July 18, 1967 F. GÜBELI 3,331,516

APPARATUS FOR STACKING COPIES OF FOLDED NEWSPAPERS, PERIODICALS OR OTHER SIMILAR ARTICLES

Filed Jan. 25, 1965

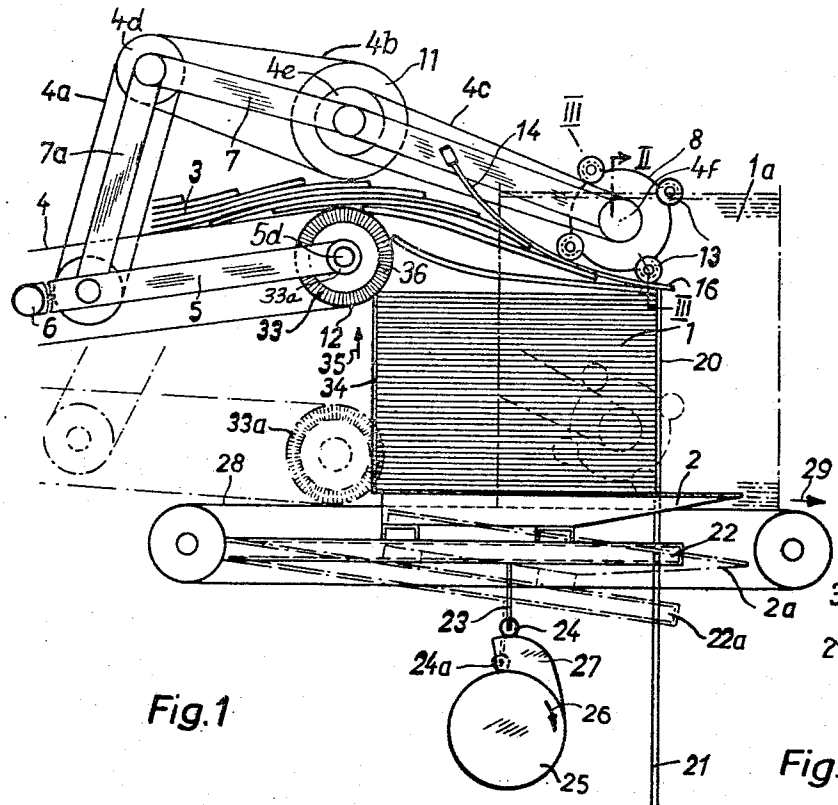


Fig. 1

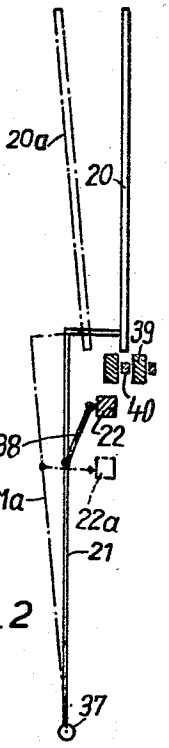


Fig. 2

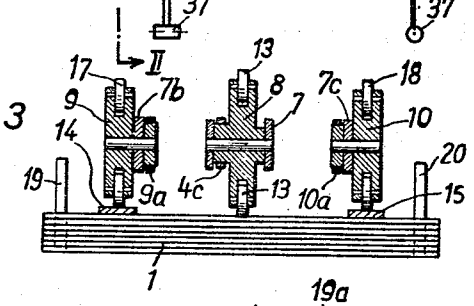


Fig. 3

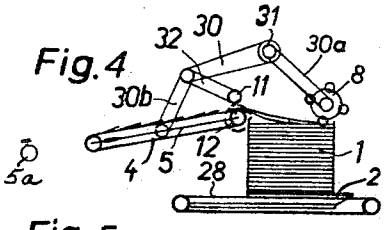


Fig. 4

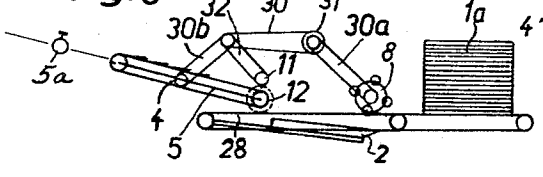


Fig. 5

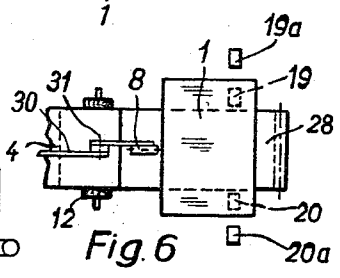


Fig. 6

United States Patent Office

3,331,516

Patented July 18, 1967

3,331,516

APPARATUS FOR STACKING COPIES OF FOLDED NEWSPAPERS, PERIODICALS OR OTHER SIMILAR ARTICLES

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Filed Jan. 25, 1965, Ser. No. 427,580
Claims priority, application Switzerland, Jan. 24, 1964, 846/64
10 Claims. (Cl. 214—6)

This invention relates to apparatus for stacking folded newspapers, periodicals or other similar articles which are delivered in a continuous succession and are to be distributed in counted groups or stacks of a predetermined number of copies of such articles.

It is an object of the invention to provide improved and reliable apparatus for continuously stacking articles of the kind mentioned and for automatically moving the completed stack away from the place of stacking.

The apparatus according to the invention comprises a conveyer belt for feeding the articles in a continuous succession to a stack to be built-up, a lever arranged above the delivery end of said conveyer belt, a rotatable driven roll carried by said lever, upright abutment rails coacting with an edge of the articles for aligning the articles in superposed position, and means mounted at the periphery of said roll for rotation with the roll and radially projecting beyond the periphery thereof for frictionally engaging each successive article while being delivered by said conveyer belt to the top of the growing stack and moving said article along until abutment of said edge of the article against said upright rails.

Said means projecting beyond the periphery of the pressure roll can be formed by a plurality of ball bearings uniformly and angularly spaced around the circumference of the driven roll. Instead of using ball bearings, said means can also be formed by fixed pressure cams radially projecting beyond the circumference of the roll. In this case it is convenient to use a slipper clutch for driving the roll.

The invention will now be described more fully with reference to the accompanying drawings showing merely by example a stacking device according to the invention and in which:

