

[54] MACHINE FOR PACKAGING MATERIALS  
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[73] Assignee: Armour and Company, Phoenix, Ariz.  
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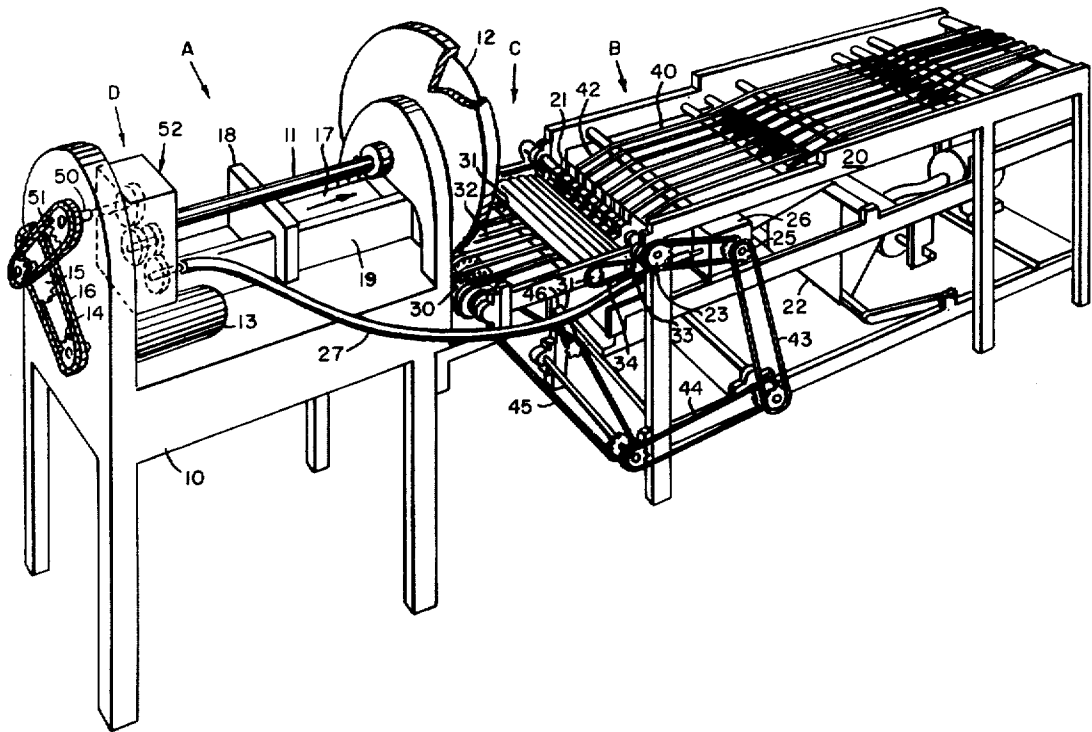
[52] U.S. Cl. .... 53/123; 74/395  
[51] Int. Cl. .... B65b 65/02  
[58] Field of Search ..... 53/123; 74/395, 397

