

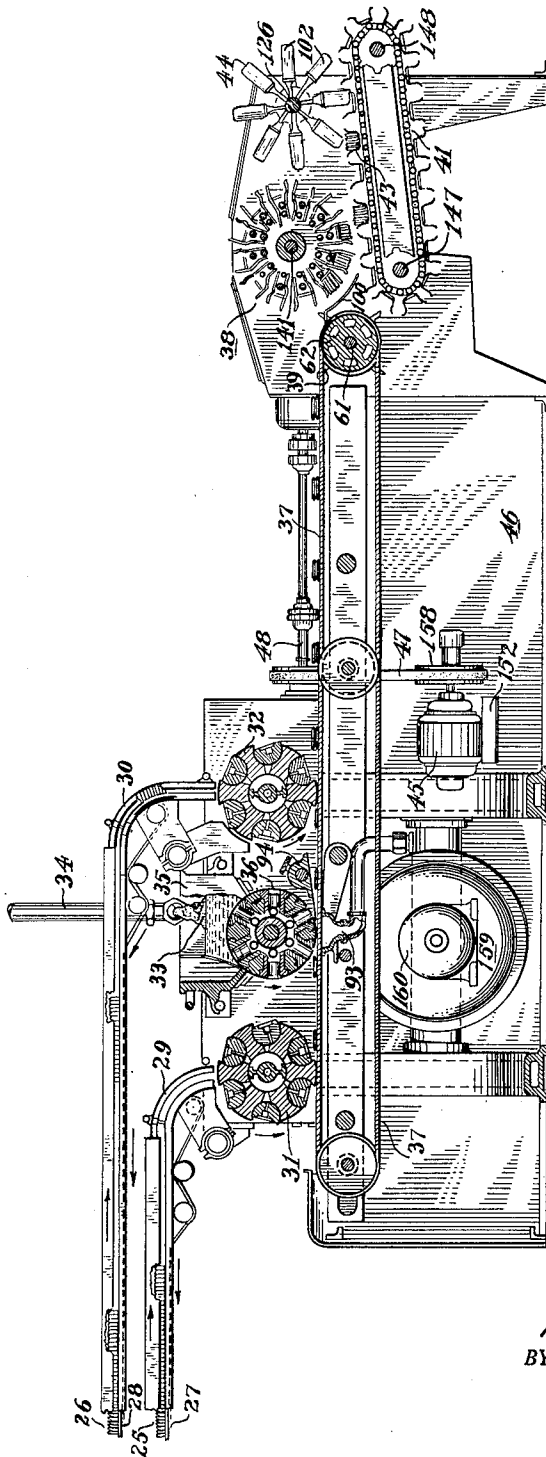
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SANDWICH MACHINES

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5 Sheets-Sheet 1



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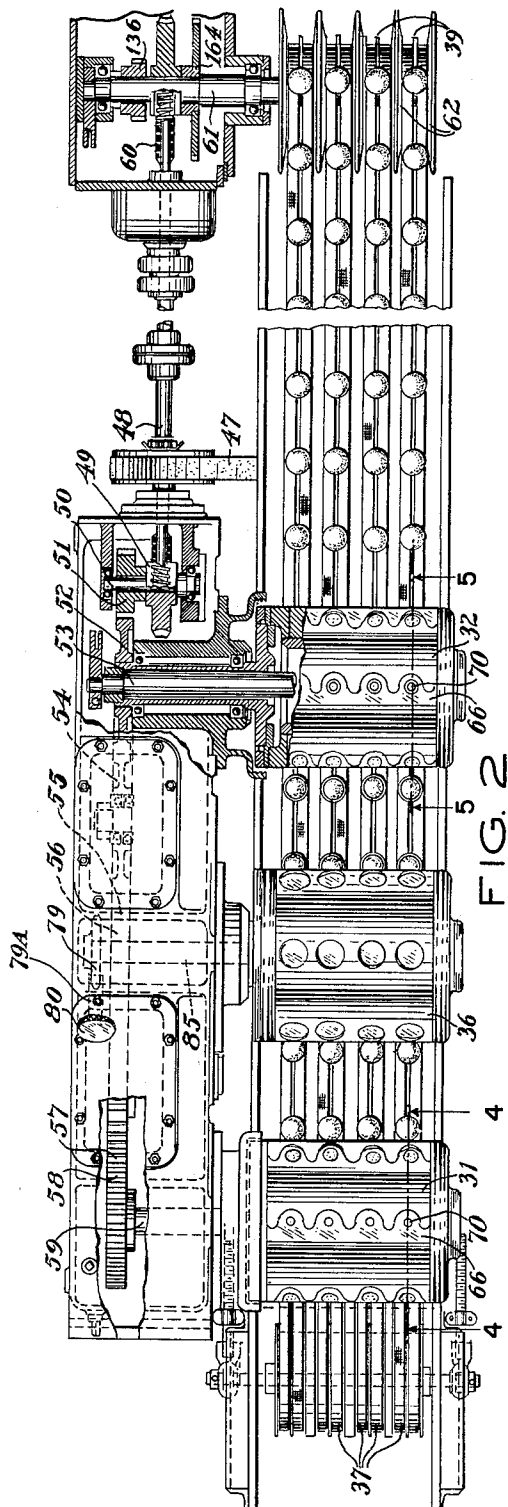


