

Aug. 9, 1938.

F. J. ENGLER

2,126,458

SLICING APPARATUS

Filed Sept. 29, 1933

6 Sheets-Sheet 1

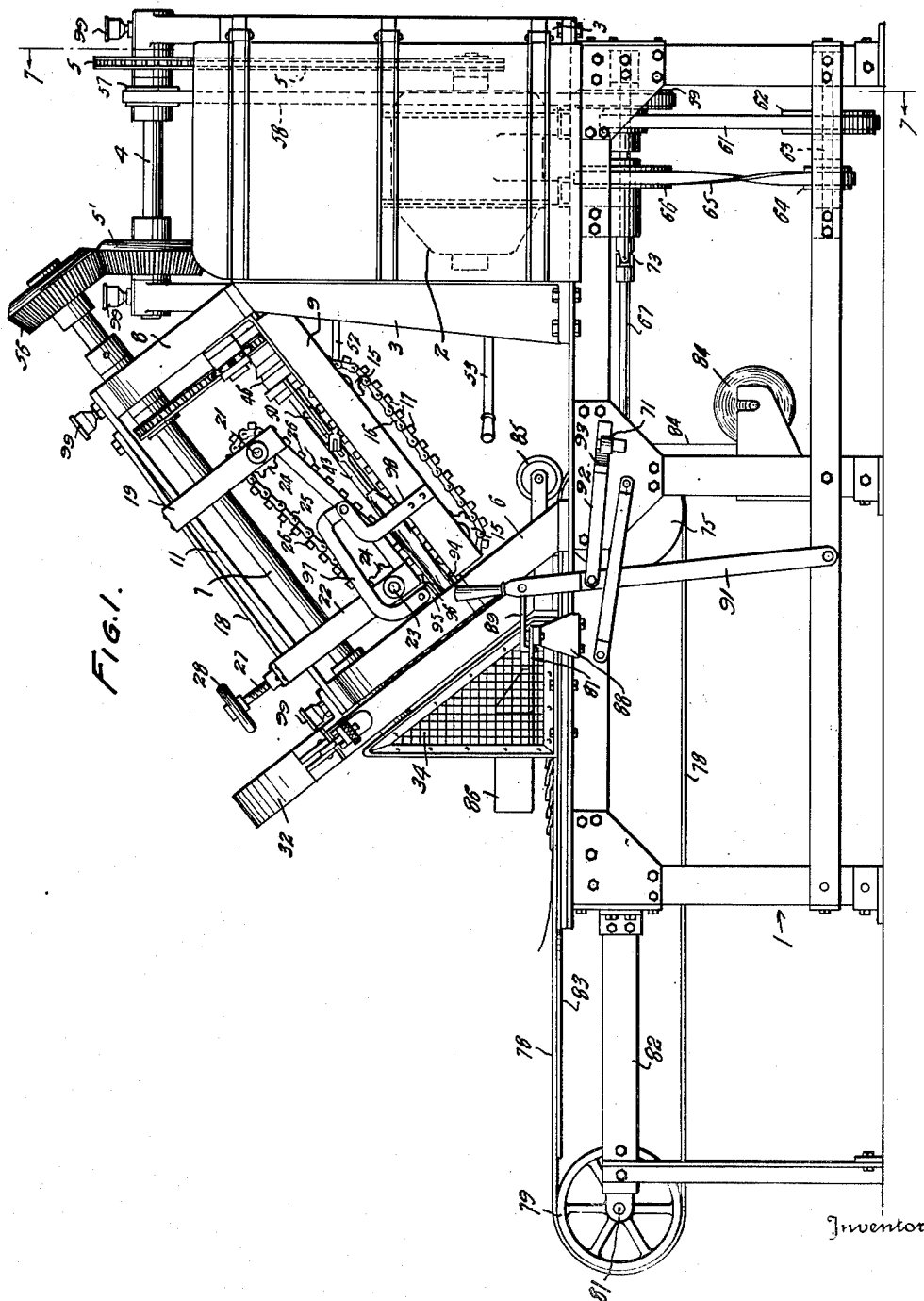


Fig. 1.

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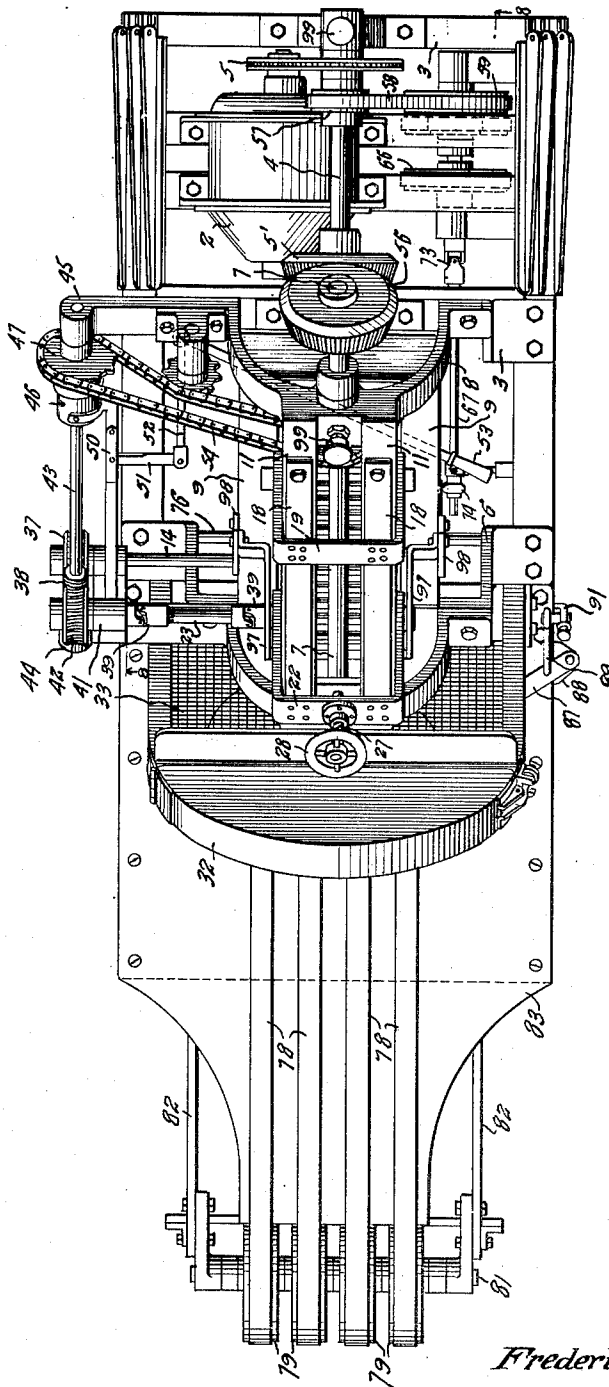
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6 Sheets-Sheet 2

