Feb. 23, 1932. J. FOLK 1,846,855

DRIVE FOR SLICING MACHINES

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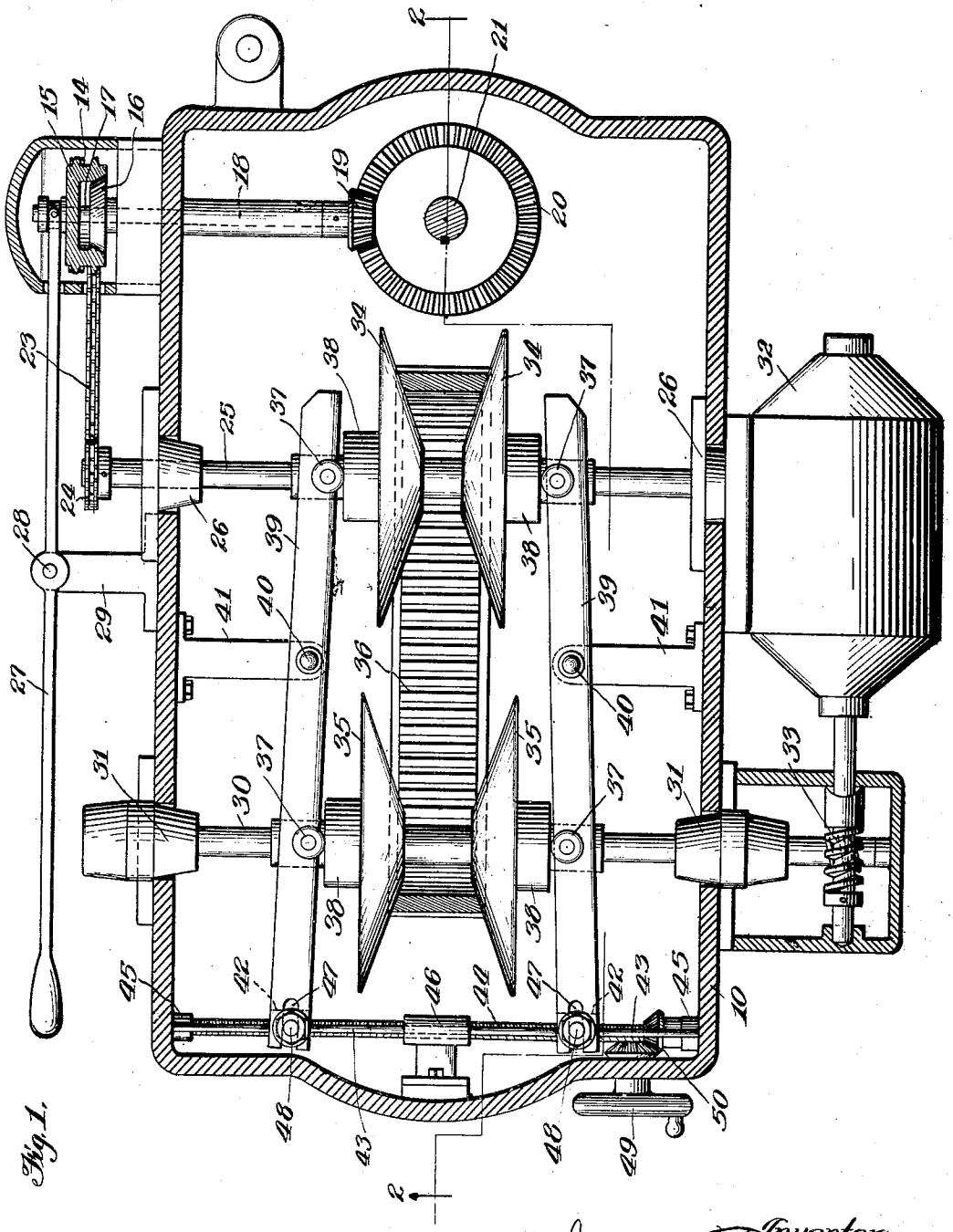


Fig. 1.

