Jan. 2, 1940. R. J. BEUTEL 2,185,744

BREAD SLICING MACHINE

Filed Jan. 2, 1936 2 Sheets-Sheet 1

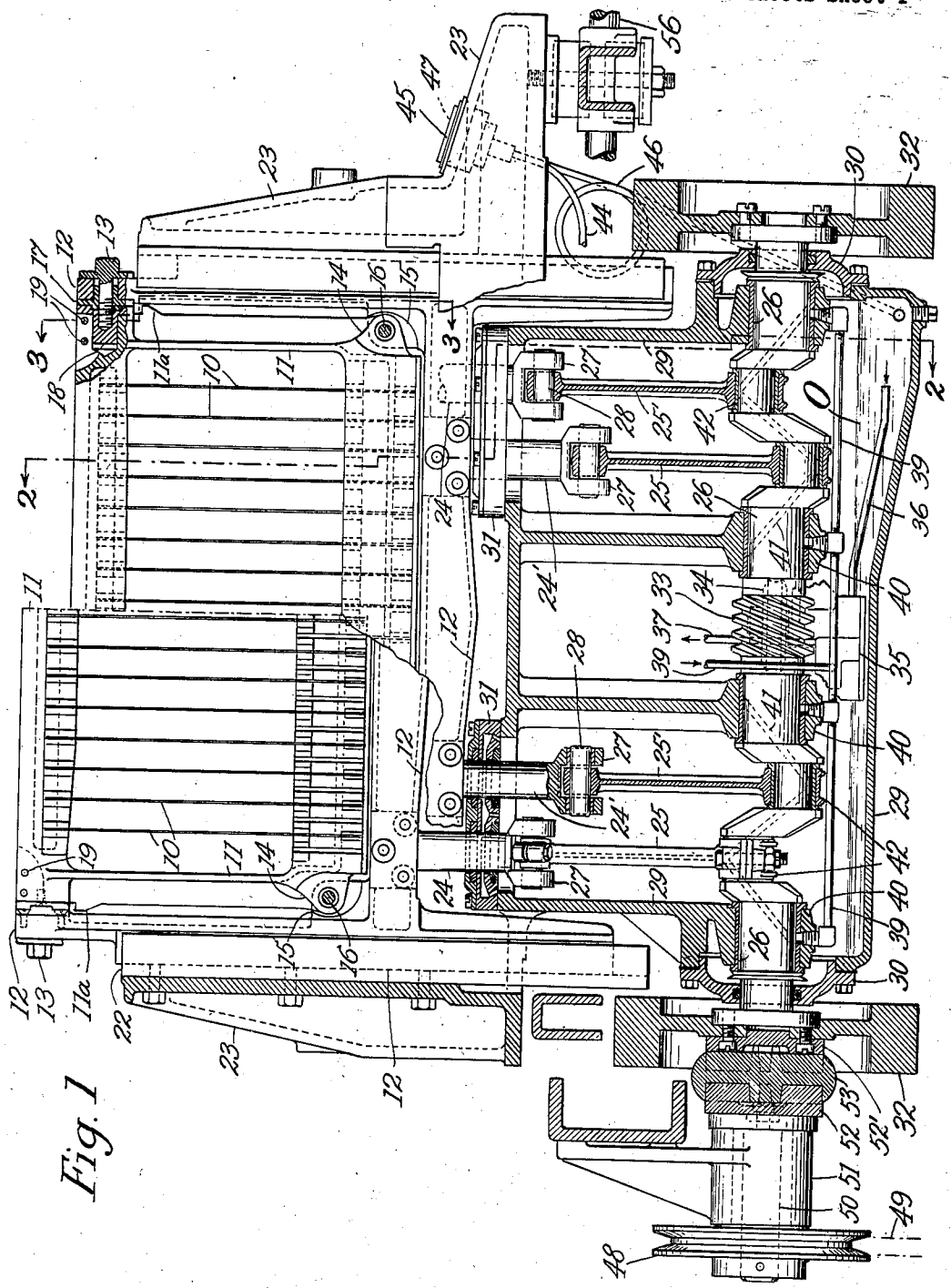


Fig. 1

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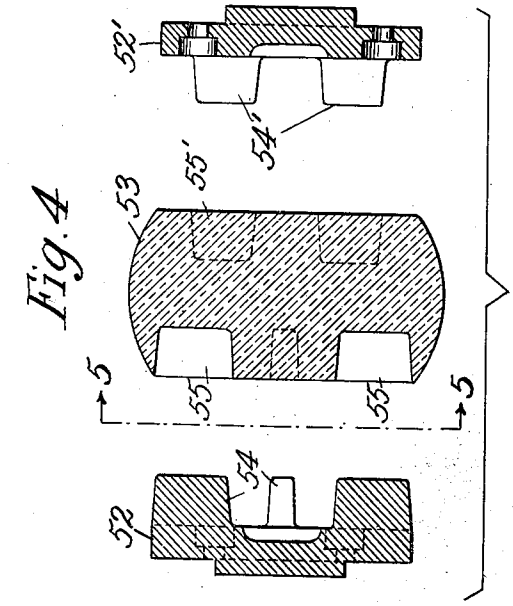



