

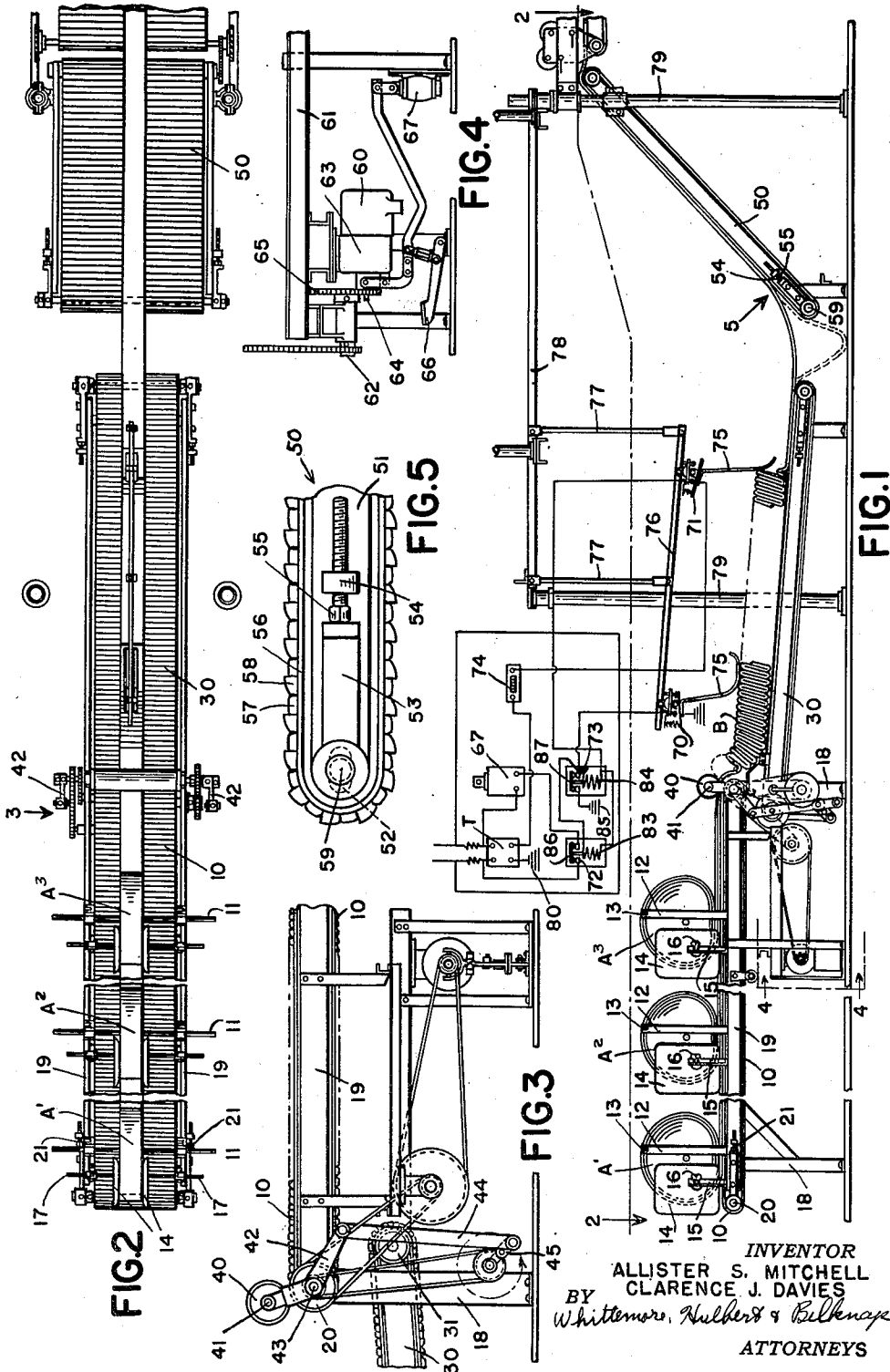
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ACCUMULATING CONVEYER

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ACCUMULATING CONVEYER

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This invention relates to a conveyer, and more particularly to an improved conveyer adapted for use with a machine intended to perform a continuous or intermittent operation on a strip or strips of material.

It is a primary object of the invention to provide a conveyer which will make strip material continuously available without interruption to a machine, while at the same time the conveyer itself may be stopped for periods sufficient to permit replacement of expended rolls of strip material, splicing of new rolls of material onto the said continuous strip, and the like.