FIG. 2

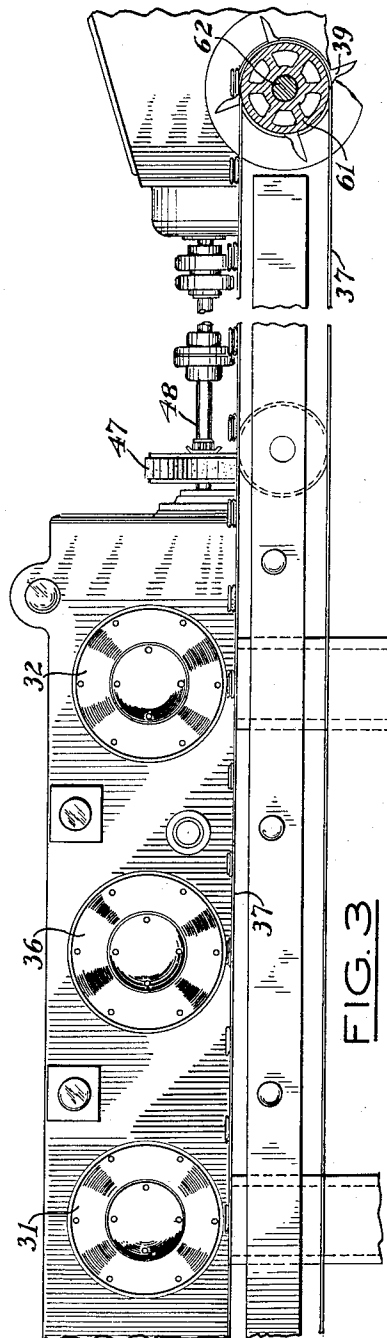


FIG. 3

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