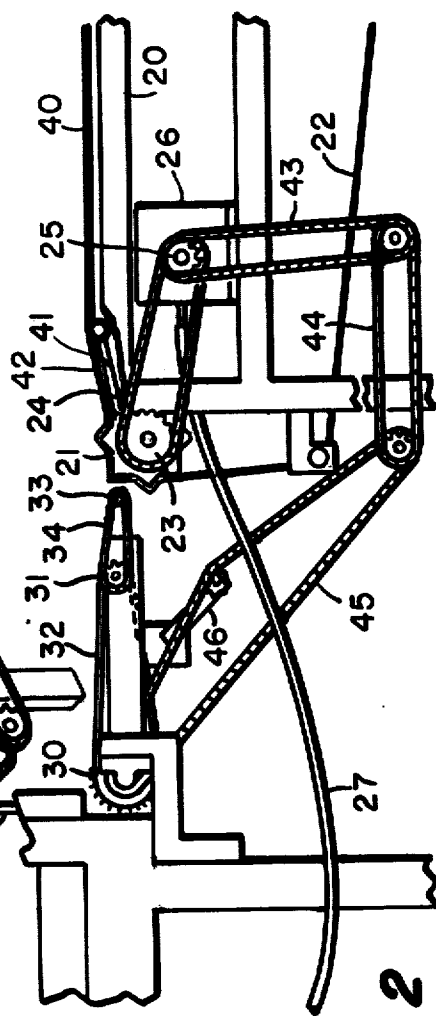
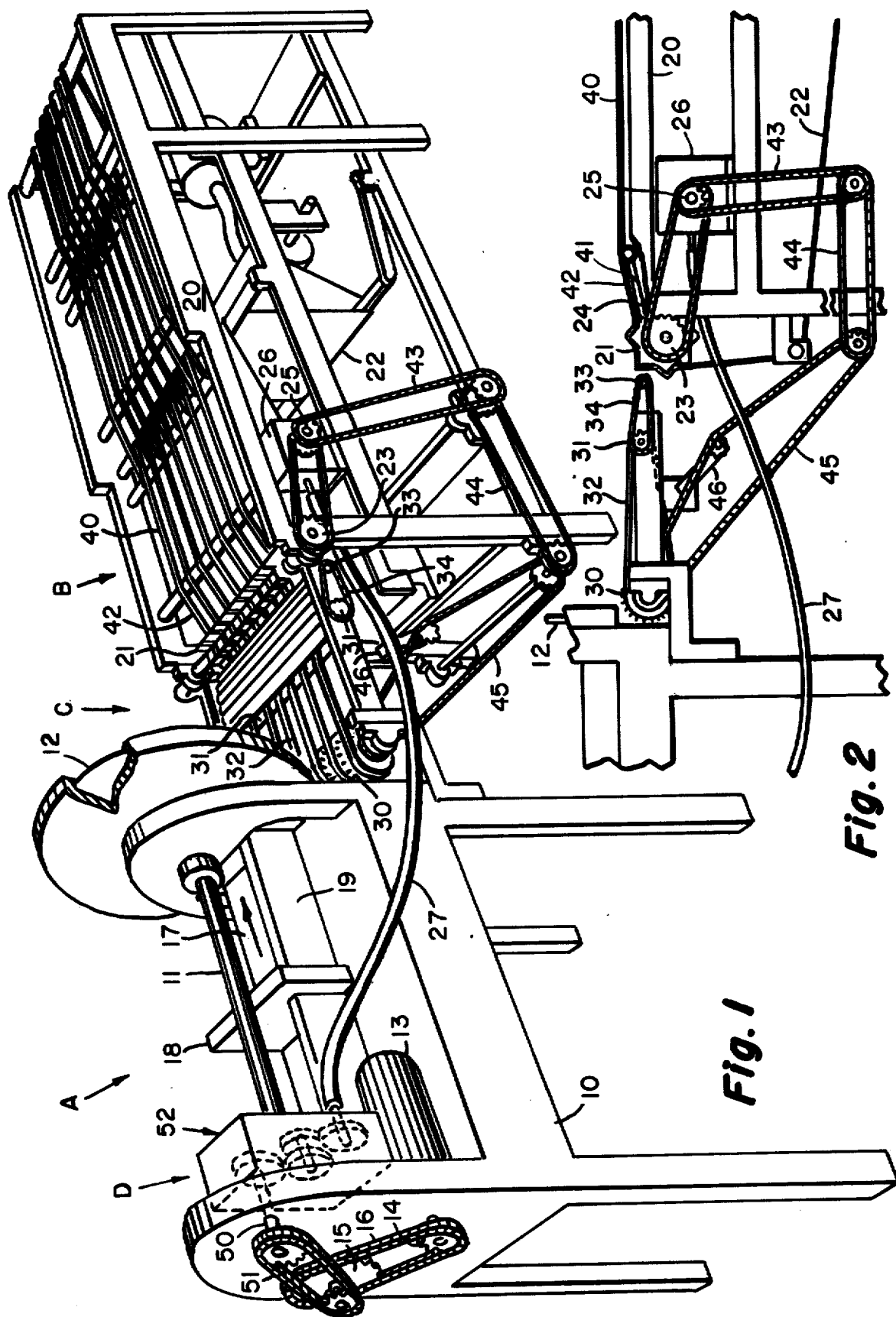
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Primary Examiner—Travis S. McGehee  
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[57] ABSTRACT  
A machine for slicing and packaging materials such as bacon and sausage slices and which includes a slicing unit, a packaging unit and a conveyor for delivering slices in sequence from the slicing unit to a receiving roll in the packaging unit. The invention deals particularly with mechanism for synchronizing the operation of one machine unit with another machine unit while the machines continue in operation, and more especially the invention deals with synchronizing the operation of the slicer unit with a receiving roll in the packaging unit while the machine is in operation so that consecutive slices arrive at the roll in the desired relation to stations spaced angularly about the roll.