It is a further object of this invention to provide a conveyer for strip material in conjunction with a machine to operate continuously on said strip material, the conveyer operating intermittently at a rate in excess of the rate of the machine, to accumulate surpluses of material adjacent the machine.

It is a further object of the invention to provide an accumulating conveyer which is equipped with automatic controls.

It is a further object of the invention to provide an accumulating conveyer which arranges the material conveyed in a regular predetermined form designed for facile withdrawal.

Other objects will be obvious from the subjoined description, taken in connection with the drawing in which:

Fig. 1 is a side elevation of my improved accumulating conveyer with a diagrammatic showing of the control circuit;

Fig. 2 is a section on the line 2-2, Fig. 1;

Fig. 3 is an enlarged detail view of the material forming mechanism taken in the direction of the arrow 3, Fig. 2;

Fig. 4 is a fragmentary elevation, taken in the direction of the arrows 4-4, Fig. 1, and

Fig. 5 is an enlarged fragmentary view of the inclined conveyer section indicated by the arrow 5, Fig. 1.

The accumulating conveyer forming the subject matter of the present invention is capable of many applications, but is illustrated herein as connected to a multi-pleater of the type shown in a prior patent, 1,921,691, issued August 8, 1933, for example.

In multi-pleaters of the type referred to, a continuous strip of cotton batting is fed into the machine, and, by suitable mechanism, interposed between lining and upholstery fabric. The cotton batting may be and preferably is broken between covers, and the upholstery cushions are sewed to desired form.

It is, of course, highly desirable to render the upholstery making machine continuous in operation, and to avoid interruptions so far as possible. In the past it has been necessary to interrupt operation of the machine in order to replace expended rolls of batting. By means of my novel accumulating conveyer, it is possible to replace expended rolls of batting without shutting down the upholstery making machine, and thus it is possible to run the upholstery making machine continuously for extended periods.

For purposes of illustration, we have illustrated an accumulating conveyer which is adapted to supply a continuous web of cotton batting. This web, as illustrated, is composed of a plurality of plies of batting, each ply originating from a single roll of batting. This permits splicing a new strip of batting onto the end of an expended strip in a practical and convenient manner and the splice thus formed is in only one ply, so that at the point of splice, there are one or more continuous plies of batting adjacent the splice. This as will be evident, provides for increased strength at the splices, and in addition results in a smoother splice. It has been found that splices so formed are entirely unobjectionable and may be included within a finished cushion without detracting from its appearance or utility.

In Figs. 1 and 2 we have illustrated the complete accumulating conveyer associated with the upholstery making machine. In these figures, a plurality of rolls of cotton batting, designated A', A² and A³ rest upon an endless conveyer 10. Each roll of batting is formed on an axial core rod 11, and upright posts 12 are provided at the sides of the conveyer belt to engage the projecting ends of the core rods.

As the conveyer is actuated, the cotton batting unrolls from its roll and is fed along the belt. This is accomplished without strain on the batting, as a result of the arrangement described. Each ply of batting, starting from the rearwardmost roll A', underlies succeeding plies, and is readily accessible, between its roll, and the next succeeding roll, for splicing purposes.

Each post 12 is provided at its top with a notch 13 of a size to receive the end of the core rods, and in splicing a new roll onto the end of an expended roll, the new roll is first mounted in the notches 13. This provides for manual rotation of the roll so as to permit positioning the free end of the strip of batting in proper place for splicing.

Adjustable flat plates 14 are provided adjacent each roll of batting. These plates are carried

from standards 15, and adjustment is provided by means of laterally extending arms 17 and clamping means 16. These plates may be adjusted inwardly to confront the ends of the rolls of batting, and will insure even rolling of the material.

The conveyer 10 includes a suitable supporting frame having legs 18, a horizontal table 19, and rollers 20 carried by the table and adjustable relative thereto by means 21 which permits tensioning of the belt 10.

A second conveyer 30 is disposed adjacent the delivery end of the conveyer belt 10, slightly below and in a position to receive material delivered from the first conveyer. This conveyer as illustrated is slightly inclined forwardly.