FIG. 2.



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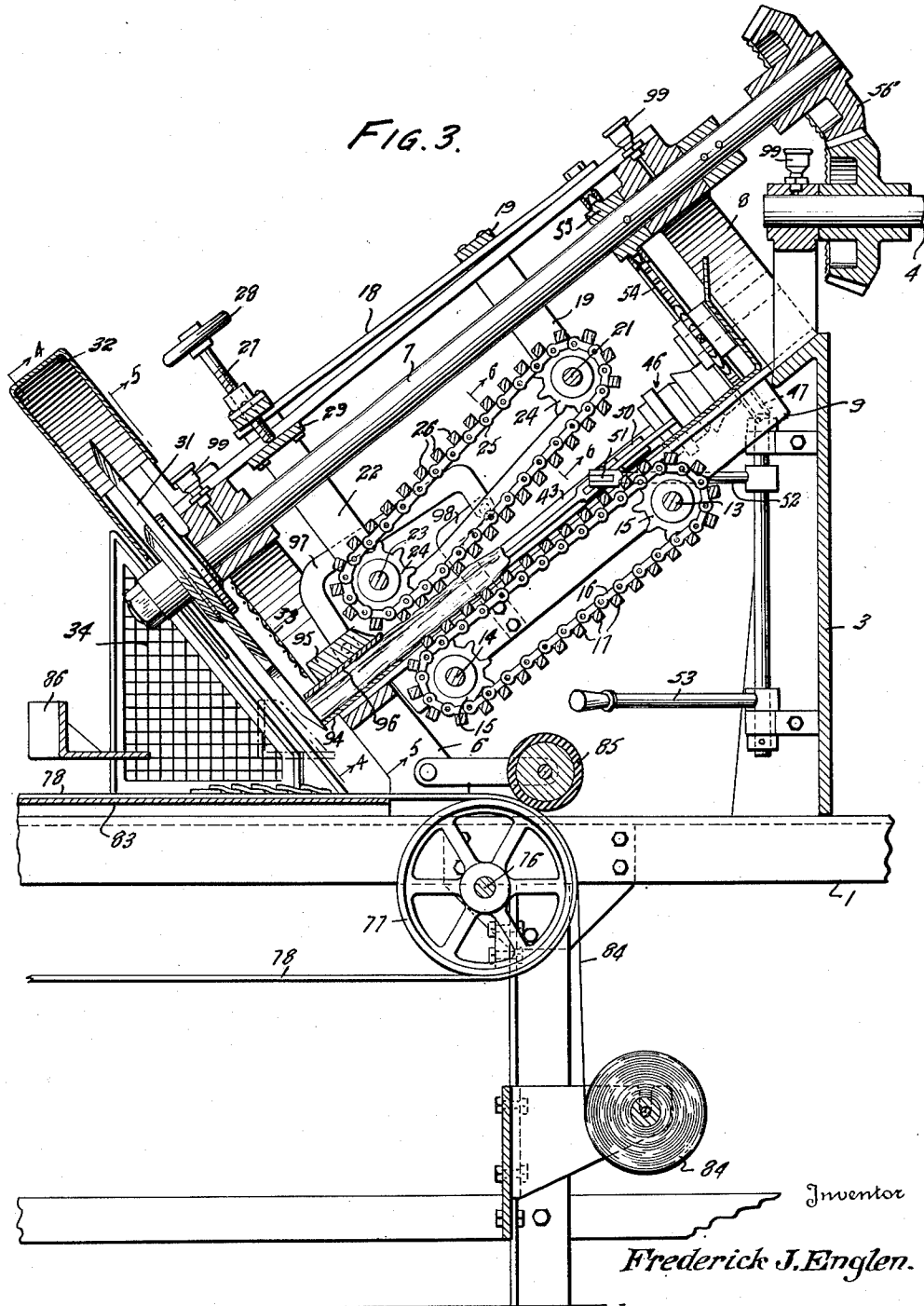
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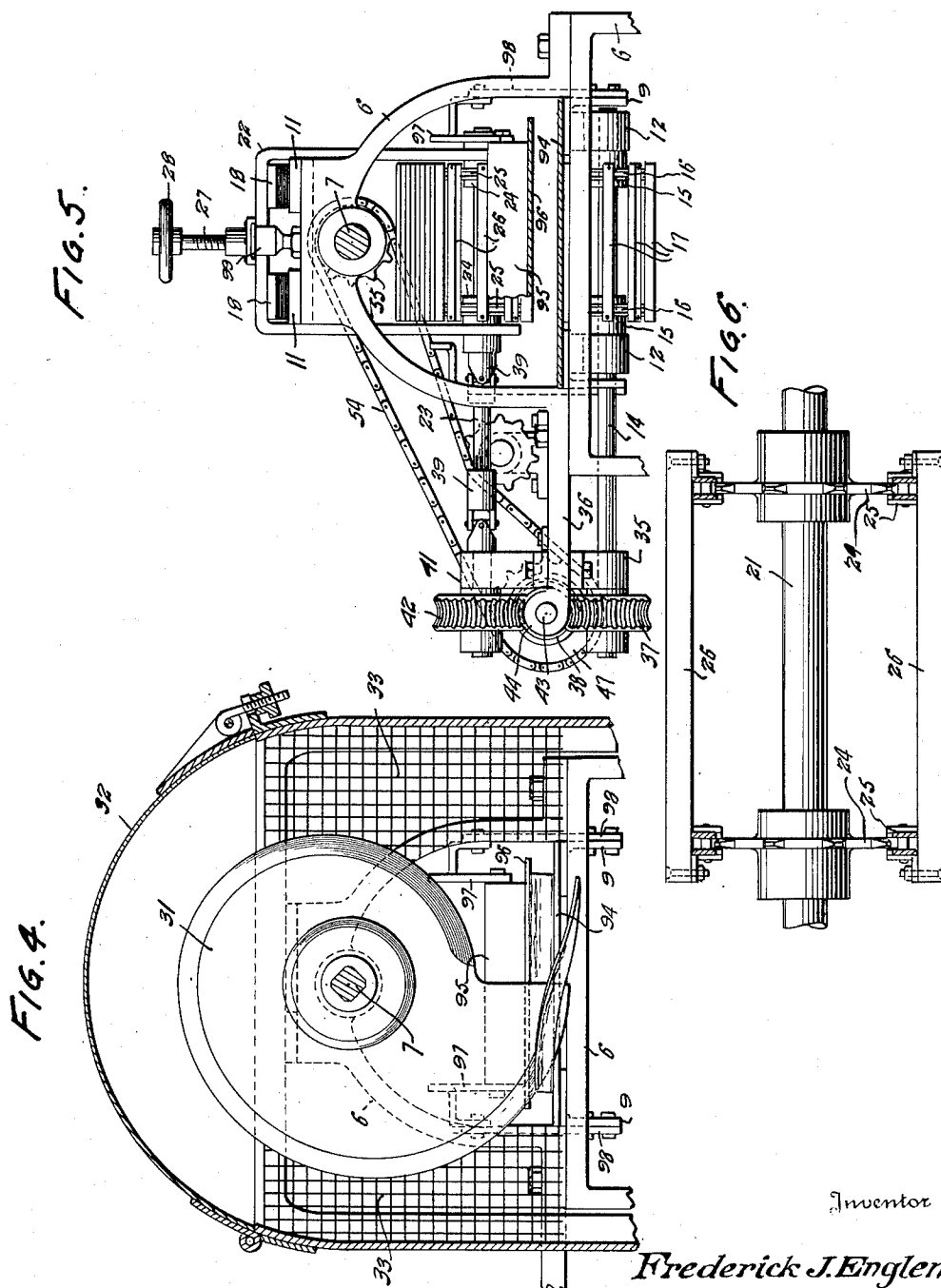
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SLICING APPARATUS