FIGURE 1 is a view in elevation of a preferred embodiment of the device;

FIGURE 2 diagrammatically shows the front abutting rails in two different positions, according to a section along the line II—II of FIGURE 1;

FIGURE 3 is a sectional view along line III—III of FIGURE 1;

FIGURES 4 and 5 are two views in elevation of a modification; and

FIGURE 6 is a plan view of the modification.

Referring to FIGS. 1 to 3, a stack **1** of superposed newspapers is resting on a table **2**. The single newspapers are supplied in a continuous succession **3** by a conveyer belt **4** to the stack **1**. The conveyer belt is carried by an arm **5** pivotally mounted on a journal pin **6** and adapted to have its delivery end adjusted to the height of the stack **1**. A lever **7** is disposed above the arm **5** and carries a roll **8** at its forward end. The roll **8** is driven by driving belts *4a*, *4b* and *4c*, passing over pulleys *4d*, **11**, *4e* and *4f*, the belt *4a* being connected to a motor driven pulley

5d carried by the arm **5**. Two further rolls **9** and **10** (FIG. 3) are disposed at the right hand side and the left hand side, respectively of the roll **8** and are driven simultaneously with the roll **8**. These rolls **9** and and **11** are also carried by the lever **7** by means of branch arms *7b* and *7c* and are driven by independent belts *9a* and *10a* connected to the pulley *4e*. The lever **7** is connected by a link arm *7a* with the arm **5** so that the movement of the arm **5** is dependent on the movement of the lever **7**. The pulley **11** carried by the lever **7** acts as a driven pressure roll **11** which applies the succession of newspapers **3** against the conveyor belt **4** while passing over the guide roll **12**, so that owing to increased friction between the newspaper and the conveyer belt the newspapers are travelling so far beyond the guide roll that they may be delivered in superposed position onto the stack **1**.

The driven roll **8** carries four rollers bearings **13** spaced at uniform angular distances along its periphery. The rollers bearings project beyond the periphery of the roller **8**. Also the two lateral rolls **9** and **10** carry each four roller bearings **17** and **18**, respectively, along their periphery. The roller bearings **17** and **18** coact with pressure rails **14** and **15**, respectively, having one end fixed to the lever **7**, while their other free ends **16** terminate slightly beyond the stack **1**; the roller bearings **13** of the roll **8** directly bear on the newspaper being delivered onto the stack **1**.

