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A. KOSEK
SHEET TEARING TABLE

2,698,659

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2 Sheets-Sheet 2

Fig. 2.

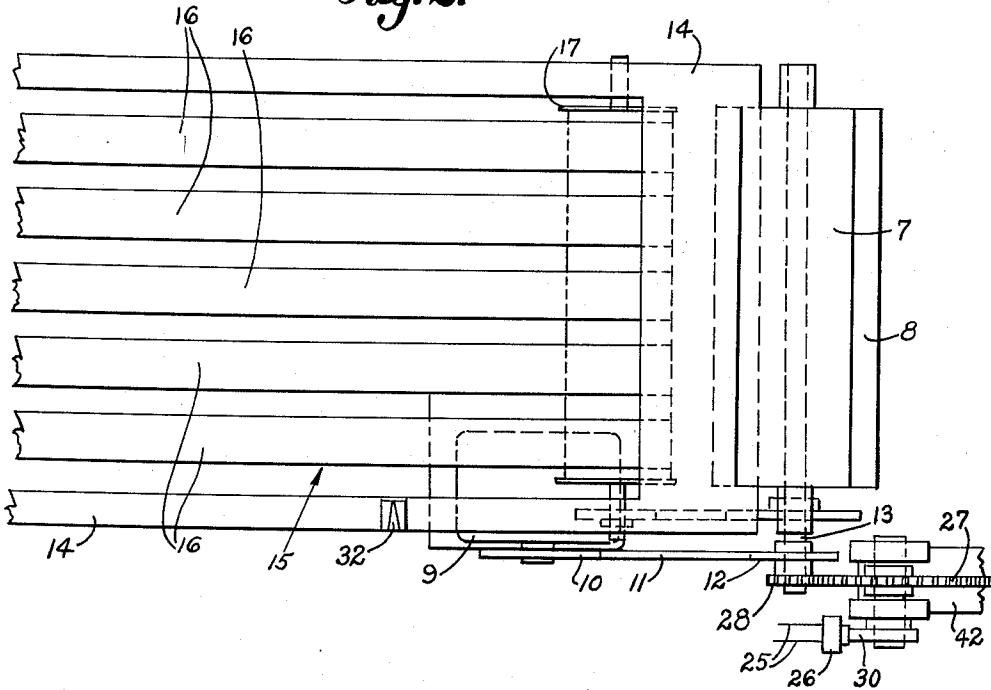


Fig. 3.

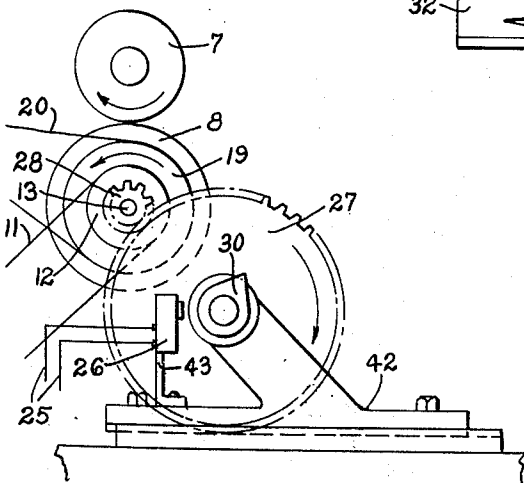
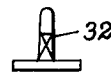


Fig. 4.



Fig. 5.



INVENTOR.
Alexander Kosek
BY
Louis C. Smith
Attorney.

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SHEET TEARING TABLE

Alexander Kosek, Salem, Mass., assignor to Naumkeag Steam Cotton Company, Salem, Mass., a corporation of Massachusetts

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In manufacturing bed sheets it is a common practice to feed sheet material in web form forwardly from a roll and to tear predetermined lengths from the web as it is thus fed forward, each torn-off length having the proper dimension to form a bed sheet.

The present invention has for an object to provide a novel apparatus by which the sheet material in web form may be fed forward by suitable feeding means which is designed to come to rest when a predetermined length of sheet material has been fed forward, so that said length may be torn from the web, which feeding means will be automatically started up again when the torn-off length is removed from the apparatus.