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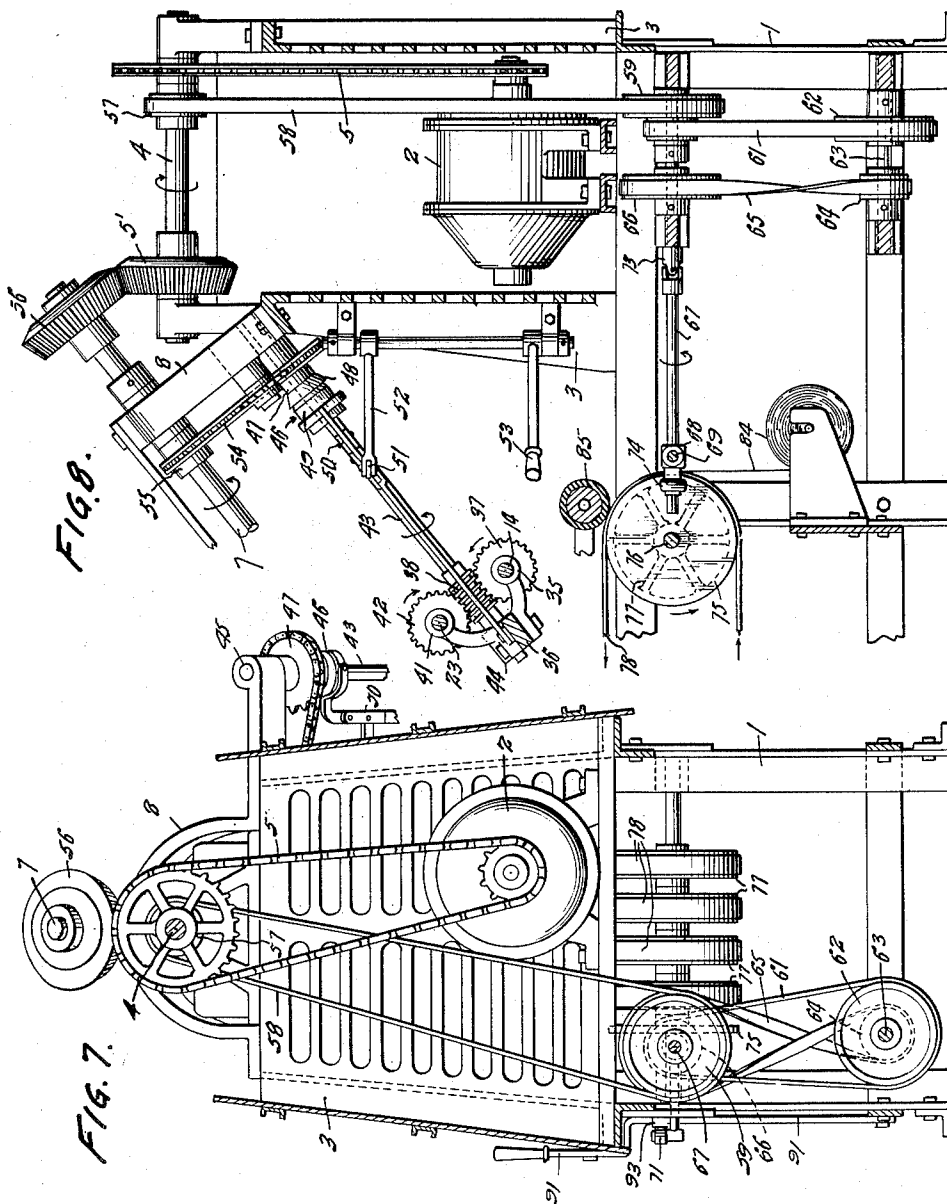
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6 Sheets-Sheet 5



