United States Patent [19]

Goldammer

[11] **3,797,072**

[45] **Mar. 19, 1974**

[54] **FIBER-MIXING DEVICE**

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[22] Filed: **June 16, 1972**

[21] Appl. No.: **263,545**

[30] **Foreign Application Priority Data**

June 19, 1971 Germany 2130497

[52] **U.S. Cl.** **19/81**

[51] **Int. Cl.** **D01g 9/00**

[58] **Field of Search** ..... 19/105, 80 R, 81, 145.5, 19/204, 97.5, 155; 214/17 R, 17 A, 17 C, 17 CA; 53/167

[56] **References Cited**

UNITED STATES PATENTS

1,869,116	7/1932	Rambold	53/167
3,085,296	4/1963	Meinicke	19/81
3,577,599	5/1971	Goldammer et al.	19/145.5

FOREIGN PATENTS OR APPLICATIONS

1,479,835	3/1967	France	19/105
324,876	12/1902	France	19/105
11,183	1896	Great Britain	19/105
1,019,056	2/1966	Great Britain	19/105

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[57] **ABSTRACT**

A carriage includes an upright post to which one end of a horizontal arm is attached for sliding along the post and swinging through a 90° arc about such post. The arm carries a row of opposed claws and normally extends perpendicular to the carriage track to lift a layer of fiber from a bale disposed beside the track. The arm is then lifted to the post top portion, swung 90 degrees, and the fiber is deposited into an elongated container mounted in cantilever fashion from the carriage. Such container has a wing along one side pivotable between a lower position to catch any fiber which may fall from the fiber layer as the arm is swung over it toward the container, and an upper position to dump the fallen fiber into the container. A return bent wing margin catches fiber at the free wing edge. In another form of the device, fiber may be stripped from a bale bottom into a container beneath the bale by toothed stripping rollers. Such container has a wing on each of two opposite container sides, such wings flaring upwardly and outwardly to confine fibers and direct them into the container.