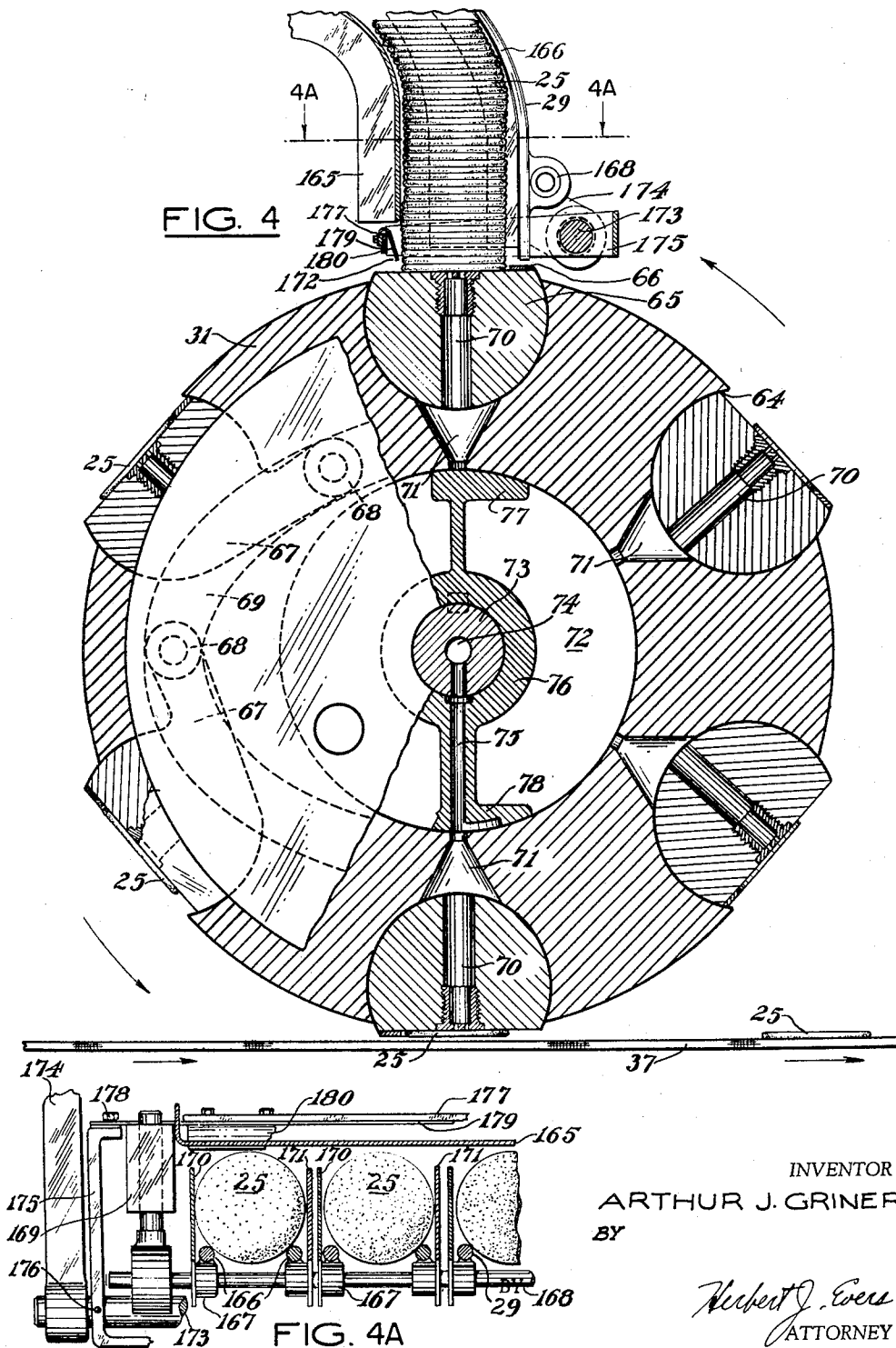
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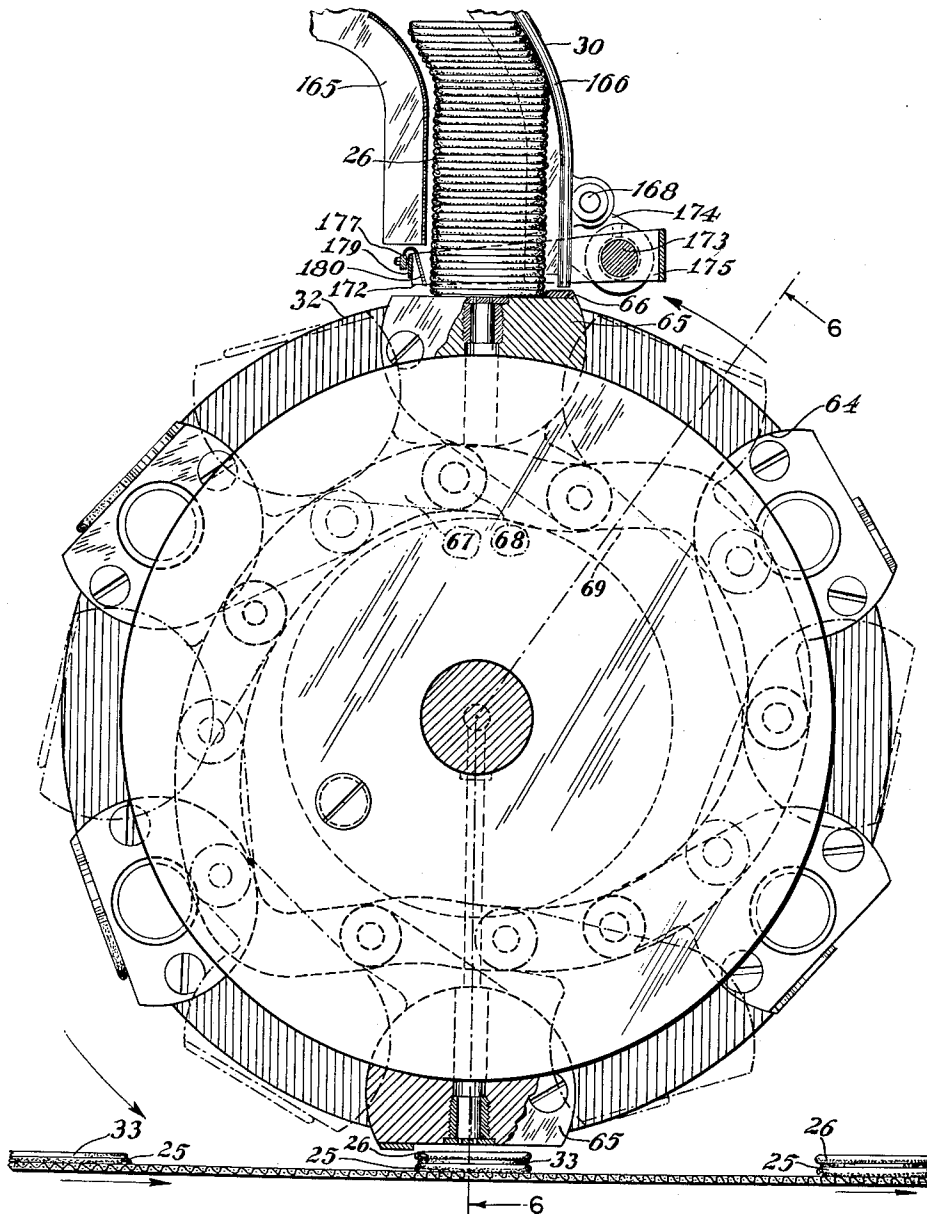