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SLICING APPARATUS

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FIG. 9.

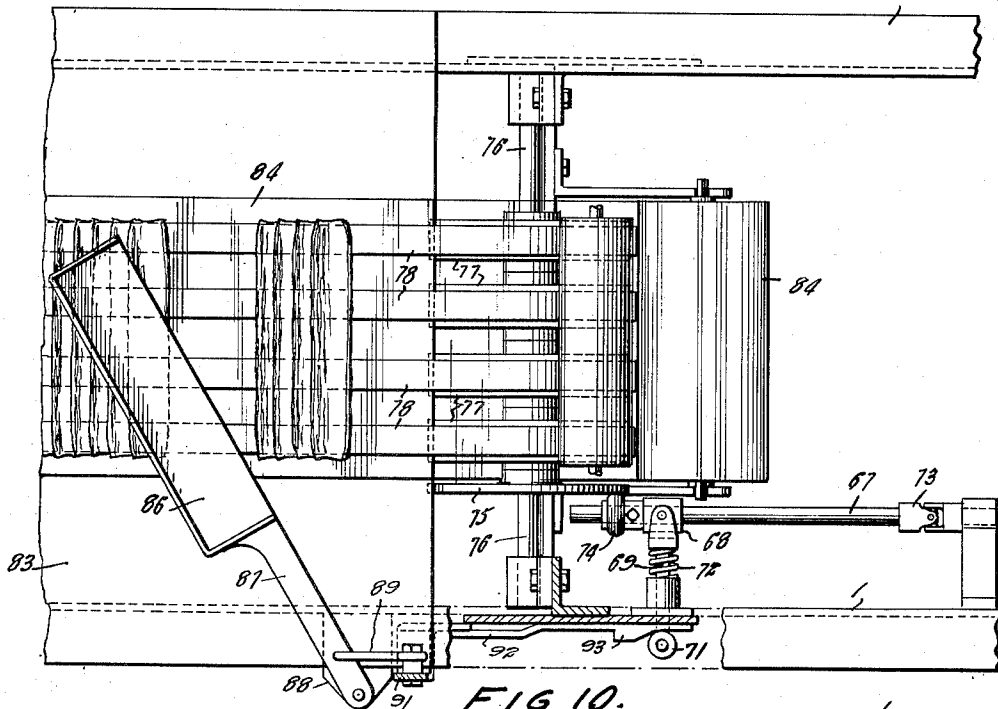
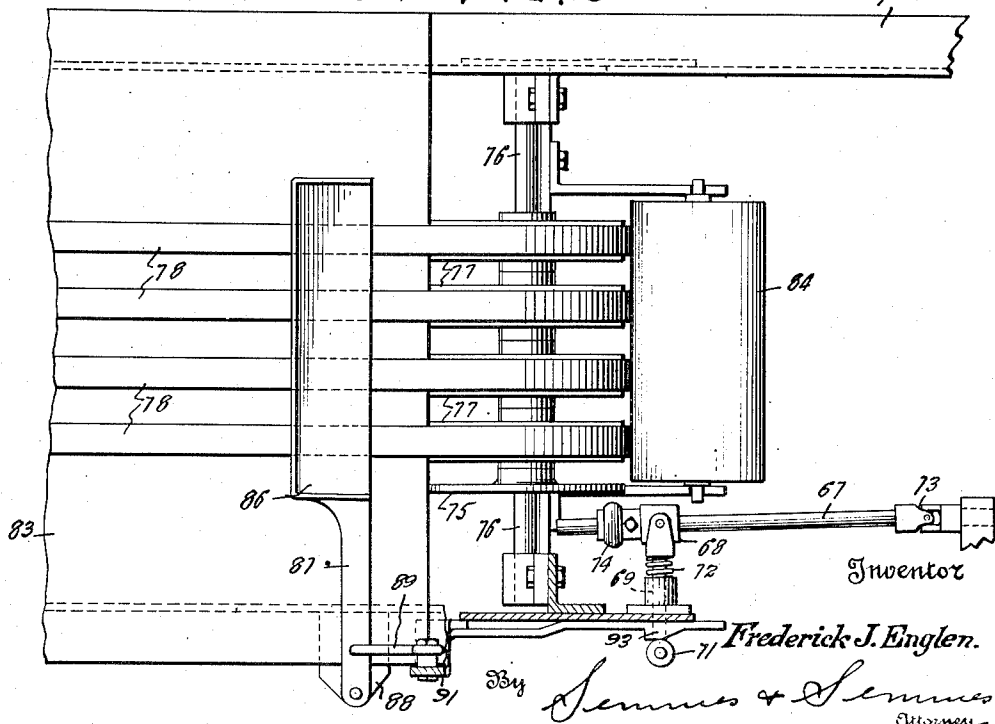


