June 11, 1957 G. HILL 2,795,254

MECHANICAL DRUM DRIVE FOR SLICING MACHINES

Filed Sept. 17, 1953 2 Sheets-Sheet 1

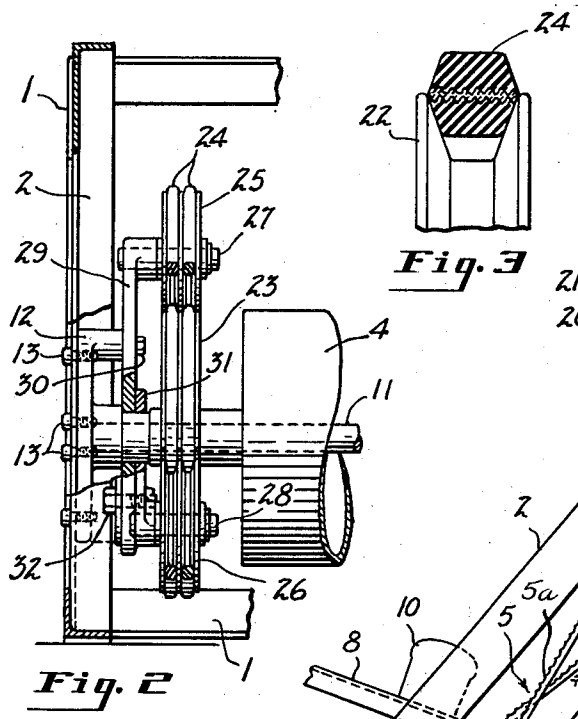


Fig. 2

Fig. 3

Fig. 1

INVENTOR
Gordon Hill

BY Evans & McCoy
ATTORNEYS

June 11, 1957 G. HILL 2,795,254

MECHANICAL DRUM DRIVE FOR SLICING MACHINES

Filed Sept. 17, 1953 2 Sheets-Sheet 2

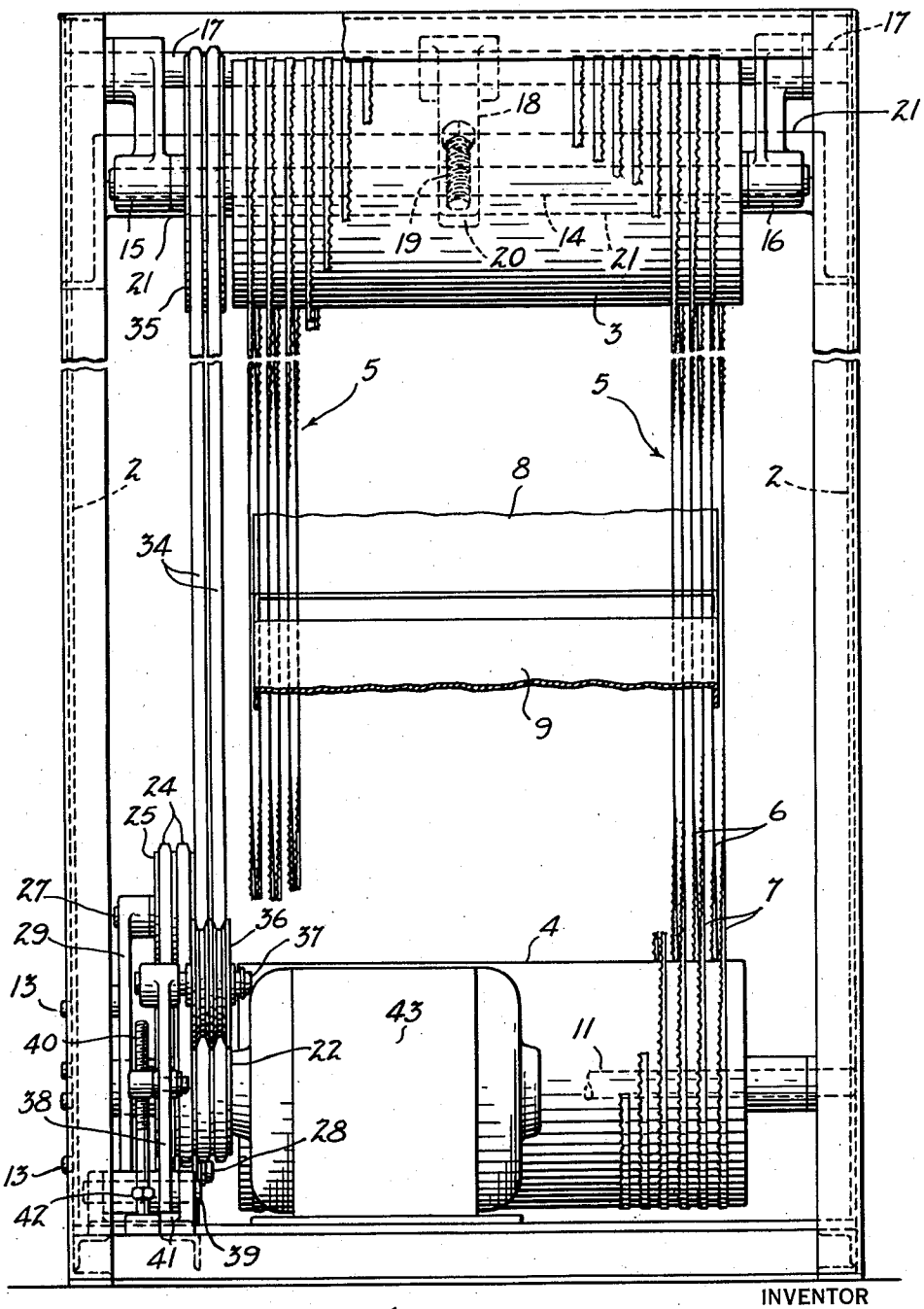


Fig. 4

INVENTOR
Gordon Hill

BY Evans + McCoy
ATTORNEYS

United States Patent Office 2,795,254 Patented June 11, 1957

2,795,254

MECHANICAL DRUM DRIVE FOR SLICING MACHINES

Gordon Hill, Bettendorf, Iowa, assignor, by mesne assignments, to American Machine & Foundry Company, New York, N. Y., a corporation of New Jersey

Application September 17, 1953, Serial No. 380,656

4 Claims. (Cl. 146—88)

The present invention relates to a V-belt driving mechanism for the cutter blade carrying drums of a bread slicing machine or the like.

In a bread slicing machine it is customary to provide a pair of spaced drums mounted for rotation in opposite directions about parallel axes and a series of endless band cutters running over said drums and crossing midway between the drums. It has been found that slicing machines of the type referred to operate most efficiently when there is a minimum of slippage of the cutter blades on the drums, and the present invention provides a simple and efficient driving mechanism which will substantially eliminate such slippage. According to the present invention, the blade carrying drums are driven in opposite directions by flexible V-belts which are actuated by a pair of coaxial driving pulleys rotating in unison. The exterior faces of one V-belt engage the periphery of a first pulley to rotate one drum in a direction opposite to the direction of rotation of the driving pulleys, and the interior faces of another V-belt engages the periphery of a second pulley to rotate the other drum in the same direction as the direction of rotation of the driving pulleys whereby the cutter blades are directly driven by both drums. Said first and second pulleys may be drivingly connected to said drums by means of flexible endless belts but are preferably coaxial with and fixed to said drums for rotation therewith in unison. Means are provided for adjusting the tension in V-belts without interfering with the tension in the endless band cutters.

