

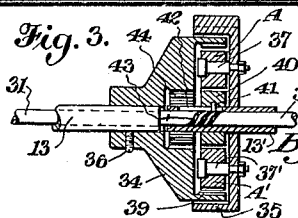
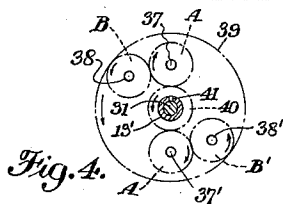
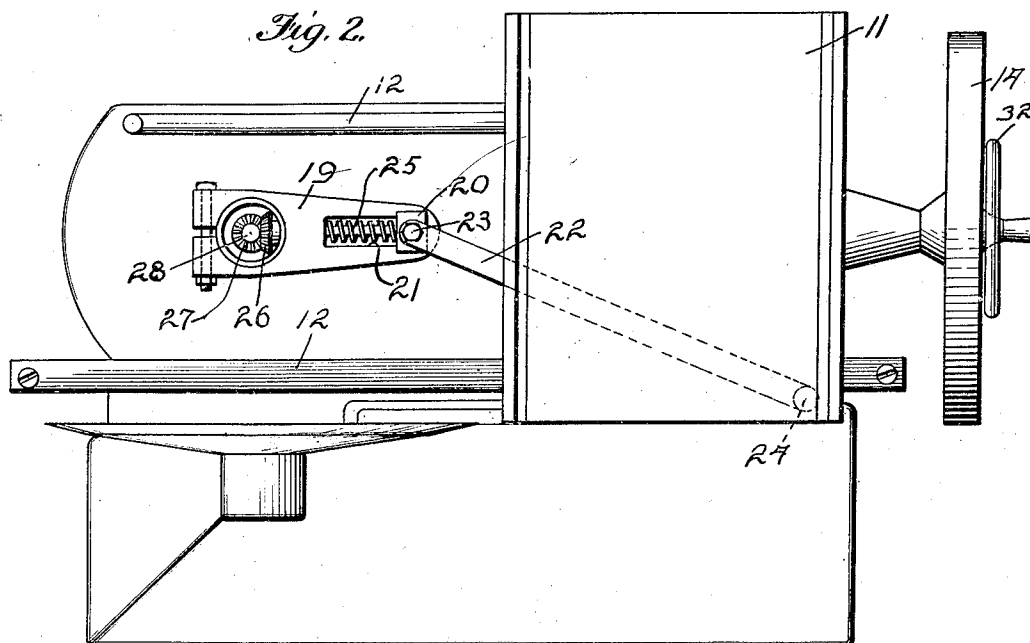
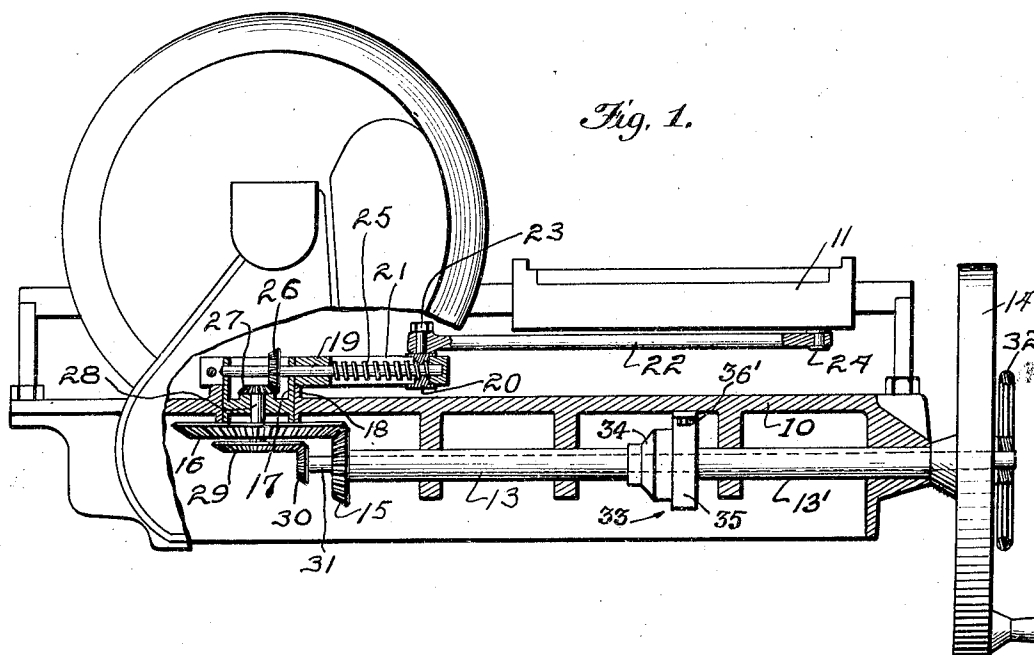
June 9, 1931.