7 Claims, 6 Drawing Figures





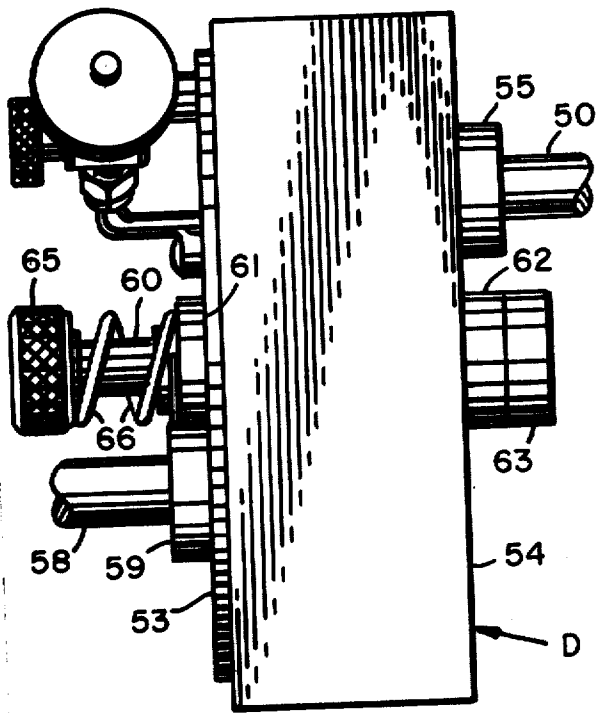


**Fig. 3**

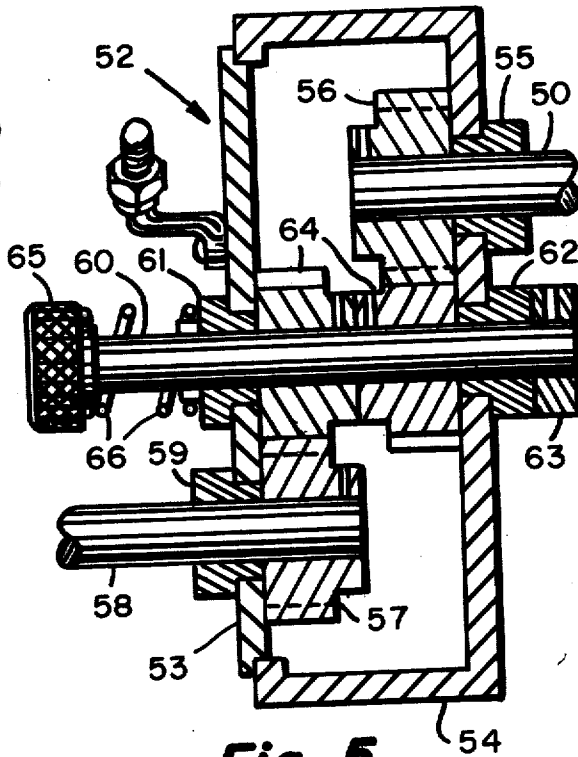


**Fig. 5**

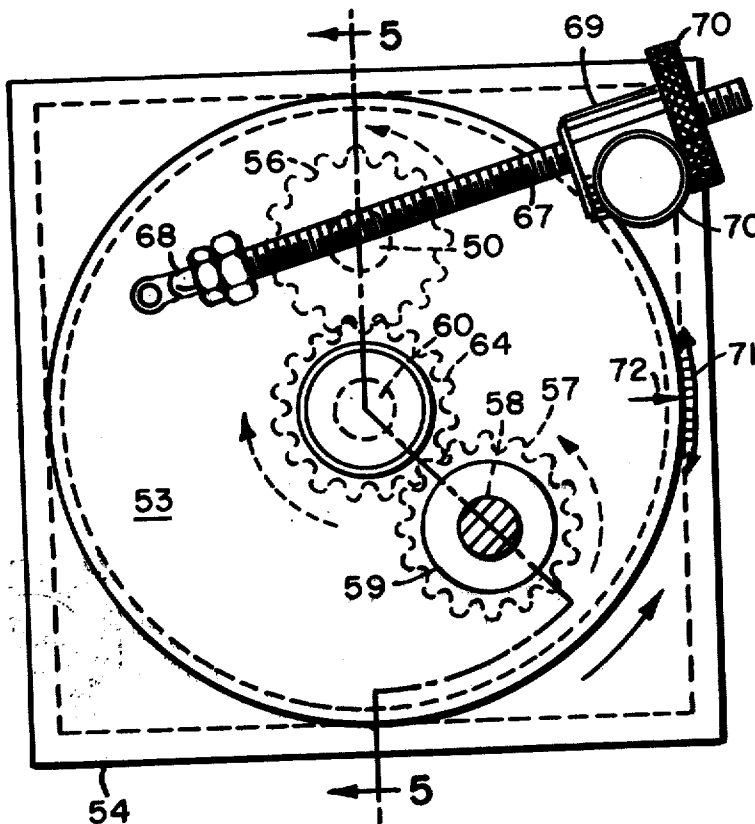


**Fig. 4**

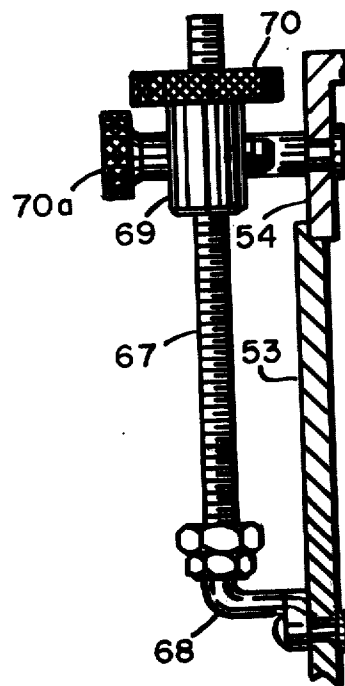


**Fig. 6**

## MACHINE FOR PACKAGING MATERIALS

This invention relates to a slicing and packaging machine for various materials such as meats or other foods desired to be marketed in sliced packaged form. The machine of this invention is particularly useful for the packing of bacon.

### BACKGROUND

In my copending Pat. application, Ser. No. 262,656, now abandoned, I described a machine of this character and in some respects the invention of this application may be considered an improvement on the machine set forth in said application, Ser. No. 262,656, now abandoned.

In my prior application above referred to I describe a stepped roll having teeth or steps and over this is passed a film material. A slicer of standard design makes slices of bacon off a bacon slab and the slices are delivered one after another at timed intervals to a position where they drop onto a step of the roll then covered with film. By suitable mechanism the slices are then gathered together with the film therebetween, the film being effective to keep the slices from sticking when the package is stored.