The stack **1** is maintained at its front side by abutting rails **19**, **20**, which are each connected to an arm **21** pivotally carried by a journal pin **37**. The arms **21** in turn are hingedly connected by means of a link **38** to tiltable carrier arms **22** which are supported by the intermediary of a link **23** and a follower roll **24** on a rotatable cam disc **25**.

The table **2** is resting on the carrier arms **22** and will be lowered together with these arms when the cam follower **24** falls off the cam **27** of the cam disk **25**, which turns in the direction of the arrow **26**. The table **2** is formed by a plurality of parallel extending laterally spaced grate bars **39** (FIG. 2).

A conveyer **28** is disposed below the surface of the table **2** and comprises a plurality of endless conveyer belts **40** travelling in the direction of the arrow **29** and in the interstices between the grate bars **39** of the table **2**. This conveyer is adapted to move a finished stack away towards the right.

The device operates in such manner that a counter counts the copies of newspapers which are delivered by the conveyer belt **4** on the stack **1**, and when the stack has been formed by the number of desired copies, the counter operates control means which cause a rotation of the cam disk, in the direction of the arrow **26**. The cam follower **24** falls off the cam **27** into the position *24a*, the table is lowered into the position *2a* and the carrier arms **22** tilt into the position *22a*.

As shown in FIG. 2, when the carrier arm **22** moves from its position **22** to the position *22a*, the link **38** pushes the arm **21** outwardly into the position *21a*. The abutment rail **20** rigidly connected with the arm **21** also moves outwardly into the position *20a*. At the same time the abutting rail **19**, also swings into the position *19a* (see FIG. 6). The stack **1** is deposited on the conveyor **28** when the table **2** is lowered and is moved away by the belts **40**.

The copies of newspapers of the succession **3** are pushed successively with their forward edges underneath the ball bearing **13** resting on the uppermost newspaper of the stack **1** (FIG. 3). When a newspaper arrives with its edge underneath the roller **13**, it is frictionally engaged by the roller which may have a roughened surface and moved along until its forward edge is stopped by the abutting rails **19** and **20**. At the same time, the resilient pressure rails **14** and **15**, which are alternately pressed downwardly when a roller bearing **17** or **18** rotating with the rolls **9** and **10**, engages them, and released again by the roller bearings, effect an oscillatory up and down movement and keep the uppermost copies of newspapers arriving beneath the roller **13** and the rails **14** and **15** in oscillating motion to facilitate their correct insertion beneath the roller **13** and deposition on the stack.

The stack **1** in this manner increases its height, the rolls **8, 9** and **10** and the lever **7** which rest on the stack, being gradually raised, and the link **7***a* connected to the lever **7** also causes the arm **5** and the conveyer belt **4** to rise with the stack. As soon as the required number of copies of newspaper have been delivered to the stack **1**, this latter is moved along by the conveyor **28**, as described, and the rolls **8, 9, 10** and the lever **7** and the arm **5** fall down into their starting position shown in dash and dot lines. Also the table **2** and the carrier arms **22** return to their original positions owing to the action of the cam disc **25** which, during the time of building up a stack **1**, completes one turn, so that the cam follower **24** is raised by the cam **27** and the link **23** raises the carrier arms **22** and the table **2**. In order that the pivotable arm **5** with the conveyer belt **4** and the lever **7** with all members support thereby can easily be raised by the rising roll **8**, the arm **5** is balanced by means of a counter-weight **5***a*. Accordingly no great force is necessary to continuously adjust the newspaper feeding and delivery device to the increasing height of the stack **1**.

The modification according to FIGS. 4 and 5 distinguishes from the example of FIGS. 1 to 3 by the shape of the lever **30** carrying the roll **8**. This lever is formed as toggle lever; the lever arm **30***a* connected to the pivot **31** can be adjusted to extend at different angles with respect to the lever arm **30**. In this manner it is possible to make the lever **30** longer or shorter in order to adapted the length of the lever to different sizes of newspapers, magazines, periodicals and the like. The pressure roll **11** is carrier by an arm **32** pivotally connected to the lever **30**. A link **30***b* forms a connected between the tilting arm **5** and the conveyer belt **4**. As shown in FIG. 4, the stack **1** is nearly completed, while in FIG. 5 the position of the members after moving away of the staple is shown.