A. VAN DUYN

1,809,430

SLICING MACHINE

Filed Jan. 20, 1927



Inventor
Adrianus van Duyn
By Nissen & Crane
Attys.

UNITED STATES PATENT OFFICE

ADRIANUS VAN DUYN, OF ROTTERDAM, NETHERLANDS, ASSIGNOR TO U. S. SLICING MACHINE COMPANY, OF LA PORTE, INDIANA, A CORPORATION OF INDIANA

SLICING MACHINE

Application filed January 20, 1927, Serial No. 162,229, and in Germany May 20, 1926.

This invention relates to slicing machines of the kind having a reciprocating part for effecting the slicing operation and has for its object the provision of means for adjusting the range and speed of reciprocation. Other objects will appear from the following description.

The invention is exemplified in the combination and arrangement of parts shown in the accompanying drawings and described in the following specification, and it is more particularly pointed out in the appended claims.

In the drawings:—

15 Fig. 1 is an elevation of a slicing machine with parts in section, showing one embodiment of the present invention;

Fig. 2 is a top plan view of the mechanism shown in Fig. 1.

20 Fig. 3 is a sectional view of the change speed gearing shown in Fig. 1; and

Fig. 4 is a diagrammatic view of the arrangement of the gears used to drive the crank at a slow speed and is a view looking 25 from the left of Fig. 3.

In the operation of slicing machines, as heretofore manufactured, in which the reciprocating table has a fixed range of movement, the movement must be great enough 30 to accommodate the maximum sized piece of material to be sliced by the machine and when a smaller piece is being sliced, a considerable portion of the reciprocating movement is wasted. In the present invention, 35 the range of reciprocation may be adjusted so that idle movement of the reciprocating parts is avoided. Means is also provided for speeding up the drive for the reciprocating part when the range of reciprocation is 40 decreased so that the actual rate of travel of the reciprocating part is not diminished when the range of movement is diminished.

The accompanying drawings show one embodiment of the present invention in 45 which the numeral 10 designates the base of a slicing machine having a reciprocating table 11 mounted to slide on ways 12. A hollow drive shaft, comprising sections 13 and 13', is journaled in bearings within the base 50 10 and is connected to a hand wheel 14 by

means of which the drive shaft is rotated. A beveled pinion 15 is connected to the drive shaft 13' and meshes with a crown gear 16 carried by a hollow stud shaft 17 journaled in a bearing 18 in the frame 10. A crank arm 19 is secured to the upper end of the shaft 17 and is rotated by the gear 16 when the hand wheel 14 is turned. A cross-head 20 is slidably mounted in a slot 21 in the crank arm 19 and a connecting link 22 is pivotally 55 connected to the cross-head 20 by a crank pin 23. The other end of the link 22 is pivoted at 24 to the reciprocating table 11. Rotation of the arm 19 therefore reciprocates the table 11 upon its guides 12. A 60 screw shaft 25 is journaled in the crank arm 19 and is disposed longitudinally of the slot 21. The screw shaft 25 has threaded engagement with the cross-head 20 so that rotation of the screw shaft will slide the cross-head in its guide slot 21. A pinion 26 is 65 secured to the screw shaft 25 and meshes with a pinion 27 carried by a shaft 28 which is journaled in and disposed concentrically with the hollow shaft 17. The 70 lower end of the shaft 28 carries a gear 29 which meshes with a pinion 30. The pinion 30 is carried on a shaft 31 which extends centrally through the hollow shafts 13 and 13' and carries a hand wheel 32 at 80 its outer end. It will be apparent that rotation of the hand wheel 32 will rotate the screw shaft 19 and adjust the cross-head 20, thus changing the effective length of the crank arm 19 and adjusting the range of 85 reciprocation of the table 11.