In the operation of the machine above referred to it has been found to be important that the slices be delivered in close synchronization with the rotation of the stepped roll so that each slice goes to the same position with respect to a step or tooth of the roll, with consecutive slices coming into place on consecutive steps of the roll. If, for example, the slices were being delivered in timed relation but each slice was arriving a little too soon, or a little too late, to go onto the roll in the desired pocket or on the desired tooth on the roll, it was necessary, in order to achieve proper adjustment, to stop the machine and dismantle it to the point where the roll could be advanced or retarded to an extent calculated to bring the roll into the desired relationship with the delivery of slices.

### SUMMARY

The present invention has for an object the provision of structure which will permit adjustment of the relation between the presentation of the steps or pockets between the steps on the stepped roll with the delivery of consecutive slices while the machine is in operation, thus to facilitate and improve the accuracy of synchronization.

According to the present invention this result is accomplished by providing a synchronizing device which is associated with the drive means of the slicing unit and also with the drive means of the stepped roll, the device being operable while the machine is running. More specifically I provide such a device which includes a gear associated with the slicer and a gear associated with the stepped roll, these gears being engaged with a third gear. One of these associated gears is moveable about the axis of the third gear, thus to advance one associated gear with respect to the other while the gears are in motion.

### DETAILED DESCRIPTION

One embodiment of the invention is illustrated in the accompanying drawings in which;

FIG. 1 is a perspective view of the machine;

FIG. 2 is a view in side elevation showing the drive connection for the packaging unit of the machine;

FIG. 3 is a view in elevation of the synchronizing device, the view being taken from the rear side of the device as shown in FIG. 1;

FIG. 4 is a view in elevation of the synchronizing device, the view being taken as seen from the right hand end of the slicer as shown in FIG. 1;

FIG. 5 is a sectional view of the device, the section being taken at line 5—5 of FIG. 4; and

FIG. 6 is a detailed view of the means for operating the synchronizing device.

As illustrated, the machine includes a slicer unit A, a packaging unit B, and a conveyor unit C for delivering slices from the slicer unit to the packaging unit. A synchronizing device D is associated with the driving mechanism for each of the slicing unit and the packaging unit.

Referring to FIG. 1, the slicing unit A includes a frame 10 in which the slicer shaft 11 is rotatably mounted. At the end of shaft 11 is the slicer blade 12. The shaft 11 and blade 12 are driven by the motor 13 which, through sprockets 14 and 15, and belt 16, drives the shaft 11. FIG. 1 shows what might be considered the back side of the slicer unit. A bacon slab, or other such material to be sliced, is placed on the bed 17 of the slicing unit in front of the pusher 18 with its side edge against the back wall guide 19. The pusher 18 is driven by mechanism not shown but well known in the art. This mechanism is synchronized with the drive for the shaft 11 and slicer blade 12 so that the bacon is pushed forwardly a certain amount for each revolution of the slicer blade thus to produce slices of uniform thickness.

The packaging unit B includes a frame 10, and rotatably mounted in this frame is the stepped roll 21 which is shown also in FIG. 2. The film 22, which is used in packaging, is drawn from a roll of such film and passed upwardly over the roll 21. Roll 21 is driven by the sprocket 23 and chain 24 which is driven by the shaft 25 of gear box 26. The gears of box 26 are driven by a flexible shaft 27 which extends to the slicer unit.

The conveyor C has roll 30 upon which the slices fall from the slicer blade 12. Roll 30 is connected with roll 31 by belt 32, and roll 32 is connected with a small roll 33 by belt 34. Belts 32 and 34 thus form the top of the conveyor on which the bacon slices, for example, may rest in spaced relation as they pass to the end of the conveyor and onto the stepped roll 21.

A second conveyor 40 carried on frame 20 has pivoted fingers 41, the ends of which extend into grooves or annular channels in the roll 21, and the belts 42 which extend to the ends of fingers 41 serve to pick up the slices with the film extending therebetween and to carry the packages so assembled onwardly to a station where they may be removed from the conveyor.