Objects of the present invention are to provide a simple and inexpensive mechanism for simultaneously driving the blade drums of a bread slicing machine in opposite directions and to provide a drum drive for a slicing machine having V-belts so disposed that they may be tensioned independently of the band blades and which may easily be removed or replaced.

Other objects, uses and advantages will become apparent from the following description.

Reference should be had to the accompanying drawings in which:

Figure 1 is a side elevation of a bread slicing machine incorporating the mechanical drum drive of the present invention.

Fig. 2 is a partial sectional view taken on the line indicated at 2—2 in Figure 1;

Fig. 3 is a fragmentary sectional view showing a double V-belt engaging a pulley; and

Fig. 4 is a front elevational view of the slicing machine with parts removed.

Referring more particularly to the drawings by numerals of reference which indicate like parts throughout the several views, the present invention is illustrated in connection with a bread slicing machine having a supporting structure or framework 1 which includes pairs of upwardly inclined parallel side rails or frames 2 at opposite sides thereof between which are rotatably mounted spaced top and bottom blade drums 3 and 4. These drums are preferably of cylindrical form and are supported near

the top and bottom of the frame 1 with their rotational axes parallel to one another. The drums are driven in opposite directions to actuate endless band cutters 5 trained around the drums 3 and 4 in conventional crossed relation or figure eight form. The cutters 5 may be in the form of relatively thin flexible bands of suitable strong resilient material such as high quality spring steel. A multiplicity of scallops or serrations 5a are ground or otherwise formed along one edge of each of the endless band cutting blades 5 to provide a cutting edge. The drums 3 and 4 preferably have smooth cylindrical surfaces throughout their lengths upon which the cutter bands 5 may be adjusted axially. As many of the bands may be trained around the drums as desired, it being understood that all of the bands are of approximately the same length and are carried by the drums in the same manner.