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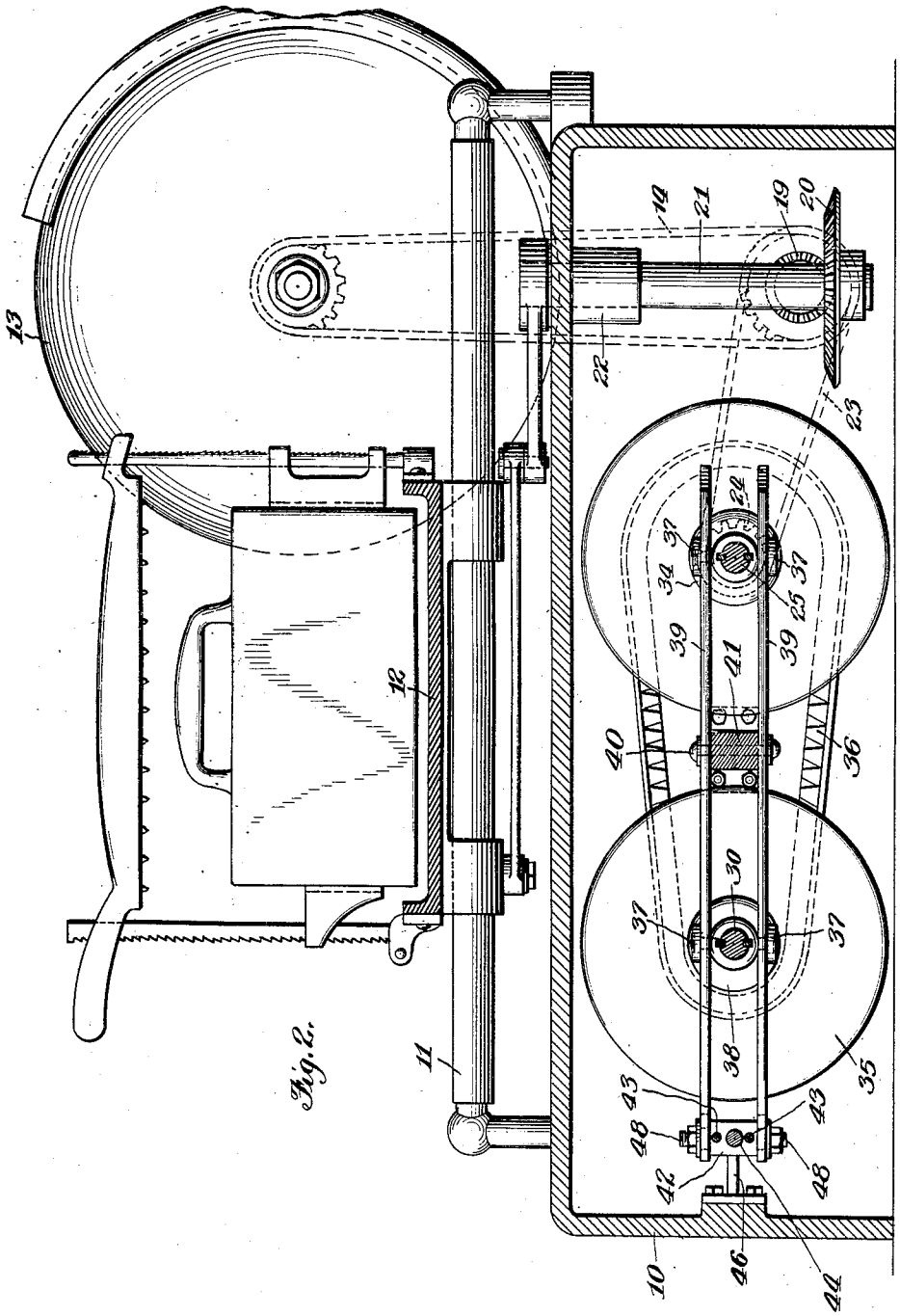


Fig. 2.

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UNITED STATES PATENT OFFICE

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DRIVE FOR SLICING MACHINES

Application filed November 8, 1926. Serial No. 146,918.

This invention relates to machines for slicing meat, bread, and other commodities, and has for one of its objects the provision of a power drive for such machines which shall be of improved construction and operation and which will permit continuous variation of the speed ratio between the motor and driven parts from a minmium to a maximum ratio.

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 claim.

In the drawings—

Fig. 1 is a horizontal sectional view through the base of a slicing machine showing the variable speed transmission for driving the machine; and

Fig. 2 is a section substantially on line 2—2 of Fig. 1.

In the operation of slicing machines it is found that different speeds are required for slicing different materials in order to secure the best results. Material which does not tear apart easily, such as dried beef, may be sliced at a higher rate of speed than other materials less tenacious, such as boiled ham or veal loaf. Different pieces of material of the same kind differ from one another, as for example, ham which contains a great deal of fat is less tenacious than ham which contains more lean meat. A ham which contains a great deal of fat is best sliced at a lower rate of speed than one which is more lean and the most advantageous speed will depend also upon the temperature of the material being sliced. Boiled ham, for instance, may be sliced at a higher rate of speed when chilled to a point near the freezing point, but if it is very warm the same rate of speed would tend to tear the slices apart. When a machine is operated by hand the speed may be readily regulated to correspond with the particular material being sliced, but where a constant speed motor is used for driving the machine it is desirable to have means for adjusting the speed ratio between the motor and the operating parts of the slicing machine. In order to secure the most suitable speed for various materials it is desirable that the variable speed drive shall be capable of fine adjustment between the limits of speed available.

Another advantage of the variable speed drive for a slicing machine is due to the fact that the speed of the motor will vary according to variations in the voltage and this may be compensated for by changing the speed ratio so as to secure the desired speed of operation irrespective of the variation in the speed of the motor. The voltage on any line is subject to fluctuations at different times and voltages of different power systems differ from one another so that without means for changing the speed ratio between the motor and operating parts, it will be necessary to design the motor or the reduction gearing for the particular circuit with which the machine is to be used. Where a variable speed drive is provided the motors may all be made the same and differences in voltages compensated for by variations in the speed ratio. The present invention provides a variable speed drive which is capable of continuous variation from minimum to maximum speed so that any speed ratio desired within the limits of the drive may be secured at any time.