FIG. 10.



## UNITED STATES PATENT OFFICE

2,126,458

## SLICING APPARATUS

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Application September 29, 1933, Serial No. 691,544

2 Claims. (Cl. 146—94)

This invention relates to a slicing apparatus, and more particularly has reference to a machine for slicing bacon and similar food products. While I shall refer specifically to bacon, it is to be understood that my invention is not limited in its application thereto.

The devices heretofore used for the slicing of food have possessed certain disadvantages. In general, they have been complicated in structure and expensive to manufacture. Furthermore, they have been ill-adapted for the slicing of bacon, under certain conditions of operation. Usually it has been necessary to manually arrange the sliced bacon upon the paper in which it is wrapped, or in the package. This has been due in part to the fact that there has been no proper cooperation between the feeding and slicing mechanism, and the conveying apparatus or receptacle for the sliced bacon. Obviously, such manual arrangement of the slices is an extremely costly step. Also, the prior structures have lacked continuous feeding mechanism, so that in such machines it has been necessary to terminate operation each time a new strip of bacon is inserted for cutting.

To overcome the above disadvantages is one of the objects of my invention.

Another object of my invention is to provide a slicing apparatus of simple yet durable construction, and which may be economically manufactured and operated.

A further object of my invention is to provide a slicing device that may be easily operated, and over which the operator may maintain a close control.

Yet another object of my invention is to provide a slicing apparatus in combination with a conveyor for the sliced products, the two elements cooperating in such a way as to dispose the sliced products in a uniform and orderly arrangement upon the conveyor.

To accomplish the above, and other important objects as will more fully appear hereinafter, my invention in general resides in the means and combinations hereinafter recited, it being distinctly understood, however, that the specific means disclosed herein and the cooperative relationship therebetween may be varied without departing from my invention.

In order that my invention may be better understood, reference is made to the accompanying drawings, showing the preferred embodiment, with the understanding that various modifications may be made therein without exceeding the scope of my invention.

In these drawings, in which similar numerals indicate the same part:

Figure 1 is a side elevation of the slicer and conveyor;

Figure 2 is a top plan view of my invention;

Figure 3 is a detailed view of the feeding and slicing mechanism, partly in section and partly in elevation;

Figure 4 is a view along the line 4—4 of Figure 3, looking in the direction of the arrows;

Figure 5 is a sectional view along the line 5—5 of Figure 3, looking in the direction of the arrows;

Figure 6 is a detailed sectional view along the line 6—6 of Figure 3, looking in the direction of the arrows;

Figure 7 is a view of the device along the line 7—7 of Figure 1, looking in the direction of the arrows;

Figure 8 is a sectional view along the line 8—8 of Figure 2;

Figure 9 is a top plan view showing in detail the scrap-catching device in inoperative position, and the conveyor driving mechanism;

Figure 10 is a view generally similar to Figure 9, but shows the scrap-catching device in operative position.

Referring more particularly to Figure 1, I provide a support or table designated generally 1, on which are mounted the slicing and conveying mechanisms and associated structure. Secured upon this table is a motor 2, or other suitable source of power, it being, of course, understood that such power source may be located exteriorly of the table, if desired. Bearing arms or standards 3 extend at either end of the motor 2, and in the upper end of said members there is journaled a shaft 4. This shaft is provided with a sprocket to receive a chain 5 which transmits power from the motor 2 to the shaft 4. There is also keyed onto shaft 4 a beveled gear 5'.

A U-shaped standard 6 is mounted angularly upon the table. At the upper end of this standard there is provided a bearing for a shaft 7. Another U-shaped standard 8 is mounted upon the standard 3, and is likewise provided with a bearing for the shaft 7. It will be noted that by this arrangement, the shaft 7 is maintained at an angle to the horizontal.

Angle irons 9 extend from either side of the lower part of standard 8 to standard 6. Also, two struts 11 extend between the tops of the supports 6 and 8, as shown in Figures 1 and 2.

As best shown in Figures 1, 3 and 5, the angle irons 9 carry four bearings 12 in which are journaled shafts 13 and 14. Four sprockets 15 are

keyed to shafts 13 and 14, and are adapted to mesh with a tractor chain 16. The tractor is provided with blocks 17 which actually support the material to be fed.

