

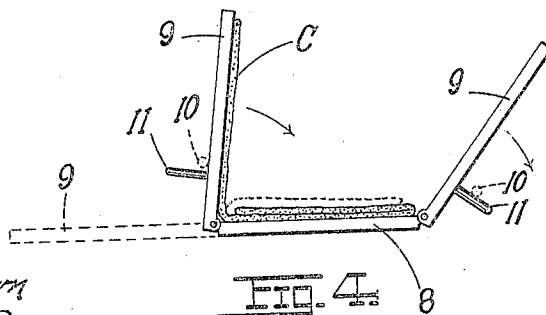
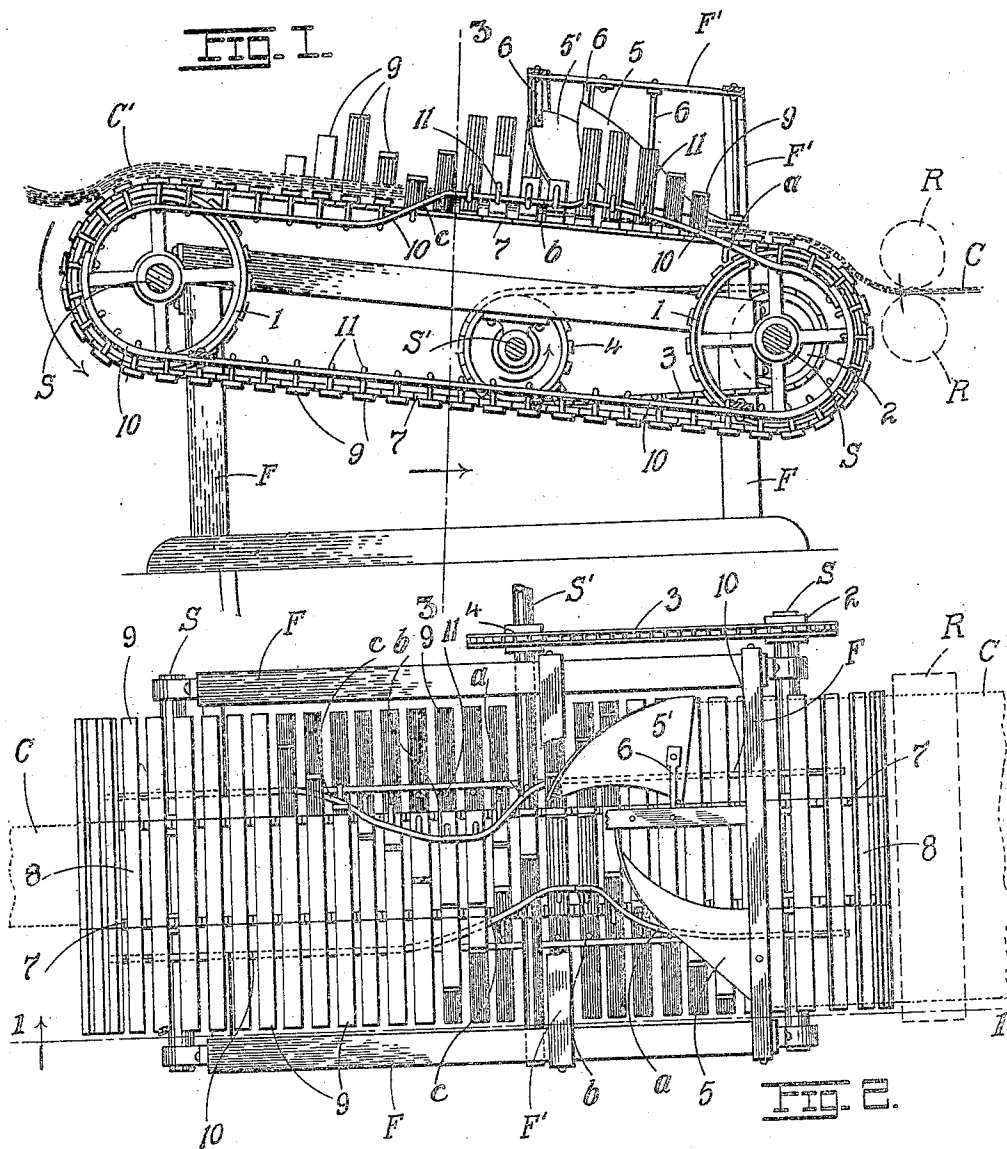
No. 817,929.

PATENTED APR. 17, 1906.

A. R. NAUER.
FOLDING MACHINE.

APPLICATION FILED AUG. 28, 1905.