The numeral 10 designates the base of a slicing machine having guides 11 thereon on which a reciprocating work support 12 is slidably mounted. The slicing machine is provided with the usual rotary slicing knife 13 driven by a sprocket chain 14 extending upwardly from a sprocket wheel 15 which is arranged to move into and out of driving engagement with a cone clutch 16. The clutch 16 is secured to a shaft 17 journaled in a bearing 18 supported within the base of the slicing machine. The inner end of the shaft 17 carries a bevel gear 19 which meshes with a crown gear 20 secured to an upright shaft 21 journaled in a bearing 22 supported by the top plate of the base 10. The sprocket wheel 15 is provided with a second set of sprocket teeth which engage a sprocket chain 23 which passes over a

sprocket wheel 24 on a drive shaft 25 journaled in bearings 26 supported by the side plates of the frame 10. A clutch lever 27 is pivoted at 28 on a bracket 29 carried by the base 10 and is arranged to shift the sprocket wheel 15 into and out of operative engagement with the cone clutch 16 to drive the shaft 17.

A shaft 30 is journaled in bearings 31 in the side plates of the base 10 and extends transversely of the base parallel to the shaft 25. A motor 32 is mounted on the side of the frame 10 and drives the shaft 30 through worm gearing 33. Splined on the shaft 25 is a pair of cone-shaped discs 34 having their conical surfaces facing each other. A similar pair of discs 35 are splined on the shaft 30. A belt 36 extends between the pairs of discs 34 and 35 and is provided with bevel edges which engage the conical faces of the discs. The discs 34 and 35 are held against separation from each other by rollers 37 which bear against the outer faces of hub members 38 connected with the respective discs 34 and 35. The rollers 37 are carried by lever arms 39 pivoted at 40 on brackets 41 projecting inwardly from the side walls of the frame 10. The levers 39 are held in adjusted positions by slide blocks 42 mounted to slide on guide rods 43 extending transversely of the base 10.

A screw shaft 44 is journaled in bearings 45 and 46 on the base 10 and has threaded engagement with the slide blocks 42. The opposite ends of the screw 44 are reversely threaded so that rotation of the screw in one direction moves the ends of the levers 39 toward each other and rotation of the screw in the opposite direction separates the ends of the levers. The levers are provided with slots 47 for engaging pins 48 carried by the slide blocks 42. A hand wheel 49 is journaled in the end of the frame 10 and is connected by bevel gears 50 with the screw 44 to facilitate rotation of the screw in either direction. It will be readily understood that by rotation of the screw in one direction the levers 39 will be swung about their pivots 40 to move the cones 35 inwardly toward each other and at the same time the opposite ends of the levers 39 will be separated to permit separation of the cones 34. As the cones 35 approach each other the belt 36 will be caused to travel outwardly to a greater diameter of the cones 35 and at the same time the cones 34 will be separated to permit the opposite end of the belt to travel inwardly to a position on the cones 34 having less diameter. The movement of the belt is continuous through all intermediate positions so that a continuously variable speed ratio is secured between the shaft 30 and the shaft 25. To increase the speed ratio the hand wheel 49 is rotated in one direction and to decrease the speed ratio the hand wheel is rotated in the opposite direction. Since the variation is continuous it is apparent that an infinite number of ratios is available and the speed may be adjusted with a great degree of accuracy to any ratio required.

Since the reciprocating table is driven by the shaft 17 through the upright shaft 21 and since the knife 13 is driven directly from the sprocket wheel 15, it is apparent that by releasing the clutch 16 the reciprocating table may be permitted to remain stationary while the knife continues to rotate. This would relieve the power drive from its heaviest load and from sudden changes in the load due to reversal of direction of movement of the reciprocating table to facilitate shifting of the discs 34 and 35, when desired. The arrangement also makes it possible to permit the reciprocating table 12 to remain stationary at the end of its guides away from the knife 13 so that the knife may be ground or cleaned without danger of material dropping from the knife onto the meat or other commodity carried by the reciprocating table. This is of great advantage in many cases, for the reason that it is inconvenient to remove the meat for grinding the knife, and if the table is permitted to continue reciprocation during the grinding operation, there is danger that particles of the grinding stones and steel will fall upon the meat.

I claim:—

The combination with a slicing machine having a rotary knife and a reciprocating table, of mechanism for driving said knife and table, said mechanism comprising a driven shaft having a toothed sprocket thereon, a clutch element having a double row of sprocket teeth thereon, a shaft connected with said table having a clutch element co-operating with said first-mentioned clutch element, a sprocket chain meshing with the sprocket teeth on said driven shaft and with one of said rows of teeth on said clutch element, and a second sprocket chain meshing with the other row of teeth on said clutch element to form a driving connection with said knife.

In testimony whereof I have signed my name to this specification on this 4th day of November, A. D. 1926.

JOSEPH FOLK.