Fig. 4

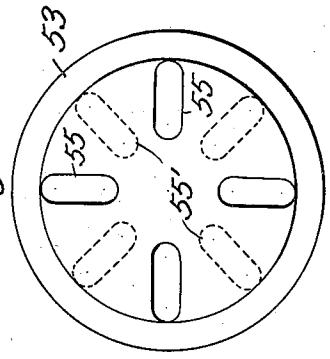



Fig. 5

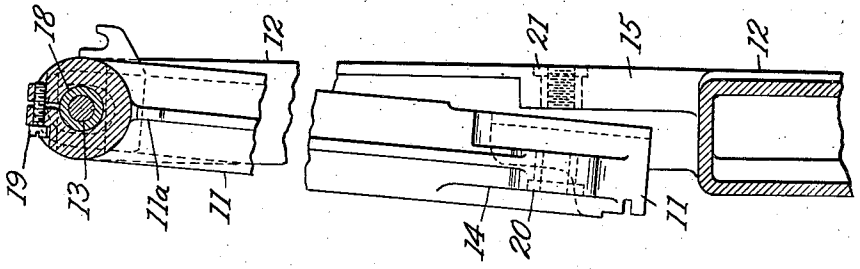



Fig. 3

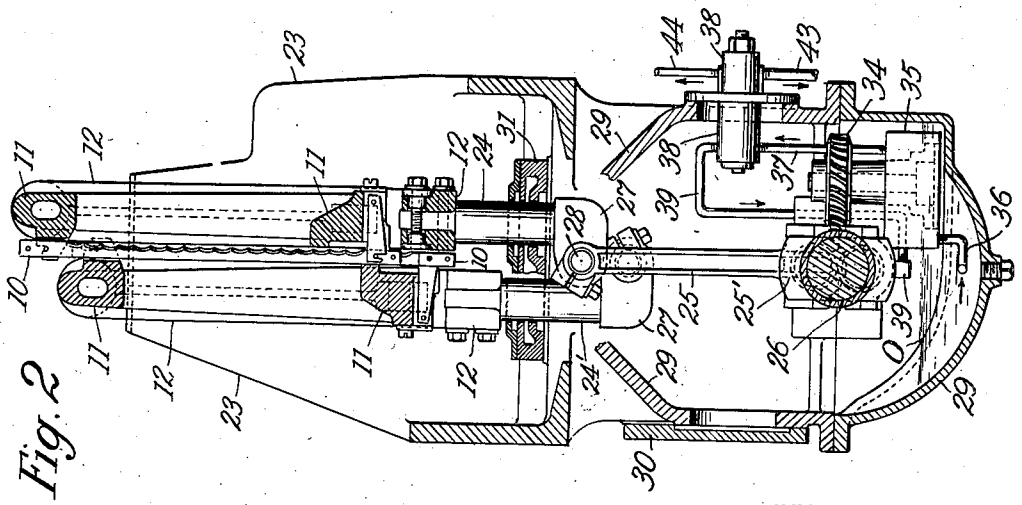



Fig. 2

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# UNITED STATES PATENT OFFICE