5 A frame 18 is secured at its upper end to struts 11, as best shown in Figure 2. Depending from the frame 18 is a yoke 19 which furnishes a bearing for a shaft 21, as shown in Figures 1 and 3. A somewhat longer yoke 22 is provided at the lower end of frame member 18, and serves as a bearing for shaft 23. The shafts 21 and 23 carry four sprockets 24, over which run a tractor 25, similar to tractor 16, and likewise provided with blocks 26.

15 There is threaded through the top of yoke 22 a screw 27 provided with a knob or wheel 28. The head of screw 27 bears against a bar 29 extending between struts 11. The frame 18 is preferably made of steel or some other metal or substance possessing a certain amount of resiliency. It will be observed that when the knob 28 is turned clock-wise, the screw 27 will be forced into engagement with bar 29 to effect a raising or pivoting of frame 18. Upon counter-clockwise movement of knob 28, the frame 18 will pivot toward strut 11 by virtue of the resiliency of frame 18, and also the weight of the supported structure.

It will therefore be appreciated that the lower tractor is fixedly mounted, and supports the product to be cut as shown in Figures 1 and 3. The upper tractor 28, however, is adjustable with respect to the lower tractor, and may be raised or lowered to accommodate meats of varying thicknesses. It will be noted that the tractor 26 secures its greatest pressure on the meat at its lowest extremity where the throw, resulting from the pivoting, is greatest. The meat is held firmly between the two tractors, and is urged forwardly at a uniform rate.

40 Keyed to shaft 7 is a rotary knife 31, as best shown in Figures 3 and 4. A suitable housing 32 is provided for this knife, as well as screening 33 and side screens 34, in order to prevent any possible injury to the operator. The knife is preferably of the conventional rotary type, and I have found that a knife having all of its cutting edge lying in a single plane may be used. Even though such a knife is used, a slice of uniform thickness and cut, straight across the strip of meat, is obtained, notwithstanding the fact that the meat moves at a uniform rate toward the knife while the latter is revolving. It is to be noted particularly that the knife operates perpendicularly to the strip of meat, so that the slice is only as wide as the thickness of the strip. It is, of course, obvious that under certain circumstances, and with minor alterations, a blade-like knife may be substituted for the circular knife.

Shafts 13 and 21 carry idler sprockets for the tractors, but, as best shown in Figure 5, shafts 14 and 23 are power shafts. Shaft 14 extends through a bearing 35, mounted on a projecting bracket 36, and is provided with a worm wheel 37. As shown in Figure 8, the worm wheel 37 meshes with a worm 38.

Shaft 23 is provided with two universal joints 39, in order to care for the arcuate movement of shaft 23 resulting from the pivoting of frame 18. Shaft 23 is mounted in a bearing 41, which, as in the case of bearing 35, is mounted upon bracket 36. A worm gear 42 is secured to shaft 23, and the gear 42 also meshes with the worm 38. It will be noted that the worm gears 37 and 42

rotate in opposite directions. It will, therefore, be seen that regardless of the thickness of the meat that is being worked upon and the consequent adjustment of tractor 25, the tractors 16 and 25 are at all times capable of operation.

5 The worm wheel 38 is secured to a shaft 43, and, as shown in Figures 5 and 8, the shaft is journaled at its lower end in a bearing 44 formed upon the bracket 36. The upper end of shaft 43 rotates in a bearing member 45, off-set from the U-shaped standard 8.

A suitable clutch designated generally 46 is provided on shaft 43. This clutch may be of any suitable type, such as, for instance, a cone clutch as best disclosed in Figure 8, comprising an idler sprocket 47 provided with a driving plate 48. A cone shaped driven member 49 is splined upon the shaft, and, when frictionally engaging the driving member 48, serves to rotate shaft 43.

20 A toggle 50 controls the longitudinal movement of the driven-half 49 upon shaft 43, such toggle being operable by means of a link 51 and bell crank 52, the lower arm of which crank is provided with a handle 53. The handle 53, as will be observed from Figure 2, extends to the opposite side of the device so that all controls are located at one portion of the machine, as hereinafter pointed out. It will be appreciated that actuation of clutch 46 will throw the tractors 16 and 25 into or out of operation.

The idler sprocket 47 carries a chain 54 which passes over a sprocket 55 mounted upon shaft 7. Shaft 7 is provided with a bevel gear 56 which meshes with the bevel gear 57 of the main drive shaft 4 of the apparatus. It will, therefore, be observed that in view of the clutch 46, the tractors can be cut out of operation notwithstanding rotation of the circular knife 31.

As best shown in Figure 8, there is also mounted upon shaft 4 a pulley 57 which carries a belt 58. The belt 58 passes over a two step idler pulley 59, on which is mounted another belt 61, extending to a pulley 62. The pulley 62 is mounted on a shaft 63, which also carries a pulley 64. A belt 65 extends from pulley 64 to a pulley 66. The pulley 66 is mounted upon a shaft 67 which is suitably journaled in the supports of table 1. It will be noted that the various pulleys and belts just described serve as a speed-reduction from shaft 4 to shaft 67.

As best shown in Figure 9, shaft 67 is mounted in a bearing 68 which is pivotally held by a yoked-pin 69. The pin 69 extends through the table frame and is provided at its outer end with a roller 71. A comparatively strong spring 72 serves to maintain the roller 71 against an arm 92, which will be described in more detail hereinafter. In such event, the shaft 67 is maintained in alignment. However, the spring permits of withdrawal of roller 71 away from the frame to effect a misalignment of shaft 67. While I have found that ordinary steel shafts present sufficient resiliency to accomplish this, in certain circumstances a universal joint 73 may be inserted in shaft 67.