Between the drums the cutting blades 5 are given a half twist so that upwardly moving runs 6 thereof cross downwardly moving runs 7 at a line of intersection substantially midway between the drums 3 and 4 to present the cutting scallops or serrations 5a of both runs of each band toward an oncoming loaf of bread. By the use of conventional guide means as shown in Kottmann Patent No. 2,225,600, issued December 17, 1940, the central portions of the blade runs may be guided into parallel equidistant cutting planes.

As in conventional slicing machines, a downwardly inclined table is provided a short distance below the intersection of blade runs 6 and 7 at a slicing zone to support loaves of bread or other articles as they are advanced through the slicing machine. As herein shown the inclined table comprises a feed plate 8 at the upstream side of the slicing zone and a discharge apron 9 at the downstream side of said zone, said plate and said apron having smooth flat upper surfaces. It will be understood that conventional slotted guide fingers or combs may be provided above and below the slicing zone as shown in the aforesaid Patent No. 2,225,600 to guide and space the cutters 5. The angle between the feed plate 8 and the upwardly moving runs 6 of the cutters 5 when measured above the feed plate and from the side of article approach is preferably obtuse so that the frictional forces of the upwardly moving cutters on the article being sliced have a forward feeding component, and the angle between the feed plate 8 and the downwardly moving runs 7 is such that the frictional forces on the article being sliced have very little forward feeding component and tends to hold the article on the portions 8 and 9 of the inclined table. Figure 1 shows an incoming loaf of bread 10 in position to be advanced through the cutter 5. Feed conveyors or other suitable means may be employed to advance loaves or other articles across the feed table to the cutters as shown in the aforesaid Patent No. 2,225,600.

The bottom drum 4 is rotatably mounted on a shaft 11 carried by the lower portion of the frame 1 between the side rails 2 thereof. Each end of the shaft 11 is held in fixed position by a bearing plate or bracket 12 that is supported on a pair of side rails 2 by means of four screws 13.

The top drum 3 is carried by a shaft 14 that is supported by spaced parallel arms 15 and 16 which are secured on a common transverse supporting shaft 17 for swinging movement thereon. Shaft 17 is journaled or otherwise rotatably mounted in the frame 1 whereby the axis of the top drum may be swung about the axis of the shaft 17 to vary the tension in the endless bands 5. A crank arm or lever 18 is provided substantially midway between the ends of the top drum 3 to hold the drum in an adjusted position and to maintain the tension in the endless bands 5. The shafts 14 and 17 extend through circular openings in the arms 15 and 16 and the lever 18 to prevent rotation of the arms and the lever with respect to the top drum,

and the bottom end of an adjustable screw **19** bears against an end **20** of the lever **18** to prevent rotation of the lever and downward movement of the top drum. The adjusting screw **19** is threaded through a cross member or beam **21** fixed to the frame and extending between the side rails **2**. The tension in the endless bands **5** is increased and decreased merely by lowering and raising the screw **19**. The top of the screw is formed with a square head or otherwise shaped to facilitate turning of the screw.

In order to substantially eliminate slippage of the endless bands **5** on the drums **3** and **4**, it is preferable to drive simultaneously both the drums from a common driving motor. According to the present invention the top and bottom blade drums are provided with pulleys or sheaves which are driven in opposite directions by flexible double-V-belt driving means, means being provided for adjusting the tension in the double-V-belt means without affecting the tension in the cutter blades. It is preferable to employ separate V-belts for driving each of the blade drums from a common drive shaft.

In order to drive one pulley in a direction of rotation opposite to that of the driving motor by the use of a flexible endless V-belt, said pulley is engaged with the exterior surface of the belt. By employing a flexible endless double-V-belt, the present invention provides a simple inexpensive and efficient means for connecting driving and driven pulleys that rotate in opposite direction and that may be connected to the blade carrying drums to drive them in opposite directions.