When a comparatively large piece of meat, such as a piece of bacon, is to be sliced, the cross-head will be disposed at the outer end of the slot 21, as illustrated in the drawings, and the table 11 will have its maximum 90 range of movement. If a smaller piece of meat, such as a piece of sausage, is to be sliced, the hand crank 32 may be rotated to move the cross-head 20 inwardly and thus 95 shorten the stroke of the reciprocating table. When the range of movement of the table is less, the complete stroke may be made in less time without increasing the cutting speed. For this reason, it is there- 100

fore desirable to speed up the rotation of the crank shaft when the length of travel of the reciprocating table is decreased. For this purpose, the two sections of the hollow drive shaft are connected by a variable speed device of any suitable construction, indicated generally at 33. Speed changing devices suitable for this purpose are commonly employed in the rear hubs of bicycles and are well-known in the art.

The speed changing device, indicated generally as 33 in Fig. 1, is more specifically illustrated in Figs. 3 and 4. In these figures, the change speed mechanism is shown comprising a member 34 rigidly fastened to the shaft 13 by means of screw 36, and a member 35 fastened by means of bolts 36' to the base 10. Rigidly fastened to the member 35 are the studs 37, 37', 38 and 38', upon which are rotatably mounted the gears A, A', B and B', respectively. The member 34 has two internal gears 44 and 39. A gear 40 is slidably mounted upon the hollow shaft 13' but is fixed so as to rotate thereby with means of the pin 41 fastened to the gear 40 and extending through a slot 42 in the shaft 13'. The pin 41 extends also into the helical groove 43 in the shaft 31. The gears B and B' are in constant mesh with the internal gear 39 on member 34 and the gear 40 is adapted to slide on the shaft 13' to alternately engage the gear 40 with the gears A and A' and gear 44 in a manner presently to be described.

The operation of the change speed mechanism is as follows:—With the parts shown in the position indicated in Figs. 3 and 4, the gear 40 is in mesh with the gears A and A'. Therefore, rotation of the shaft 13' by means of the flywheel 14, causes the member 34 to rotate in the same direction as the gear 40 through the intermediary of the gears A, A', B, B', and 39. This rotation is at a speed which is less than the speed of rotation of the shaft 13'. Consequently, the shaft 13 is rotated at a speed less than that of the shaft 13' since it is rigidly fastened to the member 34. This causes a slower reciprocation of the carriage 11 for the same speed of rotation of the shaft 13'.

Rotation of the shaft 31 in a counter-clockwise direction, as seen in Fig. 3, causes the gear 40 to slide along the shaft 13' into engagement with the internal gear 44 due to the engagement of the pin 41 with the spiral groove 43. This operation causes a direct connection between the shaft 13 and the shaft 13' so that the shaft 13 is driven at the same speed as shaft 13'. This speeds up the rotation of the crank 19 and if the length of the path of travel of the carriage 11 were the same, the movement of the carriage past the knife would be faster than where the shaft 13 was not directly connected to the shaft 13'. Since it is always de-

sirable to have the speed of movement of the carriage past the knife remain substantially the same, it is necessary to shorten the effective length of the crank 19 and this is done, as previously described, by moving the block 20 to the position nearest the center of the crank. This is automatically done as the gear 40 is shifted into engagement with the gear 44 because it is necessary at that time to rotate the shaft 31 and this, in turn, rotates the gear 30 and slides the block 20 to the position nearest the center of the crank, as previously described. Therefore, although the crank is rotating more rapidly than previously, the effective length of the crank arm is shorter and the carriage does not move through as great a distance and consequently the speed with which it moves past the knife is substantially the same as where the shaft 13 is driven through the gears 40, A, A', B, B', and 39.