2,185,744

## BREAD SLICING MACHINE

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Application January 2, 1936, Serial No. 57,081

4 Claims. (Cl. 146—153)

This invention relates to slicers, more particularly to bread slicing machines of the type in which two sets of straight slicing knives are oppositely moved, its main object being to provide a simplified slicer having a longer stroke and in which the wear of the moving parts is reduced to a minimum. To this end a pair of cradles each carrying a knife frame is rigidly connected to cross-heads reciprocated from a common crank-shaft or other suitable eccentric member and the cradles slide in guides which take up and over which the side thrust of the crank-shaft is distributed. Heretofore, this side thrust was applied to the stuffing-boxes of the crank case in which the cross-heads slide, and the wearing of the stuffing-boxes was found to be excessive and objectionable. In the present construction, the cross-heads may be guided in stuffing-boxes provided on the crank case, but due to the rigid connection of the cross-heads with the cradles, substantially the entire side thrust is imparted to the guides.

A further object of the invention is to minimize the side thrust of the crank-shaft, and to this end the latter is linked to the cross-heads by wrist-pins which are offset inwardly on their respective cross-heads.

Still another object of the invention is to lubricate the crank-shaft and connecting rod bearings. With this end in view, an oil pump is provided within the crank case and connected to the desired bearings for delivery of lubricant thereto.

An auxiliary object is the provision of an oil-tight crank case. For this purpose stuffing-boxes of novel construction are employed wherein the cross-heads protrude through an internal gland and an outer gland or cover, the outer glands serving to keep crumbs out of the stuffing-boxes and the inner glands being perforated to permit return of the oil collected from the cross-head to the crank case.

Other objects are to circulate the lubricant through an oil filter and stabilize the rotation of the crank shaft by mounting fly-wheels on each of its ends.

To prevent communication of the vibration of the slicer to the bed of the wrapping machine, if used in combination with the same, or to the bakery floor if used independently, the crank shaft is connected to the drive shaft through a rubber coupling. A further object, therefore, is to provide a novel coupling of this nature.

Supplementary objects are to permit the knife frames to be inserted or withdrawn horizontally from their cradles without being lifted or slid vertically, and relieve the shearing stress imposed on the members which lock the knife frames to their cradles, these members extending transversely of the path of reciprocation of the cradle and the stress which would otherwise be imposed on them being injurious.

With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

Generally stated, in the embodiment of the invention herein illustrated, the cradle is reciprocated in guides on which the side thrust of the crank-shaft or other eccentric driving member is imposed. In the best constructions contemplated there is provided a pair of cradles each carrying a knife frame and actuated from a common crank-shaft, the latter being linked to cross-heads rigidly connected to the cradles, by connecting rods pivoted on wrist-pins offset towards the crank-shaft on their respective cross-heads. The crank-shaft, in the best constructions, is connected to the drive shaft through a rubber coupling member which prevents transmittal of the vibration of the slicer therethrough.

The slicer may be widely varied in construction for the specific structure selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention therefore is not to be restricted to the details illustrated and described nor to the particular embodiment chosen as illustrative of the invention.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts: slicing unit embodying the invention;

Fig. 1 is a sectional side elevation of a bread-slicing unit embodying the invention;

Fig. 2 is a sectional end elevation on line 2—2 of Fig. 1;

Fig. 3 is an end elevation on line 3—3 of Fig. 1, the knife frame being shown swung out of its normal position to reveal details of its connection to its cradle;

Fig. 4 is an exploded sectional side elevation of the coupling between the driven and crank-shafts of the improved slicer unit; and

Fig. 5 is an end elevation of the coupling member, on line 5—5 of Fig. 4.