Conveyor C is driven from shaft 25 of the gear box 26 through sprocket chain 43 which drives sprocket chain 44 which drives sprocket chain 45 which drives roll 30. An idler on pivoted arm 46 keeps the chain 45 taut.

The device D for synchronizing units A and B is shown as a box in FIG. 1, and in more detail in FIGS. 3 to 6. The shaft 11 of the slicer drives the shaft 50 through sprocket chain 51 and shaft 50 extends into the part 54 of the synchronizing box. This part 54 of the box is fixedly mounted to the slicer frame. FIGS. 3 and

4 show this device as it is seen from the front side of the slicer unit which is the side opposite that shown in FIG. 1.

Referring particularly to FIGS. 3 to 5, the synchronizing device includes a frame 52 which is of two parts, one part 53 being in the form of a circular disc which may be turned about its axis, and the other part 54 being a stationary casing into which part 53 is rotatably fitted. The shaft 50 extends through bearing 55 in part 54 and is keyed to the gear 56 inside the synchronizing box. The second gear 57 within the synchronizing box is keyed to the shaft 58 which extends through bearing 59 in part 53 of the box or frame. In the center is a pin or shaft 60 which extends through bearing 61 of part 53 and through bearing 62 on part 54 and has its end keyed to the collar 63. Within the box are the gears 64 each of which are keyed to shaft 60 so as to rotate as a single gear. Subsequently in this application these gears will be referred to as the "third gear." Between the knurled heads 65 are shafts 60 and the bearing 61 in part 53 is a spring 66 which tends to press the part 53 resiliently against the other part of the frame.

As shown in detail in FIG. 6 there is on the face of device D a vernier arrangement including a threaded rod 67 with a bracket 68 at one end which is pivotally connected with the part 53. Rod 66 extends at its other end through the collar 69 and collar 69 is pivotally connected with the part 54 of the frame. A knurled nut 70 engages the end of the threaded rod 66 and a threaded key 70a is provided to fasten the rod in a fixed position so as to hold apart 53 in a certain angular position after adjustment has been made. It may be noted that the axis about which the part 53 turns coincides with the axis about which third gear 64 rotates, and when adjustment is made the part 53 turns the axis of gear 58 angularly about the axis of part 53 and gear 64.

To facilitate the adjustment between the parts 53 and 54 there is marked on part 54 scale 71, and on the edge of circular part 53 is an arrow 72. This makes it possible to note on the scale the slight extent to which the part 53 may have been turned by the verier adjustment.

### OPERATION

Let us assume that motor 13 is started in rotation and through chain 16 drives the slicer shaft 11 which causes the slicer blade 12 to rotate in a counterclockwise direction as seen from FIG. 1. The slicer shaft, through chain 51, drives shaft 50 of the synchronizer device which drives first gear 56 of that device in a clockwise direction as seen in FIG. 4. First gear 56 through its engagement with gear 64 drives that gear in a counterclockwise direction about its own axis, and through engagement with this gear with gear 54 and the engagement between gears 64 and second gear 57, drives this second gear in the same angular direction as first gear 56. Second gear 56 through flexible shaft 27 and gear box 26 drives shaft 25 which through chains 24, 43 and 45 drives roll 30 of conveyor C in a clockwise direction as seen from FIG. 2, which puts conveyor C in operation.

Shaft 25 also, through chain 24 drives stepped roll 21 in a clockwise direction as seen in FIG. 1. Rotation of roll 21 pulls film 22 over its surface.

When the operator puts a slab of bacon, for example, on the bed 17 of the slicing unit and connects the pusher 18 so that it is driven in synchronization with the slicing blade 12, the blade cuts off slices of uniform

thickness which fall on the roll 30 of the conveyor C, and are conveyed in uniformly spaced relation toward the stepped roll 21. As each slice reaches the end of conveyor C it falls off the conveyor onto one of the steps of the roll. Further rotation of roll 21 brings the slices, one at a time, over the end of the fingers 41 of the conveyor 40, and the slices are picked up by the fingers with the film doubled therebetween. The conveyor then carries the bacon package with the film between the slices onwardly to a station where the package may be removed from the machine.