FIG. 5

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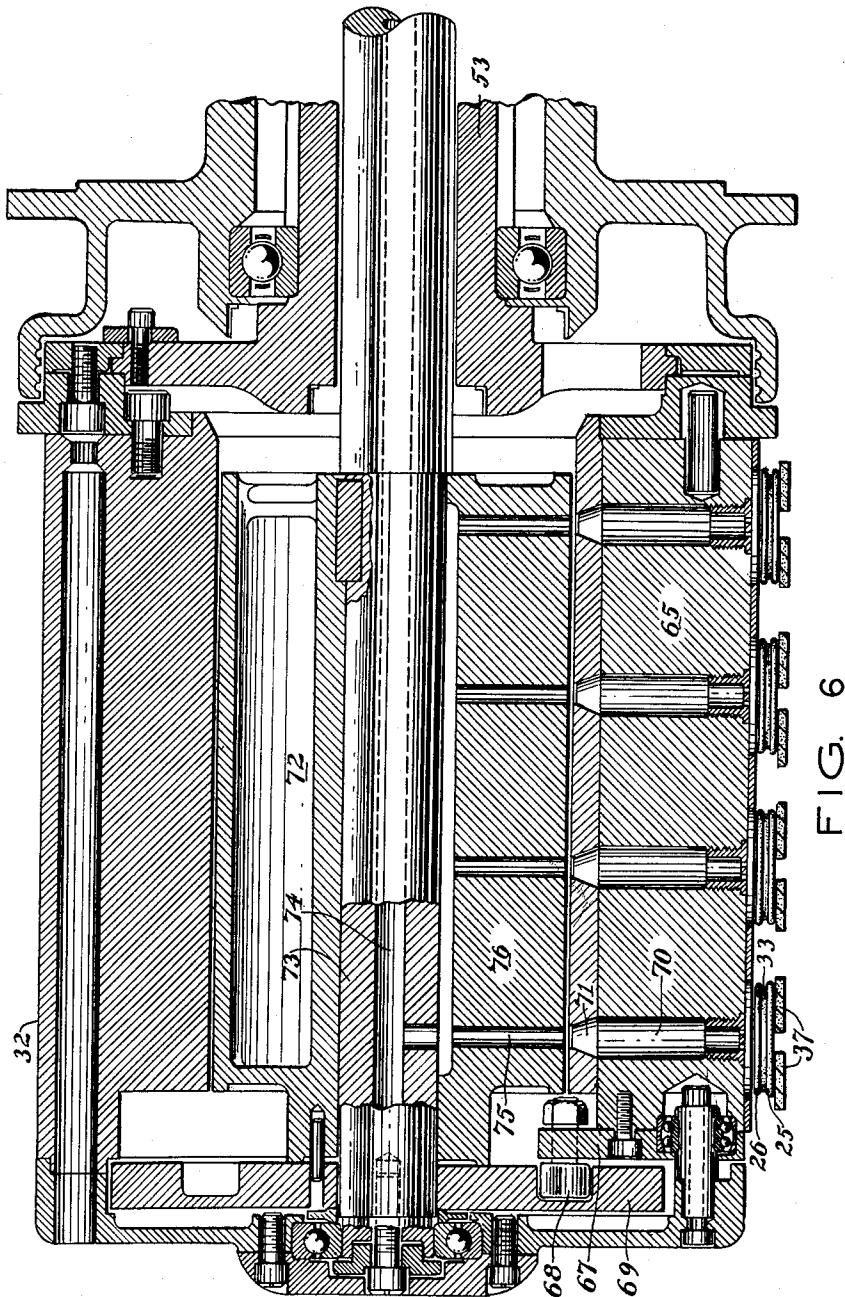