Referring to Figs. 1, 2 and 3, two sets of spaced slicing knives 10 are supported in a well known manner on knife frames 11 removably mounted on cradles 12, the frames 11 being locked to the

cradles by cap pivot screws 13 and having ears 14 engaging with lugs 15 of the cradles 12 whereon they are held in place by lag screws 16, (see Fig. 1). The screws 13 pass through flanged steel bushings 17 in the cradles 12 and are threaded into steel sockets 18 clamped between flanges on the frames 11 by screws 19. The inner flanges of the bushings 17 each have a transverse tongue fitting a groove in the head of the adjacent socket 18 and serving to relieve the shearing stress which would otherwise be imposed on the screws 13 when the cradles are reciprocated. Upon removing the screws 13 and 16 the knife frames may be withdrawn horizontally from their cradles and replaced by a similar knife frame having a different spacing of slicing knives. During the insertion and withdrawal of the knife frames the engagement of the tongues of the bushings 17 with the grooves of the sockets 18 serves to guide and support the knife frames and facilitates their exchange.

The ears 14 and lugs 15 are likewise equipped with steel bushings 20 and sockets 21 since the frequent manipulation of the screws 13 and 16 would otherwise cause excessive wearing of the cradles and knife frames, especially when the same are formed of aluminum alloys or other light weight material. To aid in locating the knife frames for insertion into their cradles, their vertical strengthening ribs are provided with outwardly projecting noses 11a which may be brought into engagement with the inner flanges of the bushings 17 to align the grooves of the sockets 18 with the tongues of the former, whereupon the knife frame is moved transversely to insert it into its cradle.

The cradles 12, which are slidable in guides 22 attached to the slicer frame 23, are clamped or otherwise rigidly mounted on pairs of vertical cross-heads 24, 24' actuated by connecting rods 25, 25' from a crank-shaft 26, the cross-heads 24, 24' being provided with pairs of flanges 27 carrying wrist-pins 28 on which are pivoted the connecting rods 25, 25'. The cross-heads 24, 24' by this arrangement have a straight reciprocating instead of an oscillating motion as heretofore, whereby the side thrust of the connecting rods on the cradles 12, due to the rigid connection of the latter with the cross-heads, is distributed over the entire extent of the guides 22. By distribution of the force of the side thrust in this manner, the friction of the cradles in their guides is appreciably reduced. Moreover, by offseting the wrist-pins inwardly toward the crank shaft as shown, the force of the side thrust is reduced and the cradles will always move in opposite directions if connected to diametrically opposite cranks on the crank-shaft. The crank-shaft 26 is mounted in the bearings of a crank case 29 which forms part of the bed. The crank case is made oil-tight by gasket-fitted seals 30 through which the ends of the crank-shaft protrude and novel stuffing-boxes 31 in which the cross-heads slide. To stabilize the motion of the cradles 12 a fly wheel 32 is mounted at each end of crank-shaft 26.

On the crank-shaft is mounted a worm 33 meshing with a worm wheel 34 driving a pump 35 of the impellor type which removes the oil O from the crank case through the inlet pipe 36 and forces the same through outlet pipe 37 into an adjustable relief valve 38 of conventional construction from which it is conducted by distributing pipes 39 into the crank-shaft bearings 40 and, through ducts 41 in the crank-shaft, into the connecting rod bearings 42. A portion of the stream of oil issuing from relief valve 38 is fed by a pipe 43 to a filter (not shown) whence it returns to the crank case sump. From relief valve 38 a pipe 44 leads to a pressure gauge 45, and from the crank case sump a pipe 46 leads to a temperature gauge 47, both gauges being mounted side by side on the slicer frame 23. If desired the lubricant may be conducted from the connecting rod bearings through tubing 41x (Figs. 1 and 2) fastened on the connecting rods to ducts in the wrist-pins communicating with their bearings; and the lubricant may be similarly conducted from the crank shaft bearings to the cradle guides although ordinarily a little grease will provide sufficient lubrication of the latter.

The pulley 48 mounted on a shaft 50 supported in a bearing 51 is driven by a belt 49 from a separate motor (not shown), the shaft 50 being concentric with crank shaft 26 and connected to the same through a flexible coupling consisting of two male clutch members 52, 52', Fig. 4, formed of steel or other suitable material and attached to the ends of shafts 50 and 26, and a floating soft rubber female coupling member 53, Figs. 4 and 5, the members 52, 52' having jaws 54, 54' fitting into depressions 55, 55' of the member 53. When the slicer unit is used in combination with a wrapping machine, it may be put out of operating position by shifting the frame 23 on its support rods 56, whereby the clutch member 52' is disconnected from the coupling member 53 as it moves with the crankshaft 26. Upon opening a switch by the same movement, the driving motor may likewise be disconnected.