2 SHEETS—SHEET 1.



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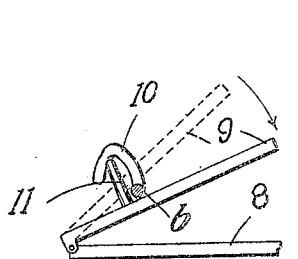
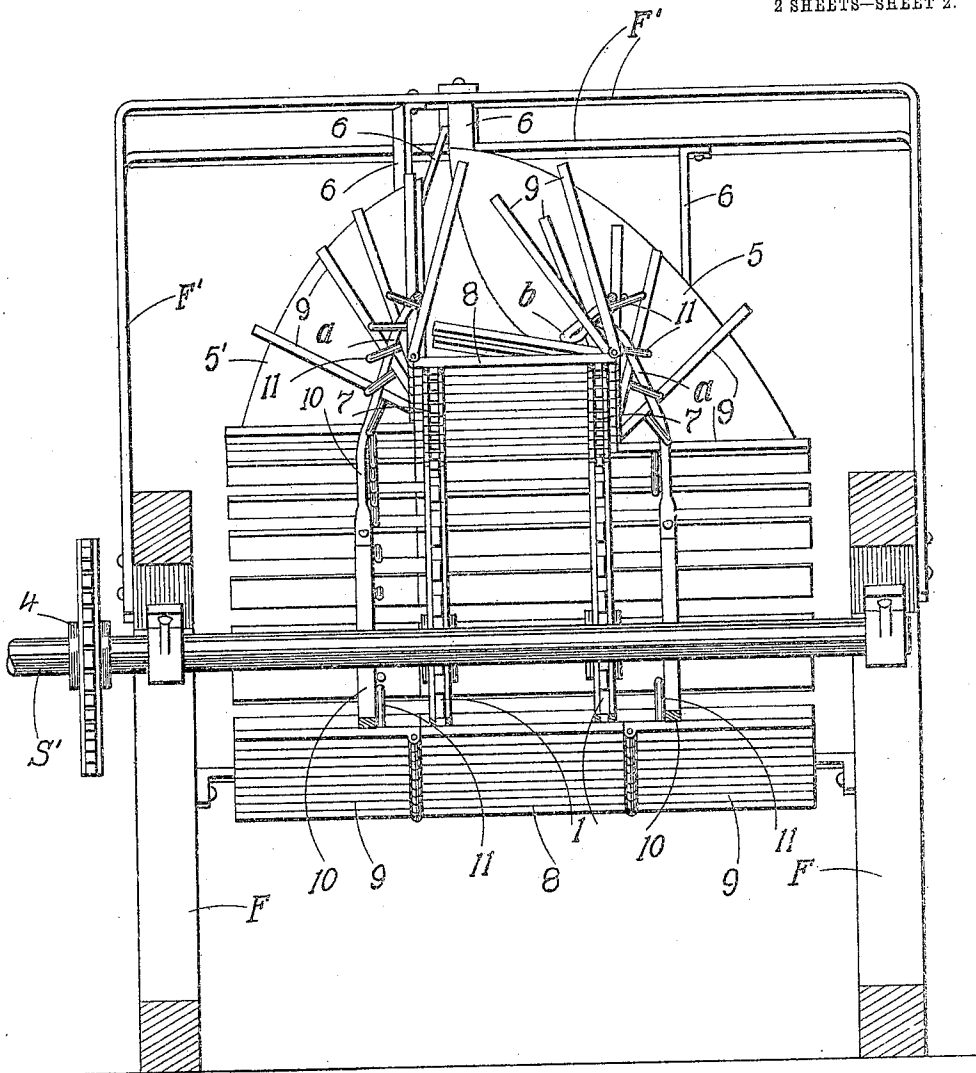


FIG. 5.

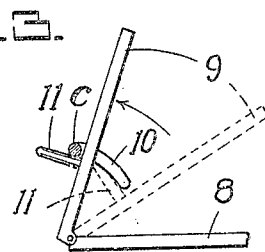


FIG. 6.

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ALBERT R. NAUER, OF ST. LOUIS, MISSOURI.

FOLDING-MACHINE.

No. 817,929.

Specification of Letters Patent.

Patented April 17, 1906.

Application filed August 28, 1905. Serial No. 276,140.

To all whom it may concern:

Be it known that I, ALBERT R. NAUER, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Folding-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in machines for folding sheet-cotton; and it consists in the novel construction and arrangement of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of the operating parts of my machine, the frame being in vertical section on the line 1 1 of Fig. 2. Fig. 2 is a top plan thereof, showing the swinging arms in the various positions assumed by them for folding the sheet of fabric. Fig. 3 is a transverse enlarged section on the slightly-inclined line 3 3 of Fig. 1. Fig. 4 is a diagrammatic view showing the manner of folding the sheet, one fold being already down and the opposite one in the act of descending. Fig. 5 is a diagrammatic view showing how the folding-arm is forced toward the belt as it rides along one of the bends or formations of the kinked loop or track, the conveyer-belt being supposed to be advancing toward the observer and the arm folding downward; and Fig. 6 is a similar view showing the engagement between one of the bends in the track and the stud on the arm whereby the latter is forced outward.