Another object of the invention is to provide an apparatus of the above type in which the feeding means is operated by an electric motor which is stopped automatically when the predetermined length has been fed forward, and the starting of which motor is controlled by an electric eye or photoelectric relay situated and arranged so that as the predetermined length is being fed forward prior to its being torn from the web, said length will intercept the light beam of the photoelectric relay, and when the predetermined length has been torn off from the web and has been removed from the path of the light beam, the relay will automatically operate to start the motor again.

In the accompanying drawings which show one embodiment of the invention:

Fig. 1 is a somewhat diagrammatic side view of an apparatus embodying the invention.

Fig. 2 is a fragmentary plan view illustrating the feed rolls and the table onto which the web material is fed from the feed rolls.

Fig. 3 is a fragmentary view illustrating the position of the stop mechanism for the feed rolls while said rolls are operative to feed the sheet material forward.

Fig. 4 is a side view of the knife used for slitting the edge of the web to initiate the tearing operation.

Fig. 5 is an end view of the knife.

Fig. 6 is a wiring diagram.

In the drawings, the web material from which the bed sheets are to be torn is indicated at 1, and it is illustrated as being withdrawn from a roll 2 by means of delivery rolls 3, 4. The delivery rolls deliver the web material onto a scray 5 on which it accumulates in a relaxed, non-tensioned condition.

The apparatus also comprises feeding means for feeding forward predetermined lengths of the web material 1 from the accumulated amount 6 of web material supported on the scray 5. Such feeding means may conveniently be in the form of feed rolls 7, 8, the roll 8 being a driven roll and roll 7 a pressure roll. The feeding rolls 7, 8 are shown as being driven from a motor 9 which has a pulley 10 that is connected by a belt 11 with a pulley 12 on the shaft 13 of the driven roll 8.

The feed rolls 7 and 8 deliver the sheet material onto a table 14 which has associated therewith an endless conveyor 15 by which the material delivered from the feed rolls is carried forwardly. The conveyor is shown as comprising a plurality of endless bands 16 which pass around a driven roll 17 and also around an idler roll 18. The driven roll 17 is belted to the feed roll 8 and is driven thereby, for which purpose the said roll 8 has a pulley 19 fast therewith which is connected by a belt 20 to a pulley 21 rigid with the roll 17. The pulley 21 is preferably somewhat smaller than the pulley 19, so that the conveyor bands 16 will be moving somewhat faster than the surface

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speed of the feed rolls 7 and 8. As a result, the web material which is fed forward by the feed rolls will be driven forward by the upper runs of the faster moving conveyor band 16 and will thus be held in a straight unwrinkled condition.

The operation of the motor 9 is controlled by a magnetic control switch 22 which controls the delivery of current to the motor through the motor circuit 23. The motor control switch 22 is rendered operative to close the motor circuit 23 or to open said circuit by a control circuit 24 which has a branch 25 leading to a normally closed micro-switch 26.

As stated above, this micro-switch is normally closed and means are provided for opening the switch and thus causing the magnetic control switch 22 to be opened when a predetermined length of material has been fed forward by the feed rolls 7, 8. For this purpose there is provided a rotary measuring element 27 which is shown in the form of a gear mounted on a shaft 29 that is journaled in a bracket 42 and which meshes with and is driven by a pinion 28 on the shaft of the feed roll 8. The relative size of the gears 27 and 28 is such that when the predetermined amount of sheet material has been fed forward by the feed rolls 7, 8, the measuring element 27 will have made one complete rotation.

Mounted on the shaft 29 of the measuring element 27 is a cam member 30 which when the measuring element has reached the position shown in Fig. 1 will engage the micro-switch 26 and open the latter, thereby breaking the branch circuit 25 which will result in stopping the motor. The feed rolls 7, 8 and the conveyor 16 will thus come to rest with the cam 30 in the position shown in Fig. 1.