1 Claim, 4 Drawing Figures

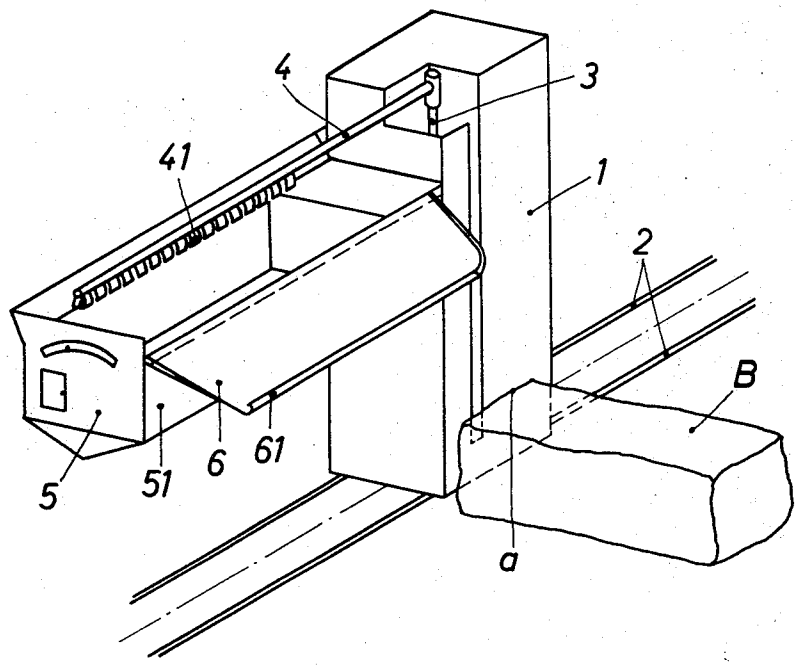


Fig. 1

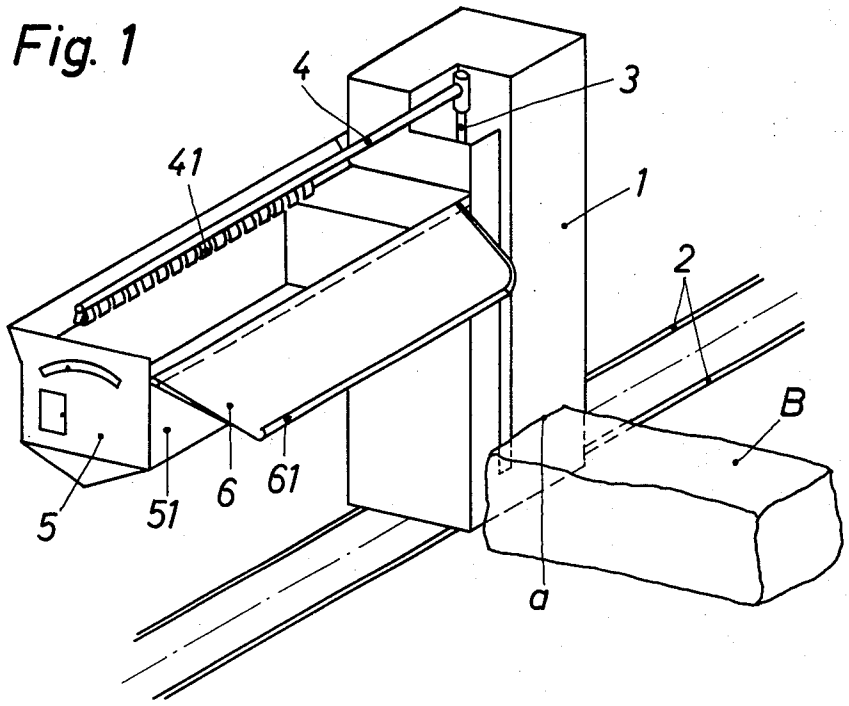


Fig. 2

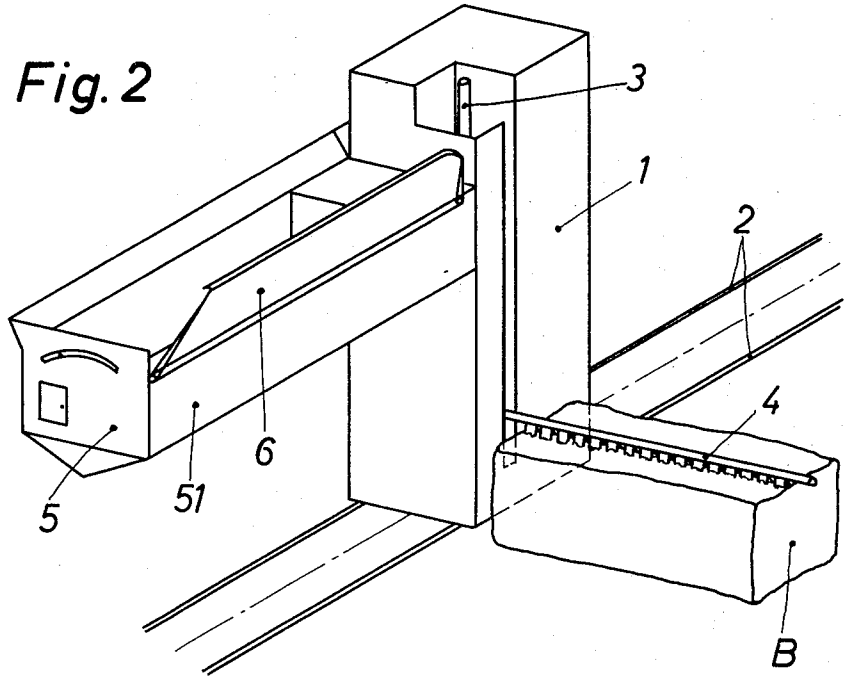
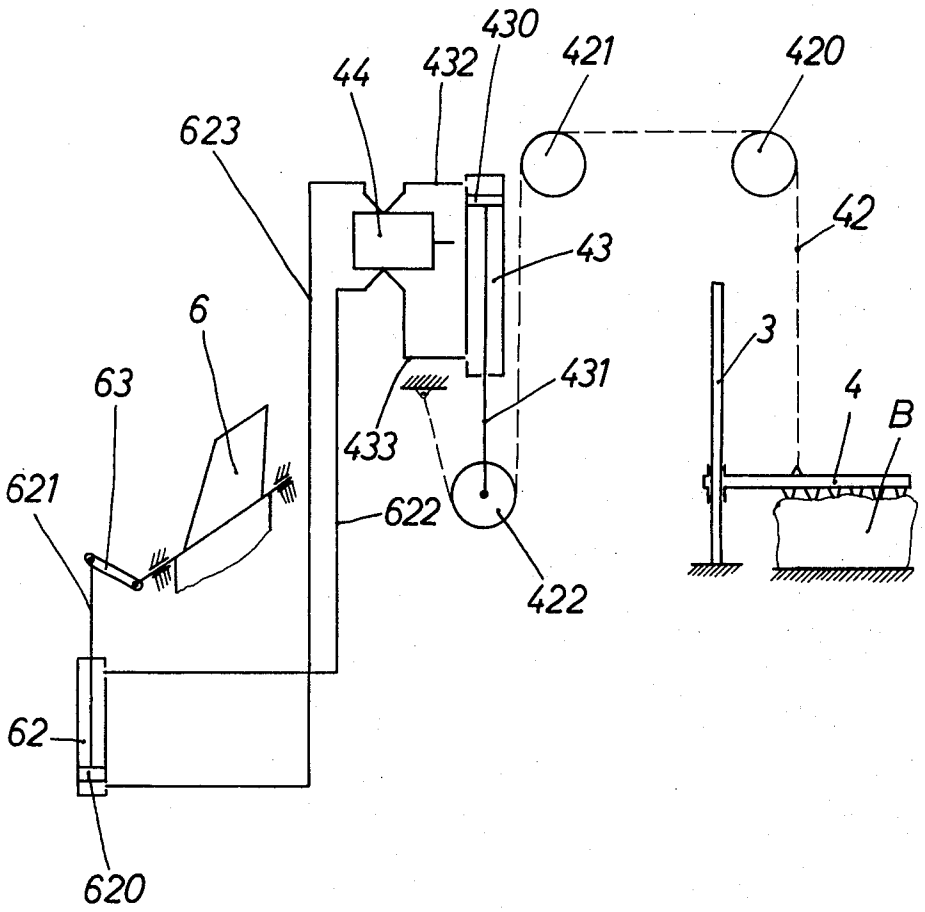