The object of my invention is to construct a machine which will fold a sheet of cotton (or, in fact, sheets of any kind of fabric or material) into a strip of three thicknesses, by folding the original sheet along lines dividing it longitudinally into three divisions, the outer divisions being consecutively folded down against the middle section or division. The folded strip is subsequently rolled or otherwise treated according to the demands and requirements of the trade.

A further object is to construct a machine which will be simple, positive in its action, one capable of turning out a uniform product, and one possessing further and other advantages better apparent from a detailed description of the invention, which is as follows:

Referring to the drawings, F represents the general frame or support of the machine.

Mounted at opposite ends thereof on the shafts S S are pairs of sprocket-wheels 1 1, the outer end of the forward shaft carrying a sprocket-wheel 2, from which passes a sprocket-chain 3 over a sprocket-wheel 4 on the drive-shaft S', leading to any source of power. (Not shown.) Mounted over the frame F at the back end thereof and secured in position in any mechanical manner are a pair of oppositely-disposed shares or wings 5 5', respectively, the latter being slightly in advance of the former, Fig. 2. The wings are substantially of a contour as shown, having a front straight edge forming the terminal of a horizontal surface which gradually curves upward, as shown, in the shape of a share or wing. The wings are preferably secured in position above the frame by means of brackets 6, depending from the front frame extension F', Fig. 1.

The sprocket-wheels 1 1 engage the pair of sprocket-chains 7, which enter into the construction of the belt-conveyer over which the sheet of cotton C passes. This conveyer is composed of a series of slats 8, disposed transversely to the chains 7 7, and collectively forming with the chains a belt or endless conveyer, as shown. To the opposite ends of each slat 8 is hinged a corresponding slat or arm 9, the hinge connection being such as to limit the outward swing of the arms 9 to a horizontal plane or to the plane of the upper surface of the conveyer when the slats 8 are occupying the upper lap of the belt, the arms 9 being, however, free to fold or swing toward the conveyer, so that the slats 8, which constitute the conveyer proper, form together with their terminal arms 9 a composite belt or conveyer, which may be considered as a conveyer composed of three sections—viz, a central driven section and two lateral sections—each composed of members or arms foldable against the central section. This composite conveyer is adapted to support and advance the sheet of cotton C fed thereto from the feed-rolls R, forming the terminals of a feed-machine. (Not shown.) As the sheet C is thus fed to and along the composite belt or conveyer 8 9 it passes first between the conveyer and the superposed wings 5 5', which, by the way, are spaced a suitable distance from the upper surface of the conveyer. From this point on the arms 9 begin to fold the original sheet along lines which correspond to the lines of disposition of the

hinge axes of the several arms 9, so that the original sheet is delivered from the conveyer with a fold formed on either side of its longitudinal center and folded against the central portion of the original sheet, the latter being thus folded to one-third its original width and into three thickness, Fig. 4.

The folding is accomplished by the following mechanism: Disposed on each side of the central section of the composite conveyer 8 9 9 is an elongated oblong closed loop 10, having rounded ends, and a lower straight longitudinal side, Fig. 1. The upper longitudinal side of this loop is formed into a series of bends, kinks, or equivalent cam formations *a b c*, (as nearly as they may be indicated,) disposed both vertically and horizontally from what would otherwise be a straight longitudinal edge. The entire loop 10 with its several bends or formations serves as a track over which the hinged arms 9 must pass with the advance of the conveyer. As the arms 9 traverse the bends of the upper side of the track or loop 10 the peculiar contour of these bends or formations forces the hinged arms first against the wings 5 5', this upward swing of the arms producing the initial fold in the sheet C, the wings 5 5' serving as supports and guides for the partially-folded sheet as it is being carried onward along the conveyer 8 9 9. This initial uplifting or folding of the sides of the sheet C is accomplished by the bends or formations *a*. The formations *b* then complete the fold of the arms 9 against the slats 8, and the formations *c* restore the arms 9 back to their original position of alinement with the slats 8. To force the arms 9 to their folded position, the formations *a b* engage the under surface of the arms, (of the upper lap of the belt,) lifting them and subsequently forcing them to a folded position against the central section of the composite conveyer, Fig. 5; but in swinging the arms back to their outwardly-distended position the formations *c* engage suitable pins or studs 11, carried by the respective arms near their hinge axes. The bend *c* is so related to the studs 11 that the latter are forced against and traverse the formation *c* in such manner that the resistance offered by the formation *c* to the free passage of the studs forces the latter in a direction to cause the arms 9 to swing outwardly to their original position, Fig. 6. The studs 11, however, (disposed as they are on the inner faces of the arms 9,) subserve still another purpose. It will be observed that the arms 9 are always free to fold against the outer face of the central section of the composite belt conveyer, so that after the arms were carried over the under lap of the conveyer they would if not arrested drop down vertically from their hinge axes of suspension; but the studs 11 by the time the arms 9 in their travel reach the under lap

