a travel one-half that of the other dolly, said dollies moving in directions opposite to each other, and a second fixed conveyor mounted between the paths of movement of said dollies, and a batt-receiving and conveying member, means on one of said dollies comprising ironing rollers, said rollers adapted to compress the web upon said batt receiving and conveying member.

5. In combination in a lapper, a main conveyor, two dollies movably mounted in said lapper and engaging and moving with said conveyor, means for reciprocating said dollies, means for giving one of said dollies a travel one-half that of the other dolly, said dollies moving in directions opposite to each other, and a second fixed conveyor mounted between the paths of movement of said dollies, and a batt-receiving and conveying member, means on one of said dollies comprising ironing rollers, means for rotating them, said rollers adapted to compress the web upon said batt receiving and conveying member.

6. In combination in a lapper, a main conveyor, two dollies movably mounted in said lapper and engaging and moving with said conveyor, means for reciprocating said dollies in co-relation with each other, means for giving one of said dollies a travel one-half that of the other dolly, said dollies moving always in directions opposite to each other, and a second fixed conveyor mounted between the paths of movements of said dollies, and a batt-receiving and conveying member,

means on one of said dollies comprising ironing rollers, means for rotating them, said rollers adapted to compress the web upon said batt receiving and conveying member.

7. In combination in a lapper, a main conveyor, two dollies movably mounted in said lapper and engaging and moving with said conveyor, means for reciprocating said dollies, means for giving one of said dollies a travel one-half that of the other dolly, said dollies moving in directions opposite to each other, and a second fixed conveyor, and means for driving said fixed conveyor from said main conveyor, and a batt-receiving member positioned below one of said dollies.

8. In combination in a lapper, a main conveyor, two dollies movably mounted in said lapper and engaging and moving with said conveyor, means for reciprocating said dollies, means for giving one of said dollies a travel one-half that of the other dolly, said dollies moving in directions opposite to each other, and a second fixed conveyor, and means for driving said fixed conveyor from said main conveyor, and a batt-receiving and conveying member, means on one of said dollies comprising ironing rollers, said rollers adapted to compress the web upon said batt-receiving and conveying member.

9. In a lapping machine, means for forming a web, and means for forming a batt, said web forming means including at least two conveyors, one of said conveyors positioned to operate about fixed points of support, through an unchanging path, members defining a fixed material receiving point upon another of said conveyors, and members defining a movable discharge point from said conveyor, and means for moving two parts of said conveyor in different directions, the path of one of said parts being approximately one-half as long as that of the other of said parts, said part moving means comprising means for moving the discharge point from said conveyor back and forth, means for maintaining a path for said web along said conveyors, of substantially unvarying length from said receiving point to said discharge point, irrespective of the movement of the latter, said last-mentioned means including said first mentioned conveyor.

10. In a lapping machine, means for forming a web, and means for forming a batt, said web forming means including a plurality of conveyors, members defining a fixed material receiving point upon one of said conveyors, and members defining a movable discharge point from said conveyor, and means for moving two parts of said conveyor in different directions and at different speeds, the path of one of said parts being approximately one-half as long as that of the other of said parts, said part moving means comprising means for moving the discharge point from said conveyor back and forth, means for maintaining a path for said web along said conveyors, of substantially unvarying length from said receiving point to said discharge point, irrespective of the movement of the latter, said last-mentioned means including another of said conveyors.

11. In a lapping machine, means for forming a web, and means for forming a batt, said webb forming means including a plurality of conveyors, members defining a fixed material receiving point upon one of said conveyors, and members defining a movable discharge point from said conveyor, and means for moving two parts of said conveyor in different directions, the path of one of said parts being approximately one-half as long as that of the other of said parts, said part moving means comprising means for moving the discharge point from said conveyor back and forth, means for maintaining a path for said web along said conveyors, of substantially unvarying length from said receiving point to said discharge point, irrespective of the movement of the latter, said last-mentioned means including another of said conveyors.

12. In a lapping machine, means for forming a web, and means for forming a batt, said web forming means including a pair of conveyors, members defining a fixed material receiving point upon one of said conveyors, and members defining a movable discharge point from said conveyor, and means for moving two parts of said conveyor in different directions, said moving means including two dollies movably mounted in said lapping machine, and means for reciprocating said dollies, the path of one of said parts being approximately one-half as long as that of the other of said parts, said part moving means comprising means for moving the discharge point from said conveyor back and forth, means for maintaining a path for said web along said conveyors, of substantially unvarying length from said receiving point to said discharge point, irrespective of the movement of the latter, said last-mentioned means including the other of said conveyors.

13. In combination in a lapper, a web forming means and a batt forming means, the batt forming means including a movable batt conveyor upon which the web is deposited in the formation of a batt, and web conveying means comprising two conveyors, means for moving one end of one of said web conveyors back and forth across the batt receiving conveyor along a generally horizontal path, and means for maintaining and for moving the other of said web conveyors bodily at all times along a fixed path at an angle to the horizontal.

14. In combination in a lapper, a web forming means and a batt forming means, the batt forming means including a movable batt conveyor upon which the web is deposited in the formation of a batt, and web conveying means comprising two conveyors, means for moving one end of one of said web conveyors back and forth across the bat receiving conveyor along a generally horizontal path, and means for maintaining and for moving the other of said web conveyors bodily at all times along a fixed path at an angle to the horizontal, and means for maintaining a loop in said first-mentioned conveyor, said other conveyor extending at all times into the loop in said one conveyor.

15. In combination in a lapper, means for forming a web, and a batt conveyor adapted to receive said web, and means for conveying said web from said web forming means to said batt conveyor and for depositing said web upon said batt conveyor, said web conveying means comprising a pair of web conveyors, means for establishing a loop in one of said web conveyors, said means including a dolly, and means for moving said dolly back and forth across said batt conveyor in a generally horizontal path, a second dolly, means for moving and maintaining said dolly along a fixed path at an angle to the horizontal, means on said second dolly for maintaining a second loop in said one web conveyor, the other web conveyor extending into said second loop in said one web conveyor, the two web conveyors providing and maintaining at all times a path from said web forming means to said batt conveyor of substantially unvarying length.