Shaft 67 is provided with a wheel 74, made of a suitable friction material. The wheel 74 engages the face of a disk 75 mounted upon a shaft 76. The shaft 76 carries a plurality of pulleys, shown in the drawings as four in number, although it will, of course, be appreciated that variations may be made in the number. In view of the permitted movement of the shaft 67, it will be observed that wheel 74 may be

thrown into or out of engagement with disk 75. Also, as clearly shown in Figure 9, the wheel 74 is preferably mounted on the shaft 67 by a set screw so that it may be adjusted longitudinally of the shaft to vary the speed of shaft 76.

Belts 78 are carried by each of the pulleys 77, and as clearly shown in Figures 1 and 2, these belts also pass over pulleys 79 which are mounted upon a shaft 81. The shaft 81 is supported by a bearing formed in standard 82, projecting from one end of the table 1.

It will be noted that the belts 78 serve as a conveyor to receive the sliced goods, and I preferably provide a shelf 83 which extends substantially the length of the upper part of the belts. Particularly to be noted is the proximity of the belts to the knife 31, and the slight distance that the slices have to fall. It is, of course, obvious that a single belt of sufficient width might be substituted for the several individual belts shown in the drawings.

I preferably provide for the passage along with the belt, of paper, cellophane, or other suitable wrapping material, so that the sliced meats will fall directly upon the packaging material. To this end, I rotatively mount upon a standard adjacent the pulleys 77 a roll of paper or cellophane 84. The paper or cellophane may be passed directly to the belts as they pass over pulleys 77, and to insure a smooth spreading of such paper or cellophane upon the belts, and its adhesion thereto, a pivoted roller 85 is provided. This roller 85 is of sufficient weight to press the paper or cellophane against the belts, to which it sticks until positively removed.

Although not essential, a tray 86 may be provided to catch scraps, as best shown in Figures 1, 9 and 10. Such a tray is desirable under certain circumstances in order that scraps, usually appearing at both ends of a piece of meat, may be diverted from falling upon the conveyor along with the desirable portions of the cut. The tray 86 is provided with an arm 87, the latter being pivoted upon a bracket 88. A rod 89 extends from arm 87 to a lever 91, which is pivoted to the table. It will be observed that movement of the arm 91, therefore, results in a pivoting of the tray 86. For instance, when the lever 91 is moved to the left of Figure 1, tray 86 is forced to a position such as shown in Figure 9. When the lever is moved toward the right of Figure 1, the tray 86 assumes the operative position shown in Figure 10, which is directly beneath the knife 31 as indicated by dotted lines in Figure 3. In this latter position, the tray will catch any slices from the knife.

The lever 91 also carries the projecting arm 92, heretofore referred to. The arm 92 has formed on its outer side a cam face 93, which is adapted to bear against roller 71. This cam face, it will be observed, serves to resiliently withdraw roller 74 from engagement with disk 75. Particularly to be noted is the fact that the disengagement of roller 74 and disk 75 occurs at the time that the tray 86 is in a position to catch slices of the meat. In other words, the conveyor stops when the tray is in operative position to catch the scraps. As soon as all of the slices from the objectionable portion of the meat have been caught in tray 86, the tray is removed to the position shown in Figure 9, and the conveyor started again. As a result, the succeeding slice is deposited upon the conveyor at the same place as if there had been no objectionable part.

It will be observed, of course, that if the tray

86 is not desired, it may be readily dispensed with, but in such event, lever 91, or some other suitable mechanism, must be retained for effecting movement of arm 92, and its cam face 93. In other words, I desire that suitable clutching means shall be employed so that, if desired, the conveyor may be stopped without interfering with operation of the slicing mechanism.

In order that the meat adjacent the knife 31 may be firmly held, I provide a slab 94 which extends between the angle irons 9. A weighted-block 95 rests upon the top of the meat. The block 95 is provided with a plate 96, and it will, of course, be appreciated that both plates 94 and 96 should be polished in order to reduce to a minimum friction between the meats and such plates. The block 95 is carried by a pair of arms 97 which are pivoted to brackets 98 mounted upon angle irons 9. The weight of the block 95 is such as to insure sufficient pressure upon the meat to maintain it in a fixed position at the time it is cut by knife 31.

It will, of course, be evident that suitable lubricating means, such as the grease cocks 99, are provided for the various journals and bearings.

Also, I desire that appropriate guards be placed around certain portions of my apparatus in order to prevent injury to operators, and preferably house the motor and its driving sprocket as shown in Figure 7.

It is believed that the operation of my invention is obvious from the foregoing. Initially, paper or cellophane 84 is fed between roller 85 and the various belts 78, and is extended out to a point beyond the knife 31, in order to receive the slices. A piece of bacon or other meat is positioned between the two tractors 16 and 25. The meat is preferably extended so that its forward end abuts against knife 31, and, as heretofore pointed out, block 95 will suffice to securely hold the meat. The upper tractor 25 is then adjusted by means of the knob 28, and is lowered to a point where it engages the top part of the meat. It will, of course, be appreciated that the weight of the upper tractor and its associated mechanism is sufficient to insure a tight engagement with the meat.

If it is not desired to include the first few slices from the end of the meat in the packaged product, the lever 91 may be thrown to the right in order to position the tray 86 beneath the knife 31, thus serving to catch the undesirable slices. As pointed out, when the lever 91 is thrown to the right, roller 74 is disengaged from disk 75, and operation of the conveyor thereby prevented. If, on the other hand, it is desired to include the end slices in the packaged product the lever 91 should be in its leftmost position, whereby the tray 86 is thrown outwardly from the knife, and the roller 74 is in engagement with disk 75.