of the belt engage the lower longitudinal straight side of the looped track 10, the engagement serving to keep the arms elevated in the plane of the central section of the bottom lap of the belt, Figs. 1, 2. The formations *a b c* of the track on one side are slightly in advance of those on the opposite side, for the same reason that one wing 5 is in advance of the opposite wing 5'. The object of this is that it gives the set of arms on one side opportunity to fold the sheet and begin the return to their normal or original position before the set on the opposite side has completed its corresponding series of operations. Otherwise the arms on opposite sides would clash and interfere with one another. As it is, the consecutive phases through which the arms on one side pass to complete a fold are duplicated a little later by the arms on the opposite side, the fold on one side of the sheet taking place a little in advance of the fold on the opposite side, Fig. 4. This of course is an obvious necessity. The original sheet C is thus delivered in a folded strip C' of three times the original thickness. The curved arrow in Fig. 1 indicates the direction of travel of the conveyer. The sheet is fed between the rolls R R to the conveyer, where it passes under the wings 5 5', during the formative period of the folds, the wings supporting the sides of the sheet, thus partially folded, and as it is advanced along the conveyer it becomes completely folded, as already indicated. The sheet thus folded is subsequently cut into lengths and rolled by suitable mechanism. (Not shown.)

Having described my invention, what I claim is—

1. In a folding-machine, a suitable conveyer, a series of arms hinged to the sides thereof, and a stationary track having formations of suitable contour in the path of said arms for folding the same against the surface of the conveyer, substantially as set forth.

2. In a folding-machine, a suitable belt conveyer, a series of arms or members hinged to the sides thereof, and a track having formations of suitable contour in the path of said arms for folding the same against the surface of the conveyer, substantially as set forth.

3. In a folding-machine, a suitable belt conveyer, a series of arms or members hinged to the sides thereof, a track having formations of suitable contour in the path of the arms for oscillating the same against the surface of the conveyer, and suitable wings against which the sheet is folded at the initial or formative stage of the folding operation, substantially as set forth.

4. In a folding-machine, a suitable conveyer-belt for the support of the sheet to be folded, a series of arms hinged to the opposite sides thereof and foldable toward the

supporting-surface of the conveyer, tracks over which the arms pass, suitable formations on the respective tracks for throwing or oscillating the arms on one side against the conveyer in advance of those on the opposite side, and devices carried by the arms and cooperating with the respective formations for returning the arms to their normal position, substantially as set forth.

5. In a folding-machine, a suitable conveyer-belt for the support of the sheet to be folded, a series of arms hinged to the opposite sides thereof and foldable toward the supporting-surface of the conveyer, tracks for the passage of the arms thereover, suitable formations on the respective tracks for consecutively oscillating the arms against the conveyer-supporting surface, and studs on the arms cooperating with the track formations for returning the arms to their normal outwardly - extended position, substantially as set forth.

6. In a folding-machine, a suitable conveyer for the support of the sheet to be folded, a series of arms hinged to the opposite sides thereof and foldable toward the supporting-surface of the conveyer, tracks for the passage of the arms thereover, suitable formations on the respective tracks for consecutively oscillating the arms against the conveyer-supporting surface, those on one side being folded in advance of those on the opposite side, and studs on the arms adapted to be engaged by the formations for returning the arms to their normal outwardly - extended position, substantially as set forth.

7. In a folding-machine, a composite endless or belt conveyer comprising a series of sections, and members forming individual components of one of the sections and fold-

able against the adjacent section, substantially as set forth.

8. In a folding-machine, a composite endless or belt conveyer comprising a central section and two lateral sections, and members forming component parts of the side sections and foldable against the central section, substantially as set forth.

9. In a folding-machine, a composite endless or belt conveyer comprising a central section, and two lateral sections formed of a series of members or arms hinged to the opposite sides of the central section, and means for folding and unfolding the arms of one lateral section to and from the central section, in advance of a corresponding folding and unfolding of the arms of the other lateral section, substantially as set forth.

10. In a folding-machine, a composite belt conveyer having a driven section, and a movable section formed of a series of arms hinged along the sides thereof, a track for the support of said arms, and studs on the arms adapted to engage the track, substantially as set forth.

11. In a folding-machine, a composite belt conveyer having a driven section, and a lateral section composed of a series of hinged arms foldable against the driven section, studs on the arms, and a track having bends or formations for respectively engaging the arms to force them to a folded position, and engaging the studs to unfold the arms, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT R. NAUER.

Witnesses:

EMIL STAREK,
M. B. BELT.