In operation, the conveyer 10 is arranged to operate at a speed several times greater than the conveyer 30. This results in accumulating a surplus of material on conveyer 30, and in order that it will be arranged for convenient withdrawal on conveyer 30, mechanism is provided to fold the batting in a plurality of parallel vertical folds.

This mechanism takes the form of a roller 40, best seen in Fig. 3. This roller is mounted for free rotation on shaft 41 which is carried by bell cranks 42 at each end. The bell cranks 42 are pivoted at 43, which is the axis of the roller carrying the conveyer 10 at the delivery end thereof. A link 44 interconnects one arm of the bell crank with a crank 45. As the crank 45 is rotated, the roller 40 oscillates in timed relation about the axis 43, and arranges the batting in folds B on the conveyer 30, as clearly indicated in Fig. 1. The folded batting is withdrawn from conveyer 30, both while the conveyer is stationary and while it is in operation, by a feed conveyer 50. The material is received by suitable feeding, forming, and sewing mechanism in the multi-pleater and finished cushions are delivered from the multi-pleater. The feed conveyer 50 is actuated by the multi-pleater mechanism and is operated continuously while the accumulating conveyer is actuated intermittently by mechanism now to be described.

A motor 60 (Fig. 4) is carried by a table portion 61. In the illustrated embodiment this motor runs continuously and clutch mechanism provides for intermittent operation of the accumulating conveyer. However, it will be apparent that if desired, the clutch could be omitted, and the motor 60 operated intermittently. The motor 60, as illustrated, drives a shaft which is operatively connected through the clutch 63 to a shaft 64. When the clutch is engaged, shaft 64 drives chain 65, shaft 62, and through the medium of suitable belts or chains, the crank 45, and the driving rollers 20 and 31 of conveyer belts 10 and 30 respectively. Conveyer 10 is operated at several times the velocity of conveyer 30, and roller 40 is oscillated in properly timed relation about axis 43.

The clutch 63 may be operated directly by foot pedal 66 or automatically by solenoid 67. The automatic control involves a pair of switches 70 and 71, normally open relays 72 and 73, transformer T, and a manual switch 74.

Switches 70 and 71 each have a downwardly extending flexible arm 75 which is positioned in the path of the folds B of the material. The switches are adjustably mounted on a bar 76 which is suspended by bars 77 from a horizontal frame member 78 carried by standards 79. By adjusting the switches 70 and 71 it is possible to predetermine the maximum and minimum amounts of folded batting carried by conveyer 30.

Transformer T is connected to the line, and its secondary is grounded at 80. The other side of the secondary is connected through manual switch 74, to one contact of switch 71. A second contact carried by switch 71 leads to relay coils 83 and 84. Relay coils 83 and 84 are in parallel and have a common return to ground 85 through switch 87, controlled by relay coil 84. Relay coil 83 closes switch 86 which controls solenoid 67. As will be apparent, when switches 70 and 71 are both closed, as they will be by gravity or spring means when the supply of folded cotton is reduced sufficiently, a circuit is established from transformer T, through switch 74, through both relay coils 83, 84, through switch 70 to ground. The flow of current through coil 83 closes switch 86 which energizes solenoid 67 and operates clutch 63. The flow of current through coil 84 closes switch 87, which sets up a holding circuit there-through to ground at 85. This holding circuit is independent of switch 70, with the result that solenoid 67 is maintained energized until switch 71 is opened by folds B engaging arm 75. Thus the accumulating conveyer is automatically operated to keep the folded material on conveyer 30 between predetermined limits.

In Fig. 5 we have illustrated the construction of the conveyer 50. Frame 51 is provided with elongated slots 52 to receive the shaft 59 carrying the rolls. Sliding bars 53, apertured to receive the shaft 59, are carried by the frame, and are adjusted by members 55 threaded in lugs 54. The conveyer belt 56 carries cross pieces 57 and 58 of the form shown in Fig. 5, the pieces 58 having an elevated acute angled forward edge for added engagement with the batting.

In operation, with conveyer 30 filled with folds of batting to a point where switch 71 is opened, the accumulating conveyer is stationary. Conveyer 50 withdraws material at a uniform rate from conveyer 30, withdrawal being facilitated by the orderly arrangement of the batting material. When sufficient material is withdrawn to close switch 70, the accumulating conveyer is energized by operation of clutch 63. Conveyer belt 10 operates several times as rapidly as belt 30, and a surplus of material is delivered to belt 30. Oscillating roller 40 arranges the surplus in parallel vertical folds. When sufficient material has accumulated to open switch 71, the accumulating conveyer stops.