FIG. 6

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3,013,693

SANDWICH MACHINES

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Divided and this application Jan. 12, 1959, Ser. No. 791,785

4 Claims. (Cl. 221-211)

This invention relates to sandwich machines, and particularly to a machine that receives base cakes, crackers, cookies or the like at one end, forms them into sandwiches with an interposed filler and delivers the completed sandwiches arranged in stacks or groups of a predetermined number at the other end, ready to be wrapped or otherwise enclosed to form packets or individual servings.

In recent years, the demand by the lunch counter and restaurant trade for small packets each containing an individual serving of cookie or cracker sandwiches has increased so rapidly that high speed machines are necessary for production adequate to meet the demand. The present invention makes this possible by producing stacks of sandwiches at a rate higher than has ever been attained before and at a reduced cost. The invention also produces a superior product, in that the sandwiches are more uniform, the top and bottom cakes are in better registry, loss due to breakage and imperfect sandwiches is reduced substantially to the vanishing point and fewer operators are required.

In a preferred embodiment of the invention, the top and bottom covers of the sandwiches, which are termed cakes or base cakes, are fed by belts in a number of continuous rows to two continuously rotating feed cylinders spaced apart in the line of travel of the cakes and between which is a filler cylinder. Each feed cylinder has as many circumferential rows of cake holders as there are rows of cakes fed to it. The first cylinder removes a cake from each row and deposits it on an endless belt running just below all three cylinders. This belt runs at the same speed as the peripheral speed of all the cylinders. As the cake deposited on the belt by the first feed cylinder passes beneath the filling cylinder, it receives a measured quantity of filler and then is carried by the belt under the second feed cylinder where the top or cover base cake is placed on it to complete the sandwich. The sandwiches are then carried on by the belt to its delivery end and there transferred to a collecting or grouping cylinder which is timed so that as soon as each holder receives a group of sandwiches sufficient to form a packet or serving, usually four or five, the group will be delivered to a flight chain to be carried on to a packaging machine. The entire operation of forming and grouping the sandwiches is performed automatically and manual operation is entirely eliminated.

The invention may be embodied in many forms of apparatus and in the accompanying drawings there is illustrated a preferred form thereof to which reference is made for a full disclosure.

FIG. 1 is a longitudinal sectional view of a complete machine, wherein the base cakes are supplied to the feed cylinders from continuously driven overhead belts;

FIG. 2 is a plan, partly in section, of the left-hand end of the structure shown in FIG. 1, with the delivery chutes and hopper omitted;

FIG. 3 is a side elevation of the structure shown in FIG. 2;

FIG. 4 is an enlarged section of the first feed cylinder, shown at the left-hand side of FIGS. 1 and 2, taken substantially on the line 4-4 of FIG. 2;

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FIG. 4A is a cross section of one of the feed chutes, taken on line 4A of FIG. 4;

FIG. 5 is an enlarged section of the second feed cylinder shown at the right-hand side of FIGS. 1 and 2, taken substantially on the line 5-5 of FIG. 2;

FIG. 6 is a longitudinal sectional view of one of the two similar feed cylinders, in this case the second one, taken substantially on the line 6-6 of FIG. 5.