Obviously, those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the claims hereto appended, and I therefore do not wish to be restricted to the precise construction herein disclosed.

I claim:—

1. A slicing machine comprising a reciprocating table, a rotary crank arm a hollow driving shaft for said crank arm, a cross-head slidably mounted in said crank arm, a link connecting said cross-head with said table, a rotary shaft concentric with said hollow shaft and having threaded connection with said cross-head for moving said cross-head along said crank arm, a hand wheel arranged at an easily accessible position on said slicing machine, and operative connection between said hand wheel and rotary shaft for rotating said shaft.

2. A slicing machine comprising a reciprocating table, a crank arm, a cross-head slidably mounted in said crank arm, a link connecting said cross-head and table, a screw shaft having threaded connection with said cross-head, a stud shaft co-axial with the axis of rotation of said crank arm, gearing connecting said stud shaft and screw shaft, a gear on said stud shaft, an operating shaft extending radially of said gear and having a pinion thereon meshing with said gear, and a hand device for rotating said operating shaft to adjust said cross-head along said crank arm.

3. A slicing machine comprising a reciprocating table, a crank arm, a link having one end pivotally connected with said table, a crank pin adjustable along said crank arm and having the other end of said link pivoted thereon, a hollow drive shaft for rotating said crank arm, means for adjusting said crank pin along said crank arm, and an op-

erating shaft for said adjusting means extending through said hollow drive shaft.

4. A slicing machine having a slicing knife and a work support arranged to reciprocate relative to each other for severing slices, means for adjusting the range of relative reciprocation of said knife and support, and means for changing the speed of relative reciprocation of said knife and support.

5. A slicing machine comprising a reciprocating member, a drive for said member, an adjustable connection between said drive and member for varying the range of reciprocation of said member, and a speed-changing connection between said drive and member for varying the relative speed of said drive and member.

6. A slicing machine comprising a slicing knife, a reciprocating table, a drive for said slicing machine, a rotary member operated by said drive for reciprocating said table, adjustable connection between said rotary member and reciprocating table for varying the range of movement of said table, and a speed-changing connection between said drive and rotary member.

7. A slicing machine comprising a slicing knife, a reciprocating table, a crank arm, a link having adjustable connection with said crank arm for reciprocating said table, a hollow drive shaft for rotating said crank arm, an operating shaft extending through said drive shaft, a connection between said operating shaft and crank arm for adjusting said link along said crank arm, a drive wheel for rotating said drive shaft, and speed-changing mechanism interposed between said drive wheel and drive shaft.

8. A slicing machine comprising a rotary slicing knife, a reciprocating table for presenting material to said knife to be sliced, a rotary crank arm having a cross-head adjustable longitudinally thereof, a link connecting said cross-head and table, a screw shaft for moving said cross-head along said crank arm, a hollow drive shaft for rotating said crank arm, an operating shaft extending through said hollow drive shaft, means connecting said operating shaft with said screw shaft to rotate said screw shaft from said operating shaft, a drive wheel, and variable speed connection between said drive wheel and drive shaft.

9. In a slicing machine, the combination with a slicing knife, of a work support, means for moving said slicing knife and work support relative to each other for severing slices from a substance mounted on said work support, and means for adjusting the range of relative reciprocation of said knife and support and simultaneously changing the speed of relative reciprocation of said knife and support.

10. In a slicing machine, the combination with a reciprocating member, of a drive for

said member, an adjustable connection between said drive and member for varying the range of reciprocation of said member, and a speed changing connection between said drive and member for varying the speed of said drive simultaneously with the varying of the range of reciprocation of said member.