When the slicer unit has been shifted, the flywheels are exposed for ready removal, thus facilitating assembly and disassembly of the flywheels and associated structures.

It will be understood that the device described may be incorporated in combined bread slicing and wrapping machines, or used as an independent slicer. In the latter case there will be provided an inclined chute and, if desired, a loaf feed serving to advance the loaves to and through the slicer knives, that shown in my co-pending application S. N. 752,344, filed November 9, 1935, being suitable for this purpose. For use with combined slicing and wrapping machines, the slicer may be provided with a table through slots of which the slicing knives pass and over which the loaves are advanced on their way to the wrapper mechanisms, as shown in British Patent No. 405,344, January 22, 1934.

What is claimed is:

1. In a slicer of the type comprising a reciprocable blade carrier, a set of guides having sliding contact with said blade carrier, and arranged to confine it to a rectilinear path, and a crank-shaft enclosed within a crank case adapted to hold a supply of lubricant; lubricant controlling means, including a stuffing box on said crank-case, and a plunger connected with said crank-shaft and protruding through said stuffing box, carrying a cross-head connected to said blade carrier; said stuffing box including a cover having an orifice through which said plunger passes with a slip fit, and an internal gland through which the plunger likewise passes, said internal gland being spaced from the cover-orifice and being fitted to strip from said plunger the major portion of the lubricant thereon, derived from the crank-case, but allowing a moiety of lubricant to remain on the plunger, the gland having perforations to permit

return to the crank-case of lubricant collected in the space between the gland and cover parts; said gland being of crumb-excluding construction to bar access to the crank case of crumbs from the sliced bread, and forming with the cover a unitary stuffing-box structure separable as such from said crank case; and means to secure said structure removably upon the crank case.

2. In a slicer, the combination with a cradle, of mechanism for reciprocating the cradle edgewise, a knife frame, a set of knives carried by said frame, screws extending transversely of the path of reciprocation of said cradle and connecting the latter and the knife frame, and bushings on said screws extending from the cradle into the knife frame to relieve the shearing stress on said screws, and lugs on said knife frame arranged to engage the cradle and aid in locating the knife frame in the proper position for insertion into the cradle, said knife frame having a transverse groove and each bushing having a flange adapted to enter said groove, to hold said parts in their intended positions.

3. The combination with a drive shaft, of a slicer unit movable in and out of operative position; rails to support said slicer unit for such movement in alignment with said drive shaft; said slicer unit including a crank shaft aligned with said drive shaft, and a flexible coupling mounted on said drive shaft, said flexible coupling comprising a member adapted to be fixed upon said drive shaft and having spaced studs extending toward the crank shaft, another member adapted to be fixed upon said crank-shaft and having studs extending toward the drive shaft, and an intermediate member made of elastic material and having recesses to be engaged with said studs on each of said members only when said slicer unit is moved into its operative position, relatively to the drive shaft, the removal of said slicer unit in alignment with said drive shaft causing at least one set of said studs to be withdrawn from their recesses in said elastic member, thus uncoupling the shafts and incapacitating the slicer, while the uncoupled shafts remain in alignment ready for recoupling.

4. A slicer comprising a pair of oppositely disposed knife frames, means mounting said frames for reciprocating movement in spaced parallel planes, a single crank shaft having its axis parallel to said knife frames and disposed in the extension of an intermediate plane lying midway between and parallel with the planes of the frames, connecting rods pivotally mounted on said single crankshaft and having wristpins reciprocable in said intermediate plane, and cross heads with connections to said knife frames and said wristpins, whereby the knife frames are reciprocated in symmetrically opposed balanced relation at each side of said plane in which said wristpins reciprocate, and in which the axis of said crankshaft is disposed.

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