If a roll, as A', A² or A³ is nearly expended, an operator by operating foot pedal 66, may completely expend the roll. A new roll is then placed on uprights 12 in notches 13, the free end found, and a splice effected. The roll is then lowered onto the belt 10. During this operation if desired, manual switch 74 may be opened to prevent automatic actuation during replacement of a roll. This will not normally be necessary, however, as a substantial interval is afforded between automatic operations. This interval may be varied by varying the setting of switches 70, 71.

It will be seen that by the use of our improved accumulating conveyer the efficiency of a machine acting continuously on a strip material is greatly enhanced. By using our accumulating conveyer it is possible to operate the machine without interruption for as long periods as desired. Splices may be effected in the backing strip without special mechanism, and ordinarily the upholstery fabric is fed into the machine in the form of precut covers.

While we have illustrated our accumulating conveyer in combination with multi-pleater, it is

obviously adapted for other applications which will suggest themselves to those familiar with the art.

The foregoing detailed description of a preferred embodiment of our invention has been given for clearness of understanding only, and no unnecessary limitation should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

What we claim as our invention is:

1. An accumulating conveying mechanism comprising a first conveyer, a second conveyer positioned to receive material from said first conveyer, automatic means responsive to the amount of material on said second conveyer for effecting simultaneous, intermittent operation of both of said conveyers, said first conveyer arranged to operate at a substantially higher speed than said second conveyer.

2. An accumulating conveying mechanism comprising a first conveyer, a second conveyer positioned to receive material from said first conveyer, a driving means for driving both of said conveyers simultaneously, measuring means associated with said second conveyer for determining the amount of material on said second conveyer, and control means for said driving means operated by said measuring means for keeping the amount of material on said second conveyer between widely spaced predetermined limits, said first conveyer arranged to operate at a substantially higher speed than said second conveyer.

3. An accumulating conveyer mechanism for sheet material, comprising a first conveyer, a second conveyer positioned to receive sheet material from said first conveyer, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and means for arranging said sheet material on said second conveyer in predetermined form.

4. An accumulating conveyer mechanism for sheet material, comprising a first conveyer, a second conveyer positioned to receive sheet material from said first conveyer, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and means for arranging said sheet material on said second conveyer in a series of folds in predetermined form.

5. An accumulating conveyer mechanism for sheet material, comprising a first conveyer, a second conveyer positioned to receive sheet material from said first conveyer, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and means for arranging said sheet material on said second conveyer in a series of vertical folds in predetermined form.

6. An accumulating conveyer mechanism for sheet material, comprising a first conveyer, a second conveyer positioned to receive sheet material from said first conveyer, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and means for arranging said sheet material on said second conveyer in a series of abutting vertical folds in predetermined form.

7. An accumulating conveyer mechanism for sheet material, comprising a first conveyer, a second conveyer positioned to receive sheet material from said first conveyer, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and oscillating

means for arranging said sheet material on said second conveyer in predetermined form.

8. An accumulating conveyer mechanism for sheet material, comprising a first conveyer, a second conveyer positioned to receive sheet material from said first conveyer, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and oscillating means for arranging said sheet material on said second conveyer in predetermined form, said means comprising a transverse material engaging member oscillated with respect to said material.

9. An accumulating conveyer mechanism for sheet material comprising a first endless conveyer, a second endless conveyer positioned adjacent the discharge end of said first conveyer in a position to receive sheet material therefrom, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, automatic means for effecting simultaneous intermittent operations of said conveyers.

10. An accumulating conveyer mechanism for sheet material comprising a first endless conveyer, a second endless conveyer positioned adjacent the discharge end of said first conveyer in a position to receive sheet material therefrom, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and means for arranging said sheet material on said second conveyer in predetermined form.

11. An accumulating conveyer mechanism for sheet material comprising a first endless conveyer, a second endless conveyer positioned adjacent the discharge end of said first conveyer in a position to receive sheet material therefrom, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and means for arranging said sheet material on said second conveyer in predetermined form, said means comprising a transverse material engaging member.