11. In a slicing machine, the combination with a slicing knife, of a reciprocating table, a drive for said slicing machine, a rotary member operated by said drive for reciprocating said table, an adjustable connection between said rotary member and reciprocating table for varying the range of movement of said table, a speed changing connection between said drive and rotary member, and means for simultaneously changing the range of movement of said table with the changing of the speed by said speed changing connection.

12. In a slicing machine, the combination with a slicing knife, of a reciprocating table, a drive for said slicing machine, a pivoted member operated by said drive for reciprocating said table, an adjustable connection between said pivoted member and said reciprocating table for varying the range of movement of said table, and a speed changing connection between said drive and pivoted member operable to change the speed of reciprocation of said table simultaneously with the changing of said adjustable connection to vary the range of movement of said table.

13. A slicing machine comprising a rotary knife and a table movable relative to said knife so that slices may be cut from a substance on said table, means for causing relative reciprocation between said knife and table, adjustable to vary the extent of relative travel between said knife and table comprising pivotally connecting members which are also pivotally connected respectively to elements fixed with respect to said knife and said table, said members being movable about their common pivotal connection to cause relative reciprocation between said knife and table, means for varying the point of pivotal connection between said members to vary the extent of relative reciprocation between said knife and table, and means for varying the rate of relative movement between said knife and table.

14. A slicing machine comprising a rotary knife and a table movable relative to said knife so that slices may be cut from a substance on said table, and means for causing relative reciprocation between said knife and table, adjustable to vary the extent of the relative travel between said knife and table comprising pivotally connected members which are also pivoted respectively to elements fixed with respect to said knife and said table, said members being movable

about their common pivotal connection to cause relative reciprocation between said knife and table, means for varying the point of pivotal connection between said members to vary the extent of relative reciprocation between said knife and table, and means for simultaneously varying the speed of relative reciprocation of said knife and table.

15. A slicing machine comprising a rotary knife and a table movable relative to said knife so that slices may be cut from a substance on said table, and means for causing relative reciprocation between said knife and table, adjustable to vary the extent of the relative travel between said knife and table and to vary the rate of relative movement between said knife and table comprising pivotally connected members which are also pivoted respectively to elements fixed with respect to said knife and said table, said members being movable about their pivotal connection to cause relative reciprocation between said knife and table, means for varying the point of pivotal connection between said members to vary the extent of relative reciprocation between said knife and table, and means for simultaneously varying the speed of relative reciprocation of said knife and table to increase the number of relative reciprocations per unit of time simultaneously with a decrease in the extent of the relative reciprocation.

16. In a slicing machine, the combination with a reciprocating member, of a pivoted arm movable about its pivot for actuating said member, means for moving said pivoted arm, a link having an adjustable connection between said arm and said member, change speed mechanism for moving said arm to reciprocate said member through said link, means for varying the adjustable link connection between said arm and member to vary the extent of reciprocation of said member, and means for changing said change speed mechanism to vary the rate of reciprocation of said member.

17. In a slicing machine, the combination with a reciprocating member, of a pivoted arm movable about its pivot for actuating said member, means for moving said pivoted arm, a link having an adjustable connection between said arm and said member, change speed mechanism for moving said arm to reciprocate said member through said link, means for varying the adjustable link connection between said arm and member to vary the extent of reciprocation of said member, and means for changing said change speed mechanism to vary the rate of reciprocation of said member simultaneously with the change in the adjustable connection between said arm and member.

18. In a slicing machine, the combination with a slicing knife, of a work support, means for moving said slicing knife and

work support relative to each other for severing slices from a substance mounted on said work support, and a single means for adjusting the range of relative reciprocation of said knife and support and for simultaneously changing the speed of relative reciprocation of said knife and support.

In testimony whereof I have signed my name to this specification on this thirty-first day of December, A. D. 1926.

ADRIANUS VAN DUYN.

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