Fig. 3



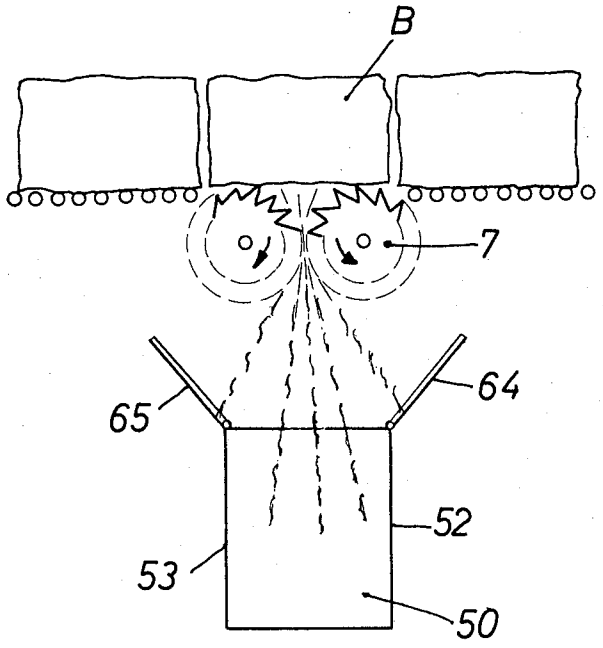


Fig 4

FIBER-MIXING DEVICE

The present invention relates to a device for automatically mixing a plurality of types of fiber in a container mounted on a carriage movable relative to a row of fiber bales.

U.S. Pat. No. 3,577,599 discloses a gripping device having pairs of gripping members movable with a carriage supporting a container movable along a row of fiber bales. The gripping device strips a layer of fiber from the top of a bale and in a modified form, is then swung over the container to cast the fiber layer into the container.

Such a device has serious disadvantages. Fibers which drop from a fiber layer tend to fall on the carriage track, thereby impeding carriage movement and requiring frequent manual cleaning of the track. Such fiber is either wasted, or cleaning must occur before the carriage moves to bales containing a different fiber type and the fiber cleaned from the track returned to the bales of the same fiber type. Furthermore, fiber may catch and collect on the exterior of the container so that it is not mixed in such container, but which fiber nevertheless is included in the scale reading intended to indicate the contents of the container, so that weight inaccuracies result.

It is a principal object of the present invention to collect fibers which drop from a layer of fiber and automatically dump them into the container.