When the feed rolls and conveyor have thus come to rest after having fed forward a predetermined length 31 of sheet material, the operator tears such predetermined length from the web, which is then lying at rest on the stationary conveyor. To initiate the starting of the tearing operation there is provided a knife 32 which is carried by the table and which is provided with two cutting edges 33. When the forward movement of the sheet material has ceased by the stopping of the feed rolls and conveyor, the operator takes one edge of the sheet material and enters it into the notch of the knife so as to make a short slit in such edge, and after this has been done the predetermined length may be readily torn from the web material by hand.

After the predetermined length of sheet material has been thus torn off, the forward edge 34 of the web will be located opposite the knife and will be resting on the leading end of the upper runs of the conveyor bands 16, as shown in Fig. 1.

The present invention includes means which is responsive to the removal of the torn-off length 31 from the table to start the motor in operation, thereby to feed another predetermined length of sheet material forward.

For this purpose there is provided a photoelectric relay 35 which includes the well-known electric eye, the latter having a light source 36 and a selenium cell or other receiving element onto which the light beam 37 is directed. The control circuit 24 for the motor control switch 22 has another branch circuit 38 which is in multiple with the branch circuit 25, and which contains the switch 39 activated by the relay 35 for opening and closing the branch circuit 38. The photoelectric relay 35 is constructed so that the switch 39 will close the branch circuit 38 when the receiving element of the electric eye is subjected to the full lighting intensity of the light beam 37. When this light beam is intercepted, then the relay 35 opens the switch and the branch circuit 38.

The photoelectric relay is so located that as the sheet material is carried forward by the conveyor bands 16 during the forwarding feeding movement of the web, the leading end of the sheet material will be moved across the light beam 37, thereby intercepting it, and when this occurs the relay 35 will open the switch in the branch circuit 38. Hence, while the branch circuit 38 is normally closed it will be opened by the advancing end of the sheet material while the predetermined length 31 thereof is being fed forward.

As stated above, when such predetermined length has been fed forward the cam 30 will be brought into

the position shown in Fig. 1 and will open the switch 26. Inasmuch as at this time the switch in the branch circuit 38 is open, the opening of the micro-switch 26 will open the motor circuit and thus stop the motor 9.

When the forward feeding movement of the sheet material is thus stopped, the operator will make a nick in the edge of the sheet material by means of the knife 32 and will tear the predetermined length 31 from the web material.

So long as this torn-off length 31 remains on the conveyor in a position to intercept the light beam 37, the branch circuit will remain open. However, as soon as the operator removes the torn-off length 31 from the path of the light beam the relay 35 will then become operative to close the switch 39 and thus close the branch circuit 38, thereby starting the motor 9 in operation and initiating the feeding forward of another predetermined length of sheet material.

From the above it will be observed that while both switches 39 and 26 are normally closed, yet in the operation of the device the switch 39 will be opened first before the predetermined length has been completely fed forward, and as soon as the feed rolls 7, 8 have fed forward such predetermined length, the cam 30 will open the switch 26, thereby opening the motor circuit and bringing the motor 9 to rest.

The removal of the torn-off length 31 from a position in which it intercepts the light beam 37 will automatically start the motor in operation again, and as soon as the feed rolls begin to turn, the cam 30 will move out of engagement with the switch 26, and the latter will automatically close.

The light source 36 may be activated by current in a circuit 40, the latter being shown as having a transformer 41 therein to provide the proper voltage for the light 36.

The predetermined length to be fed forward by each operation may be increased or decreased to provide longer or shorter sheets by varying the relative size of the gears 27 and 28. For this purpose the gear 28 is in the form of a change gear which can be removed from the shaft 13 and replaced by a larger or smaller gear as the case may be. The measuring gear 27 is mounted on a support 42 which can be adjusted in a horizontal direction to permit the gear 27 to mesh with larger or smaller change gears. The micro-switch 26 is shown as mounted on the support 43 and thus has a fixed relation to the cam 30.