As shown in FIG. 1 the end of the arm **5** may carry a driven roll **33** on the journal pin **5***d* laterally of the roll **12** and having its periphery provided with radially directed bristles **36** extending over the rear edge of the top sheet of the stack **1** and which climbs with the growing stack in the direction of the arrow **35**. In this manner, the arm **5** is automatically raised with the increasing height of the stack and assists in raising the lever **7** by means of the link **7***a* connected to the arm **5**. After completion of a stack and withdrawal of it from the table **2**, the roll **33** with the arm **5** falls back into the position shown in dash and dot lines and starts to climb again with the fresh stack being formed.

The roll **33** may be driven by the intermediary of a disengageable clutch **33***a*. Accordingly it is possible to have the roll **8** operate alone or together with the roll **33**. According to the nature of the articles to be stacked it may be advantageous to operate only the device **8** or the device **33**, or both devices at the same time to cause raising of the delivery end of conveyer belt **4**.

I claim:

1. Apparatus for stacking folded newspapers, magazines, periodicals, and similar flat articles, comprising a conveyer belt for feeding the articles in a continuous succession to a stack to be built-up, a lever arranged above the delivery end of said conveyer belt, a rotatable driven roll carried by said lever, upright abutment rails spaced downstream of said belt and adapted for coacting with an edge of the articles for aligning the articles in superposed position, and means mounted at the periphery of said roll for rotation with the roll and radially projecting beyond the periphery thereof for frictionally engaging each successive article while being delivered by said conveyer belt to the top of the growing stack and moving said article along until abutment of said edge of the article against said upright rails.

2. Apparatus according to claim **1**, in which said means mounted at the periphery of said roll for rotation with the roll are formed by a plurality of roller bearings mounted at regularly spaced intervals about the circumference of the roll.

3. Apparatus for stacking folded newspapers, magazines, periodicals and similar flat articles comprising an endless conveyer belt for feeding the articles in a continuous succession to a stack to be built-up, a pivotally mounted arm carrying said conveyer belt, a lever arranged above the delivery end of said conveyer belt, a rotary driven roll carried by one end of said lever, upright abutment rails spaced from the delivery end of said belt and adapted for coacting with an edge of the articles for aligning the articles to be stacked in superposed position, means mounted at the periphery of said roll for rotation with the roll and radially projecting beyond the periphery thereof for frictionally engaging each successive article while the articles are being delivered by said conveyer belt to the top of the growing stack and for moving said article along until abutment of said edge of the article against said upright rails, and a link connection between said lever and said pivotally mounted arm carrying the conveyer belt to make the position of said arm dependent on the position of said lever with respect of the growing stack.

4. Apparatus according to claim **3**, comprising a pressure roll and in which said lever carries said pressure roll above said conveyer belt for pressing the articles at the delivery end of the conveyer belt against the belt.

5. Apparatus according to claim **3**, comprising pressure rails and further rolls and in which said lever supports said pressure rails above the articles as they are delivered by said conveyer belt onto the top of the growing stack, the end of the lever carrying said roll for frictionally engaging each successive article delivered by the conveyer belt carrying said further rolls intermittently exerting pressure on said rails for correctly depositing the successive articles on top of the stack.

6. Apparatus according to claim **5**, in which said pressure rails are resilient and said further rolls include means angularly spaced about the periphery of the rolls and radially projecting beyond the periphery for imparting an up and down oscillatory movement to said pressure rails.

7. Apparatus according to claim **3** in which said lever carrying a rotary driven roll is a toggle lever.

8. Apparatus according to claim **3**, comprising a rotary roll and in which said pivotally mounted arm carrying the conveyer belt carries said rotary roll at its end corresponding to the delivery end of the conveyer, said roll including at its periphery radially directed bristles engaging the side of the stack opposite said abutment rails, whereby upon rotation of the bristle carrying roll, the roll climbs with the growing stack and maintains the delivery end of the conveyer belt above the top of the stack.

9. Apparatus according to claim **3**, including and in which the pivotally mounted arm carrying the conveyer belt is balanced by a counter weight.

10. Apparatus according to claim **8**, including and in which said bristles carrying roll is rotatably driven by the intermediary of a releasable clutch.

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