General description

Referring first to FIG. 1, base cakes 25, 26, which may be crackers, cookies, wafers or the like stacked on edge, are carried by belts 27, 28 in a continuous horizontal column to delivery chutes 29, 30, which turn the cakes so as to present them in vertical stacks to the respective feed cylinders 31, 32. Filling material 33, such as peanut butter, fondant, or other suitable substance, is supplied by a pipe 34 to a hopper 35 from which pockets of an intermediate filler cylinder 36 are filled.

All of the cylinders 31, 32 and 36 rotate counter clockwise as shown in FIG. 1 and at the same speed. Beneath the cylinders is the top run of a conveyor 37, that consists of a number of endless belts, one pair for each circumferential row of cake feeding units in the cylinders, see FIGS. 2, 8 and 10. The conveyor 37 is driven at the same speed as the peripheral speed of the cylinders 31, 32, 36 and in the same direction as their lower surfaces. The horizontal distance between the axes of the three cylinders cake from the stack as the bar passes therebeneath. At 31, 36 and 32 is an exact multiple of the circumferential distance between the feeding units in the respective feed cylinders so that exact registry of the cakes on the conveyor 37 with the filling units will be obtained. The axes of the cylinders are adjustable to obtain and maintain this registry at all times.

The conveyor 37 receives the cake to form the bottom of the sandwich from the first feed cylinder 31 and carries it beneath the filler cylinder 36 where a measured quantity of filler is deposited thereon. The cake with the filler is then carried under the second feed cylinder 32 where the top cake is placed on the filler to complete the sandwich.

The feed cylinders 31, 32, filling cylinder 36, conveyor 37, stacker arms 39, collecting cylinder 38, flight chains 40, 41 and pusher 44 are all synchronized and driven from a single motor 45, FIG. 1. The motor 45 is swingably mounted on a frame 46 of the machine and through a belt 47 drives a main drive shaft 48, which in turn drives a worm wheel 49 keyed to a short shaft 50 having a gear 51 that meshes with a gear 52 keyed to the hollow shaft 53 of the second feed cylinder 32. The gear 52 meshes with an idler 54 that drives a gear 55 fixed to the hollow shaft 56 of the filling cylinder 36. Similarly, the gear 55 meshes with an idler 57 that drives a gear 58 keyed to a hollow shaft 59 of the first feed cylinder 31.

Feed cylinders

The feed cylinders 31, 32 are identical in construction and operation and are illustrated in FIGS. 4, 5 and 6. Each cylinder is driven from the respective hollow shaft 53 or 59 to which it is fixed. Each cylinder has a number of longitudinal channels 64, circular in cross-section, that open through the periphery thereof and form bearings for cake holder bars 65 and permit them to have a limited oscillating movement. Each holder bar has a flat outer face to which an arcuate stripper plate 66 is secured in alignment with the cakes in each delivery chute, FIG. 2, so as to form a pusher for removing the bottom cake from the stack as the bar passes therebeneath. At one end, each holder bar has an arm 67 carrying a roller 68 that runs in the groove of a cam 69, FIGS. 5 and 6,

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to cause the bar to oscillate within its bearing in the cylinder. Each holder bar has four transverse bores 70, each of which communicates with flared transverse bore 71 leading to a vacuum chamber 72 within the feed cylinder. The feed cylinder rotates on a fixed shaft 73 having a longitudinal bore 74 connected to a source of air pressure. The bore 74 communicates with lateral passages 75 in a valve member 76 keyed to shaft 73. The member 76 has valves 77, 78 that control communication of the bores 71 and passages 75 with the vacuum chamber and air pressure, respectively.

The bottom cake is withdrawn from the stack in the delivery chute 29 or 30 at the top of a feed cylinder and deposited on the conveyor 37 beneath the cylinder as best shown in FIGS. 4 and 5. When a cake holder bar 65 reaches the top of the cylinder, communication with the vacuum chamber is cut off by the valve 77, and the stripper plate 66 has contacted the bottom cake. At this time the flattened face of the holder bar is horizontal or parallel with the cake. The roller 68 is riding in the cam groove 69 which is shaped so as to oscillate the holder bar about its own axis and keep its flat face horizontal, or substantially so, until the bottom cake is pushed forward free from the stack. At this time, the bore 71 moves past the valve 77 which opens communication with the vacuum chamber 72 and by suction through passage 70 holds the cake to the bar as it is carried out and down to the bottom of the cylinder.