Another important object of the invention is to shield the carriage track from falling fibers and thereby to reduce considerably maintenance time and expense and to eliminate waste.

A further important object is to prevent fibers of one type from dropping onto an adjacent bale containing fibers of another type.

An additional object is to prevent collection of fibers on the exterior of the mixing container and thereby to eliminate weighing errors.

FIG. 1 is a top perspective of a fiber mixing device of the present invention, and FIG. 2 is a similar view with parts shown in different relationship.

FIG. 3 is a schematic diagram of operating mechanism of the device of FIGS. 1 and 2.

FIG. 4 is a diagrammatic side elevation of a modified form of the present invention.

In the device of FIGS. 1 and 2, a cantilever arm 4 carries a row of downwardly depending opposed claws 41. The fiber-gripping device 4,41 is mounted on a carriage 1 movable along a track having rails 2. Alongside such track is a row of fiber bales B, in which the fibers of some bales are different from the fibers of other bales.

The supported end of arm 4 is reciprocable along an upright post 3. Such arm can be lowered to the position shown in FIG. 2 to dispose its claws in a position for gripping an upper edge of a bale B and peel a layer of fiber from the bale as the arm 4 is raised toward the top portion of post 3. The arm is then swung through a 90° arc to overlie cantilever fiber-receiving container 5 extending from the carriage above and parallel to the carriage track, whereupon the claws 41 are spread to release the fiber layer to drop into the container.

To accomplish the objects of the present invention a fiber-catching wing 6 is connected to and extends the length of the wall 51 of container 5, which wall extends parallel to rails 2 and is adjacent to the row of bales B. Such wing 6 catches any fiber which may fall from the fiber layer being delivered by the swinging arm 4 to the container to prevent the fiber from falling onto the track formed by rails 2. The outer edge 61 of wing 6 is normally disposed so that it lies well below the plane in which arm 4 swings, so that the wing will not interfere with transport of the fiber layer by such swinging arm. The wing should be at least wide enough to extend over the end margins *a* of the bales adjacent to the carriage track, and the wing may be disposed at an angle such that fibers which fall onto it from the fiber layer will slide into the container under gravitational force. Alternatively, the wing may be downwardly and outwardly inclined so that such fiber falls back onto a bale below the wing.

In the preferred form of invention the wing 6 is normally substantially horizontal, and preferably stray fibers dropped onto the wing will be delivered to the container rather than dropped onto underlying bales. The outer wing edge 61 may include an upward return bend to prevent fiber from sliding outwardly over edge 61 if the wing is downwardly inclined. In order to dump the stray fibers into the container, the wing is pivoted to container wall 51 and swingable from its generally horizontal position shown in FIG. 1 into an upright position such as shown in FIG. 2, so that the fiber thereon can slide by gravity into the container.

As fiber-catching wing 6 swings upward it crosses the plane through which arm 4 swings. To avoid collision of the gripping device 4,41 with such wing when it is raised to its fiber cast-off position of FIG. 2, the wing is swung pneumatically about its pivotal connection with wall 51 in synchronization with reciprocating drive means for arm 4. Such interdependent drive means need not be pneumatic but could be electrical or mechanical, for example. FIG. 3 shows schematically one form of synchronized drive mechanism for arm 4 and wing 6 which could be contained in the housing of carriage 1. A chain 42 having one end secured to arm 4 passes over sprocket wheels 420, 421 and 422 and has its opposite end anchored to a fixed mounting within the carriage housing. Sprocket wheel 422 is connected to plunger 431 of a compressed air cylinder 43 and is reciprocated by movement of piston 430. A second compressed air cylinder 62 contains a piston 620 for reciprocating a piston rod 621 connected to swing a lever 63 connected to fiber-catching wing 6.

Compressed air is supplied by actuation of valve 44 simultaneously to the side of piston 430 opposite sprocket wheel 422 by a line 432 to force such sprocket wheel down and raise arm 4 and to the side of piston 620 opposite lever 63 by line 623 to swing wing 6 down. When the valve is reversed air will be bled simultaneously from such ends of cylinders 43 and 62 and compressed air will be supplied to the end of the cylinders at the opposite sides of pistons 430 and 620, respectively, to raise sprocket wheel 422, lower arm 4 and swing wing 6 upward. With such compressed air connections the simultaneous supply of compressed air to cylinders 43 and 62 will automatically synchronize movement of pistons 430 and 620 in opposite directions.