12. An accumulating conveyer mechanism for sheet material comprising a first endless conveyer, a second endless conveyer positioned adjacent the discharge end of said first conveyer in a position to receive sheet material therefrom, said first conveyer arranged to operate at a substantially higher speed than said second conveyer, and means for arranging said sheet material on said second conveyer in predetermined form, said means comprising a transverse material engaging member oscillated about the discharge end of said first conveyer.

13. In combination, a machine for performing operations on sheet material at a definite rate, a first conveyer, a roll of sheet material on said conveyer, an axial rod in said roll, stop means for said rod, a second conveyer positioned to receive sheet material from said first conveyer, means for operating said conveyers simultaneously and said first conveyer at a substantially greater rate than said second conveyer, said second conveyer being adjacent said machine.

14. Apparatus for feeding a fiber batt of low tensile strength to a machine and for accumulating a surplus of said batt in a form which can be withdrawn by said machine during interruption of said feeding means, which comprises means for advancing said batt, means for folding said batt into an accumulation of untensioned loose folds extending longitudinally toward said machine, additional folds being formed at the end of said accumulation away from said machine,

said folds being formed so as to be readily withdrawable without substantial tension from the end of said accumulation nearer said machine.

15. Apparatus for feeding a fiber batt of low tensile strength to a machine and for accumulating a surplus of said batt in a form which can be withdrawn by said machine during interruption of said feeding means, which comprises means for advancing said batt, means for folding said batt into an accumulation of untensioned loose folds extending longitudinally toward said machine, additional folds being formed at the end of said accumulation away from said machine, said folds being formed so as to be readily withdrawable without substantial tension from the end of said accumulation nearer said machine, and means for operating said apparatus rapidly for accumulating said surplus, and for interrupting said apparatus to permit substantially complete withdrawal of said surplus.

16. An accumulator conveyer mechanism comprising a first and second endless conveyer, said first conveyer operable at a speed considerably higher than said second conveyer to accumulate thereon a supply of sheet material, means for driving said conveyers simultaneously, control means for starting and stopping said driving means, said control means being effective to start said driving means when all but a predetermined minimum of said material has been withdrawn, and for stopping said driving means when a predetermined maximum of said material has been accumulated.

17. A moving conveyer, means for accumulating and folding sheet material on said moving conveyer in a plurality of vertical folds, means for stopping said conveyer and folding means comprising an abutment over said conveyer positioned to contact the tops of said folds, but to permit withdrawal of said sheet material beneath said abutment, and means for starting said conveyer and folding means comprising a second abutment spaced rearwardly from said first abutment and adapted to contact the tops of said folds, whereby said first means operates periodically to fill and permit exhaustion of said conveyer between said abutments with folds of said sheet material.

18. Apparatus for forming a fiber batt into a form from which it may be withdrawn without

substantial tension which comprises, a slow speed conveyer, means for feeding said batt onto said conveyer rapidly, and means for folding said batt into a plurality of loosely associated, substantially regular, sinuously shaped folds.

19. Apparatus for forming a fiber batt into a form from which it may be withdrawn without substantial tension which comprises, a slow speed conveyer, means for feeding said batt onto said conveyer rapidly, and means for folding said batt into a plurality of loosely associated, substantially regular, sinuously shaped folds, said last means comprising a roll mounted for free rotation and movable toward and away from said conveyer.

20. Accumulating apparatus comprising a first high speed conveyer, a second low speed conveyer adapted to receive sheet material from said high speed conveyer, related driving means for said conveyers for driving said conveyers simultaneously in timed relation, control means for said conveyers for starting both of said conveyers when the amount of material on said second conveyer reaches a predetermined minimum, and for stopping both of said conveyers when the amount of material on said second conveyer reaches a predetermined maximum.

21. Accumulating apparatus comprising a first high speed conveyer, a second low speed conveyer adapted to receive sheet material from said high speed conveyer, related driving means for said conveyers for driving said conveyers simultaneously in timed relation, control means for said conveyers for starting both of said conveyers when the amount of material on said second conveyer reaches a predetermined minimum, and for stopping both of said conveyers when the amount of material on said second conveyer reaches a predetermined maximum, and a reversely movable folding device for arranging sheet material on said second conveyer in a plurality of substantially regular folds.

22. The method of feeding a web of low tensile strength which comprises forming said web into an elongated series of generally overlapping, untensioned regular folds while advancing said series as a whole, interrupting advance of said series and withdrawing said web from the forward end of said series by an unfolding thereof.

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