The mechanical drum drive of the present invention comprises a plurality of coaxial V-groove driving pulleys or sheaves **22** keyed to a shaft **22***a* of an electric driving motor **43** for rotation therewith in unison, said motor being fixed to the bottom portion of the frame **1**. The pulleys **22** and the bottom drum **4** are drivingly connected to each other for rotation in opposite directions about parallel axes which are spaced apart a fixed distance. Mounted on the shaft **11** for rotation with the drum **4** is a multiple-belt V-groove pulley or sheave **23** which is driven by a pair of flexible endless double-V-belts **24**, the interior side faces **24***a* of said belts engaging the sides of circumferential grooves in the pulleys **22** and being spaced from the bottoms of said grooves as shown in Fig. 3. The exterior side faces **24***b* of the belts **24** are held in driving engagement with the sides of circumferential grooves in the pulley **23** by upper and lower multiple-belt V-groove idler pulleys or rolls **25** and **26** whereby the bottom drum **4** is driven by the belts **24** in a direction of rotation opposite to that of the driving pulleys **22**. The pulleys **25** and **26** are rotatably mounted on cantilever shafts **27** and **28** which are located on opposite sides of the drum **4**. The shaft **27** of the upper pulley **25** is carried by the upper end of a stationary attaching plate **29** which is fixed to the bearing plate **12** by bolts **30**. The shaft **28** of the lower pulley **26** is carried by the outer end of an adjustable supporting arm **31** which is pivotally mounted on the bearing plate **12** for swinging movements about the axis of the shaft **11**. The arm **31** is held in an adjusted position by a hex-head clamping bolt **32** or other suitable clamping means. An arcuate slot **33** is provided in the outer portion of the arm **31** to receive the clamping bolt **32**, said slot permitting a substantial amount of swinging movement of the arm **31** when the clamping bolt is loosened to permit sliding of the bolt head over the margin of the slot whereby the position of the idler pulley **26** and the tension in the belts **24** may easily be adjusted without affecting the tension in the endless bands **5**. Since the belts **24** surround only the pulleys **22**, **25** and **26** and do not surround the pulley **23** of the bottom drum **4**, these belts may easily be removed from the pulley **23** merely by disengaging the belts from the pulleys **25** and **26**.

The upper drum **3** and the pulleys **22** are drivingly connected to each other for rotation in the same direction whereby the drums **3** and **4** are driven in opposite directions of rotation. The pulleys **22** are preferably spaced from the top drum **3** as shown in the drawings and are drivingly connected to the top drum by means of a pair of endless flexible double-V-belts **34** and a multiple-belt V-groove pulley or sheave **35** which engages the interior side faces **34***a* of said belts. The pulley **35** is drivingly connected to the top drum **3** for rotation therewith on the shaft **14**, said pulley being located between the arm **15** and the end of the top drum. The interior side faces **34***a* of the belts **34** engage the circumferential grooves in the pulleys **22** and **35** to drive them in the same direction and are spaced from the bottoms of said grooves to provide a wedging action which reduces slippage.

Means are provided for holding the belts **34** in engagement with the pulleys **22** and **35** and for adjusting the tension in these belts without disturbing the tension in the endless bands **5** comprising a multiple-belt V-groove idler pulley or roll **36** which is rotatably mounted on a cantilever shaft **37** carried by the upper end of a curved pivoted lever arm **38**. The idler pulley **36** has a circumferential groove which receives the exterior side faces **34***b* of the belt. The lower end of the curved arm **38** is journalled on a pivot pin **39** which is supported between lugs **41** that project from the frame **1** whereby the position of the idler roll **36** may be varied to vary the tension in the belts **34**. Rotation of the arm **38** in a direction to decrease said tension is limited by an adjustable screw stop **40** which is threaded into the central portion of said arm, the lower end of the stop **40** being held against the frame **1** by engagement of the idler **36** with the exterior of the belts **34**. The stop is provided with an hexagonal portion **42** to facilitate adjustment of the screw and tensioning of the belts **34**.

The belts **24** and **34** are preferably of identical cross section and the idler pulleys **25**, **26** and **36** may be of the same size and shape. The belts **24** and **34** may engage the bottoms of the circumferential grooves in the idler pulleys **25**, **26** and **36**; however, these belts are preferably spaced from the bottoms of the grooves in the pulleys **22**, **23** and **35** so as to reduce slippage. The location of a belt **24** with respect to a pulley **22**, for example, is illustrated in Fig. 3. The pulleys **22**, **23**, **25**, **26**, **35** and **36** are preferably mounted for rotation about parallel axes so that the belts **24** and **34** may be located in parallel planes.

In operation the tension in the cutter bands **5** and the position of the top drum **3** are preselected by turning the adjusting screw **19**. The position of the idler rolls **26** and **36** and the tension in the flexible V-belts **24** and **34** may then be easily preselected by adjusting the position of the swingable arms **31** and **38**. The belts **24** and **34** may readily be removed or replaced without disturbing the adjustment of the endless band cutters **5**.

It is to be understood that in accordance with the provisions of the patent statutes, variations and modifications of the specific devices herein shown and described may be made without departing from the spirit of the invention.