At the beginning of a working cycle fiber-receiving wing 6 is in its substantially horizontal position of FIG. 1, while arm 4 is disposed in its upper position on post 3, but extended perpendicular to track 2 in spaced overlying relationship to a bale B. Valve 44 is then actuated to supply air under pressure to lines 433 and 622

to effect retraction of piston rods **431** and **621.** Retraction of rod **431** raises sprocket wheel **422,** thereby increasing the effective length of chain **42** to lower arm **4** onto a bale B so that claws **41** will grasp the upper portion of the bale. At the same time retraction of rod **621** will swing lever **63** connected to the pivot for wing **6** to swing such wing upward into its upright fiber cast-off position, shown in FIG. **2.** With the wing in this position fiber material collected thereon will slide into container **5.**

After claws **41** have been closed to grasp the fiber material of bale B, the flow of compressed air is reversed by valve **44** so that compressed air is supplied to the opposite sides of pistons **430** and **620** by lines **432** and **623,** respectively, to project piston rods **431** and **621** outward from their respective cylinders **43** and **62.** Piston rod **431** presses sprocket wheel **422** downward to effectively shorten chain **42** and thereby draw arm **4** upward along post **3** to the plane of arm rotation. During such upward movement of arm **4** piston rod **621** will have pushed lever **63** away from the position shown in FIG. **3** to swing wing **6** into its lower position shown in FIG. **1,** so that the outer wing edge **61** lies well below the plane of arm rotation. The fiber-gripping device **4,41** is then swingable without hindrance by wing **6** into its position shown in FIG. **1** overlying the collection container **5** for casting off the fiber layer into the container.

Any stray fiber material which drops from the fiber mass held by claws **41** during rotation of arm **4** will fall either onto the underlying bales or onto wing **6.** The return bent edge **61** forms a channel to prevent any fiber caught by the wing from sliding off and falling back onto the bales. After the gripping device **4,41** has cast its mass of fiber material into the container, arm **4** is again swung outward into its position perpendicular to track **2.** The carriage is then advanced until the arm overlies the next bale in the bale row, whereupon the carriage stops and the working cycle described above is repeated.

Fiber-catching wings can be used to advantage on a fiber-collection container located below a row of fiber bales. One such arrangement is shown in FIG. **4** in which a row of bales B is located above fiber-stripping toothed rollers **7,** which in turn overlie a fiber-collection container **50** having opposite side walls **52** and **53** parallel to the axes of rollers **7.** Since the rollers rotate in opposite directions with their peripheries approaching each other on the side of the nip of the rollers adjacent to bale B, the fiber is stripped from the bale bottom and passes between the rollers downward toward container **50.** After fibers pass between the rollers, those fibers in direct contact with the rollers **7** will have a velocity direction parallel to the tangent of the roller at the point from which the fibers disengage the rollers.

To prevent loss of the fibers having a velocity in a direction deviating substantially from the vertical without requiring rollers **7** to be located extremely close above container **50** or a container of substantial width, wings **64** and **65** are provided on opposite sides of the container, each having an edge coextensive with the edge of the corresponding container wall **52** or **53,** respectively. The wings are inclined upwardly and outwardly a sufficient distance to intercept the fibers having the greatest deviational velocity. Such intercepted fibers will then slide downwardly along the wings into the container **50.** The wings **64** and **65** can, of course, be pivoted to their respective container walls **52** and **53,** so that the angle of inclination and width of the mouth formed by the outer wing edges can be varied for different installations, or the wings can be swung toward each other intermittently to increase their inclination for assuring that all fiber intercepted by the wings is dumped into the container instead of clinging to the wings.

I claim:

1. In a fiber-mixing device including a carriage movable along a row of fiber bales, a fiber-collecting container mounted on the carriage, means for stripping fiber from a bale and transferring such fiber to the container, a fiber-catching wing extending along a wall of the container and pivot means connecting the fiber-catching wing to the container about which the wing is swingable from a substantially horizontal position into a substantially vertical position for dumping into the container fiber stripped from a bale and caught by the wing, the improvement comprising drive means for swinging the fiber-catching wing about the pivot means in synchronism with transferring movement of the fiber-stripping means and including a first piston actuating the fiber-stripping means and a second piston actuating the wing, said pistons being moved in opposite directions.

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