Upon commencement of operations, clutch 46 should be in engaged position so that the tractors 16 and 25 are operated upon rotation of shaft 7. The motor 2 may then be started, and through the various gearing, shaft 7 will be rotated. As heretofore pointed out, this results in rotation of circular knife 31, and also, through the described gearing, the operation of tractors 16 and 25 will commence.

If it is desired to cease operations, either the motor may be turned off, which will stop all operations, or lever 53 may be manipulated to throw clutch 49 out of engagement to thereby stop the tractors 16 and 25, while the knife 31 continues to operate. If perchance, it should also be de-

sired to stop the conveyor, it is merely necessary to throw lever 91 to the right to disengage roller 74 and disk 75.

As heretofore stated, my invention is particularly applicable for use on bacon and similar meat products, where they are primarily packaged in paper or cellophane. For economies of speed, and also to enhance the keeping qualities, it is usually desirable that each strip of meat shall slightly overlap the preceding strip, such as shown in Figures 1 and 3. My invention finds particular application in such event because of the angle at which the meat is sliced. This angularity insures that the slices will automatically assume the position shown in Figure 3, thereby obviating the necessity of manually arranging the slices upon the paper or cellophane.

The sliced product will usually be put up in packages of certain sizes, such as, for instance, quarter-pound, half-pound or pound packages, and in such case my invention is particularly efficacious. Inasmuch as the slices are of substantially uniform size, the operator can determine the number of slices necessary for the desired size package. When this is determined, the slices may be deposited on the conveyor, in overlapping arrangement as heretofore mentioned, and in individual batches of the desired size. This is accomplished by merely stopping the operation of tractors 16 and 25, by throwing clutch 46 out of engagement, after the required number of slices have been cut. The knife 31 continues to rotate, but, of course, does not slice any of the meat, and the conveyor belts 78 continue their travel. Consequently, when the clutch 46 is thrown into re-engagement, a vacant space has been left on the conveyor belts between the several batches of the sliced product as shown in Figure 9. As the batch approaches the discharge end of the conveyor, the paper or cellophane may be severed intermediate the batches and each batch rolled or wrapped into independent packages.

Another improvement residing in my invention is the fact that the operation may be continuous. Additional strips of material may be inserted between the tractors 16 and 25, as the preceding strip is diminished without interrupting the operation. In other words, it is not necessary upon exhaustion of one strip to cease the operations and insert a new strip, as is customary in prior devices.

Also, as pointed out, the various sub-operations are capable of being carried out without interference with certain of the others. For instance, if desirable, either the conveyor or the tractors, or both, may be cut out of operation temporarily and without ceasing the operation of knife 31.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth, by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art, without departing from the spirit of the invention, or exceeding the scope of the appended claims.

I claim:

1. A meat slicing device comprising a table, upright members connected at their base by a pair of angle irons and at their upper ends by a pair of struts, parallel shafts journaled in said

angle irons and supporting an endless tractor member upon which rests the substance to be sliced, a rotary knife supported by said upright members and rotating in a path perpendicular to the upper supporting surface of said tractor and spaced from one end thereof to slice the substance carried by said tractor, a frame including elongated members attached at one end to the pair of struts and adjustably connected to said struts at the other end, said adjustable means including a screw threaded in said frame and abutting said struts, an inverted U-shaped member fixed to the adjustable end of the said frame, the legs of said U-shaped member extending downwardly towards the endless tractor at an end adjacent to the path of the knife, a second inverted U-shaped member having shorter legs than the first fixed to the frame at a point between the adjustable end thereof and the end attached to the strut, the legs of said U-shaped members supporting parallel shafts carrying a second endless tractor, the lower surface of which is inclined relative to the upper surface of the first tractor and bears against the upper side of the substance carried by the first tractor, means for driving said tractors to feed the substance towards the knife and means for rotating the knife.

2. A meat slicing device comprising a table, upright members connected at their base by a pair of angle irons and at their upper ends by a pair of struts, parallel shafts journaled in said angle irons and supporting an endless tractor member upon which rests the substance to be sliced, a rotary knife supported by said upright members and rotating in a path perpendicular to the upper supporting surface of said tractor and spaced from one end thereof to slice the substance carried by said tractor, a frame including elongated members attached at one end to the pair of struts and adjustably connected to said struts at the other end, said adjustable means including a screw threaded in said frame and abutting said struts, an inverted U-shaped member fixed to the adjustable end of said frame, the legs of said U-shaped member extending downwardly towards the endless tractor at an end adjacent to the path of the knife, a second inverted U-shaped member having shorter legs than the first fixed to the frame at a point between the adjustable end thereof and the end attached to the strut, the legs of said U-shaped members supporting parallel shafts carrying a second endless tractor, the lower surface of which is inclined relative to the upper surface of the first tractor and bears against the upper side of the substance carried by the first tractor, means for driving said tractors to feed the substance towards the knife, means for rotating the knife, a horizontal endless belt conveyor extending from a position beneath said endless tractors to a position beyond the cutting edge of the knife, a guard positioned about the knife adjacent the ends of the tractor members and said endless belt conveyor, to protect the operator, a scrap tray, means supporting said scrap tray in different positions to either receive scrap slices discharged from the knife or allow slices discharged from the knife to be received on the endless belt and automatic means operatively connected to the tray supporting means for stopping the movement of the endless belt conveyor when the scrap tray is in position to receive scraps from the knife.

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