What I claim is:

1. In a bread slicing machine having a series of endless band cutting blades mounted upon drums in crossed form, said drums being mounted for rotation on spaced parallel axes and said blades being trained around the drums in side-by-side relation, drive means for rotating said drums at equal peripheral speeds in opposite directions comprising: a pair of coaxial V-groove driving pulleys spaced from said drums and connected to rotate in unison about an axis parallel to the axes of said drums, an endless flexible V-belt on one pulley for driving one drum in the direction of rotation of said pulleys, an endless flexible double-V-belt on the other pulley to drive the other drum in a direction opposite to the direction of rotation of said pulleys, each of said drums having a V-groove pulley portion engaging one of said V-belts, one driving pulley and the pulley portion of one of said

drums being in driving engagement with the interior side faces of said V-belt and rotating in the same direction, the pulley portion of said other of said drums being in driving engagement with the exterior side faces of the double-V-belt, means for holding said double-V-belt against said last-named pulley portion comprising a pair of idler rolls on opposite sides of said other drum engaging the interior of said double-V-belt, and adjustable means engageable with each belt for tightening it on its driving and driven pulleys.

2. In a bread slicing machine having a pair of spaced cylindrical drums mounted for rotation about parallel axes, a series of endless band cutting blades running over said drums and crossing midway between the drums and positioning means for moving one drum in relation to the other to adjust the tension of said blades, the combination therewith of a driving mechanism for driving said drums at equal peripheral speeds in opposite directions comprising a stationary support spaced from said drums and having a pair of coaxial V-groove driving pulleys journalled therein, said pulleys being fixed to each other for rotation in unison, means to drive said pulleys in one direction, a first drum pulley coaxial with and drivingly connected to one of said drums for rotation therewith in a direction opposite that of said coaxial pulleys, a second drum pulley coaxial with and drivingly connected to the other drum for rotation therewith in said one direction, an endless flexible V-belt having its interior faces surrounding and drivingly engaging one of said driving pulleys and said second drum pulley, an endless flexible double-V-belt having its interior faces engaging the other of said driving pulleys and its exterior faces engaging said first drum pulley, means for holding the exterior faces of said double-V-belt in driving engagement with said first pulley including idler roller means engaging the interior of said belt, and means independent of said positioning means for adjusting the tension of each of said V-belts.

3. In a bread slicing machine having a pair of spaced drums mounted for rotation in opposite directions on parallel axes, one drum being rotatably mounted on a stationary support and the other drum being rotatably mounted on an adjustable support so that the distance between said axes may be varied and a series of endless band cutter blades running over said drums and crossing midway therebetween, the combination therewith of a mechanism for driving said drums at equal peripheral

speeds in opposite directions comprising a drum pulley coaxial with and connected to each of said drums for rotation therewith in unison, a pair of coaxial driving pulleys spaced from said drums and mounted on a stationary support for rotation as a unit about an axis parallel to the axes of said drums, a pair of idler pulleys mounted on opposite sides of one of said drum pulleys for rotation about axes parallel to the axes of said drums, a pair of flexible double-V-belts mounted on said driving pulleys for driving said drums in opposite directions of rotation, each of said pulleys having a circumferentially continuous groove shaped to receive a V-belt, one double-V-belt surrounding said idler pulleys and one driving pulley with its inner side faces engaging in the grooves thereof and being held by said idler pulleys against said one drum pulley with its outer side faces in driving engagement with the groove thereof, means for adjusting one of said idler pulleys to adjust the tension of the V-belt engaging the same, the other double-V-belt surrounding the other driving pulley and said other drum pulley and having its inner side faces engaging in the grooves thereof, and means for adjusting the tension in said other double-V-belt and for holding said belt in engagement with said other driving pulley comprising an idler pulley mounted on an adjustable support for rotation about an axis parallel to the axis of said drums and located between said other pulley and said other drum pulley, said idler pulley engaging the outer side faces of said other V-belt and being driven thereby in the same direction of rotation as said one drum.

4. A mechanism such as defined in claim 3 in which each of the pulleys is a multiple groove pulley and in which a plurality of belts connect the driving pulleys with each of the drums.

References Cited in the file of this patent

UNITED STATES PATENTS

1,640,623	Stein	Aug. 30, 1927
1,919,389	Myers	July 25, 1933
2,032,118	Criner	Feb. 25, 1936
2,331,157	Arey	Oct. 5, 1943
2,379,911	Kottmann	July 10, 1945
2,430,160	Criner	Nov. 4, 1947
2,450,262	Winslow et al.	Sept. 28, 1948