In Fig. 6 there is shown a conventional wiring diagram illustrative of the manner in which the magnetic control switch 22, the micro switch 26, and the photoelectric relay switch 39 operate. The circuit 23 by which the motor 9 is actuated is shown as a three-wire circuit and the magnetic control switch 22 is a three-pole switch, as indicated at 60 in Fig. 6. The magnetic coil by which the switch is controlled is illustrated at 62 and is in the circuit 24. One side of the circuit 24 is shown as connected to one of the outside wires of the circuit 23, and the other side of the circuit 24 is connected to the coil 62, and the latter is connected to the central wire of the circuit 23. The circuit 24 is shown as having a hand operated switch 65 therein by which it can be opened and closed.

In Fig. 6 the micro switch is indicated at 26 and the relay switch of the photoelectric relay is indicated at 39.

Assuming that the hand operated switch 65 is closed, it will be seen from Fig. 6 that when either the micro switch 26 or the photoelectric relay switch 39 is closed, the circuit 24 through the magnetic coil 62 will be closed, and thus said coil will be activated thereby to close the magnetic control switch 22.

When, however, both the micro switch 26 and the photoelectric relay 39 are opened, the circuit activating the coil 62 will be broken, and said coil will be de-energized and the switch 22 will be automatically opened, thus stopping the motor. This is the condition illustrated in Fig. 1.

As stated above, when the torn-off predetermined length 31 is removed from the table and from the path of the light beam 37, the switch 39 will be closed thereby ener-

gizing the coil 62 and thus closing the switch 22, with the result that the motor is started in operation to feed forward another predetermined length.

I claim:

1. A device of the class described comprising feed rolls for feeding forward sheet material in web form from which bed sheets may be torn, a movable conveyor to receive sheet material from the feed rolls and carry it forward, a motor, means operatively connecting the motor to the feed rolls and conveyor, a rotary measuring element connected to the feed rolls for measuring predetermined lengths of sheet material, means actuated by the rotary measuring element to stop the feed rolls and conveyor when a predetermined length of sheet material has been measured, whereby said length may be torn from the web while the feed rolls and conveyor are at rest, an electric eye device so situated that its light beam is intercepted by the sheet material being moved forward by the conveyor while a predetermined length is being measured, and means responsive to the removal of the torn-off length from the path of the light beam to start the motor in operation again.

2. A device of the class described comprising feed rolls for feeding forward sheet material in web form from which bed sheets are to be torn, a movable conveyor to receive the sheet material from the feed rolls and carry it forward, an electric motor to rotate the feed rolls and actuate the conveyor, a motor circuit for actuating the motor, said circuit having therein two switches arranged in multiple, whereby the motor circuit is activated when either switch is closed and is de-activated when both switches are opened, one of said switches being a normally closed switch, a measuring element connected to and operated by one of the feed rolls to measure predetermined lengths of sheet material as it is fed forward by the feed rolls, switch actuating means responsive to the forward movement given to the sheet material by the conveyor to open the other switch while the predetermined length is being measured, and means actuated by the measuring element to open the normally closed switch and thus stop the motor when said predetermined length of sheet material has been measured, whereby said length may be torn from the web while the feed rolls and conveyor are at rest, said switch actuating means being responsive to the removal of the torn-off length from the conveyor to close said other switch thereby activating the motor and starting up the feed rolls and conveyor.

3. A sheet tearing table comprising feed rolls for feeding forward sheet material in web form from which predetermined lengths are to be torn, a movable conveyor to receive the sheet material from the feed rolls, an electric motor to operate both the feed rolls and the conveyor, two switches connected in multiple for controlling the motor whereby said motor is rendered operative by closing either switch and is rendered inoperative when both switches are opened, one of said switches being a normally closed switch, a rotary measuring element operatively connected to one of the feed rolls to measure predetermined lengths of sheet material as it is fed forward, switch control means rendered operative by the sheet material as it moves forward on the conveyor during the measuring operation to open the other switch, means rendered operative by the measuring element to open the normally closed switch when a predetermined length of sheet material has been measured, thereby stopping the motor, whereby said predetermined length may be torn from the web while the feed rolls and conveyor are idle, said switch control means being responsive to the removal of the torn off length from the conveyor to close said other switch and thus again start the motor in operation.

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