During operation of the machine it may be determined that each slice arrives a bit too soon with respect to the steps on roll 21 on which the slices come to rest. This determination may be made when occasionally a slice may fly over the roll and come to rest on the following step of this roll. When such determination is made the operator may, without stopping the machine, loosen the said screw 70a and turn nut 70 to permit lengthening the distance between the pivot points at the ends of rod 66, thus turning part 53 with respect to part 54 of the casing 52. The direction of turning is counterclockwise as seen in FIG. 4. This causes the second gear 58 to rotate or be moved angularly about the axis of the third gear 64 and toward the first gear 56 and operates through the turning of the part 53 to advance the rotation of the second gear 56 with respect to the rotation of first gear 56. This serves to advance the rotation of stepped roll 21 with respect to the delivery of bacon from conveyor C so that the slices fall exactly into the pockets of the roll.

Adjustment to retard the stepped roll with respect to the delivery of slices while the machine is running may be just as simply accomplished by turning nut 70 to pull rod 66 up to shorten the distance between its pivoted end connections, thus retarding the rotation of roll 21 with respect to the delivery of slices to the roll.

It may be observed that changing the synchronizing device to advance the rotation of roll 21 also advances roll 30 and conveyor C, but this is not of consequence because the slices are cut at the same rate of speed and slices will be delivered at the roll 21 at the same rate irrespective of the angular position of gear 58 about the axis of third gear 64. The difference is in the adjustment of the precise position that each slice hits the roll with respect to each position on the roll where a pocket or the point of a step is located.

While only one embodiment of my invention has been illustrated and described in the foregoing detailed description it is understood that the invention may take many forms and many changes may be made all within the spirit of the invention and within the terms of the appended claims.

I claim:

1. In a slicing and packaging machine, a slicer unit having a slicing blade and drive means for rotating said blade as the material to be sliced is passed through said unit to thereby produce slices of said material, a packaging unit which includes a stepped roll and means for delivering packaging film over said roll, conveyor means for receiving slices produced by said slicer unit and for delivering said slices consecutively to said roll, drive means for rotating said roll, a first gear in drive relation with said blade rotating means, a second gear in drive relation with said roll rotating means, and a third gear in engagement at one point on its periphery with said first gear and at another point on its periphery

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with said second gear, and means for moving one of said first and second gears about the axis of said third gear to change the angular distance therebetween while each is engaged with said third gear.

2. A machine as set forth in claim 1 including a frame structure in two parts one of which is turnable with respect to the other about the axis of said third gear, one of said first and second gears being rotatably mounted in said one part and the other of said first and second gears being rotatably mounted in the other of said parts.

3. A machine as set forth in claim 2 including means for turning said one part with respect to the other part of said frame to advance one of said drives with respect to the other.

4. A machine as set forth in claim 3 wherein said turning means includes a device pivotally connected at one end with said one part and at its other end with said other part of said frame, and having means for changing the distance between said points of connection.

5. In combination, a first machine unit, first rotary drive means connected to said unit, a second machine unit, second rotary drive means connected to said second unit, and a synchronizing device including a first

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gear connected in drive relation with said first driving means, a second gear in drive relation with said second driving means, and a third gear in engagement at its periphery with each of said first and second gears, one of said first and second gears being turnable about the axis of said third gear to change the angular distance between said first and second gears to thereby advance the rotation of one of said first and second gears with respect to the other.

6. A machine combination as set forth in claim 5 including a frame structure in two parts one of said first and second gears being rotatably mounted on one of said two parts and the other of said first and second gears being rotatably mounted on the other of said two parts, said one of said parts being turnable with respect to the other part and about the axis of said third gear.

7. A machine combination as set forth in claim 6 in which said one part of said frame and said third gear are rotatable about a common stationary axis and said first and second gears are each rotatable about an axis displaced from said stationary axis by a distance which is the sum of its radius and the radius of said third gear.

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