As the bar holding the cake 25 approaches the conveyor 37, it is again moved by the cam 69 so that its face and the cake are parallel with the conveyor. The bore 71 then communicates with the passage 75 and a slight air pressure assures deposit of the cake on the belt. The second feed cylinder of course deposits its cake on the filling that has been placed on the first cake during its passage beneath the filling cylinder.

Partial vacuum in the chambers 72 of the feed cylinders and pressure in the passages 74, FIGS. 4 and 6, and suction in the chamber 93 under the filling cylinder, FIG. 1, may be attained by any suitable means. There is shown in FIG. 1, by way of example, a blower 159 driven by a motor 160 that may be connected to provide suction in chambers 72 and 93 and slight pressure in passages 74.

In FIG. 2, there is shown a gear 164 on the shaft 61 that may drive an oil pump for force feed lubrication of the machine.

As shown in FIGS. 1, 4 and 5, the chutes 29 and 30 receive the cakes from the belts 27 and 28 and present them in vertical stacks to the feed cylinders 31 and 32, which remove the bottom cakes and deliver them to the conveyor 37 for formation of the sandwiches. The chutes 29, 30 are identical in construction and are best shown in FIGS. 4 and 4A. Each chute has a rear plate 165, which extends laterally the full width of the belts 27 or 28 that carry the four stacks of cakes, and has spaced rods 166 forming an open front for each stack of cakes. The rods 166 are secured, as by welding, to bosses 167 on an adjusting bar 168, which is adjustably connected to a nut 169 fastened to each side of the rear plate 165 so that the distance between front rods 166 and rear plate 165 may be adjusted to care for variations in the size of the cakes and their rate of feed by belts 27, 28. The bar 168 is longitudinally adjustable so that the stacks of cakes can be aligned accurately with the holder bars 65 and strippers 66 on the feed cylinders. Side plates 170 and 171, preferably secured to the bosses 167, provide lateral guides for the cakes. The front bars 166 preferably are made from round rods so as to present the smallest frictional surface to the descending column of cakes, and being spaced apart they provide access to the cakes should they become jammed in the chute, or to remove a broken one, or for any other purpose.

An adjustable gate 172, FIGS. 4 and 4A, is provided to permit the stripper 66 to strip the bottom cake only from the stack. As shown, the gate 172 comprises a fixed

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shaft 173 mounted in a pair of stationary arms 174 arranged at opposite sides of the chutes 29 and 30. To the shaft 173 a pair of brackets 175 are adjustably secured by set screws 176, and the free ends of the brackets are connected by a stop bar 177 fastened thereto by studs 178. The bar 177 comprises a rigid member 179 and an inner resilient member 180, the latter being provided to be engaged by the leading edge of the bar next to the bottom cake and absorb the shock caused by friction between the bottom and the next to the bottom cake tending to carry the latter forward during the stripping operation. In order to adjust the gate 172 so that cakes of different given thicknesses may be used in the machine, it is necessary only to loosen the set screws 176, rock the brackets 175 to bring the bar 177 to the desired position, and then set up the screws 176 to hold the bar in that position.

The cakes 25, 26 are stacked on edge on the belts 27, 28 and as they leave the belts they fall along a curved path, due to their forward velocity and the force of gravity, into vertical stacks in the chutes 29, 30. The front guide rods 166 and rear plate 165 are curved to approximate as closely as possible the path of the cakes falling from the belts thereby reducing to a minimum the friction in the chutes and the probability of jamming of the cakes.

In the accompanying drawings and the foregoing description, a preferred embodiment only of the invention has been shown and described and obviously many variations and modifications may be made therein and in its mode of application which will still be comprised within its scope. It is to be understood, therefore, that the invention is not limited to any particular form or embodiment, except insofar as such limitations are expressly set forth in the appended claims.

Having thus described my invention, what I claim is:

1. In a sandwich machine, a feed cylinder mounted to rotate on a horizontal axis, means for rotating said cylinder, means for feeding a vertical stack of cakes to a position at the top of the cylinder, a cake holder mounted in the cylinder to oscillate relatively thereto and being formed with a flat outer face, the leading and following edges of said flat face extending radially beyond the periphery of the cylinder when said flat face is disposed tangent to said cylinder, a stripper attached to said holder and projecting radially outward from said flat face whereby when the holder is carried beneath the stack of cakes as the cylinder rotates the stripper will engage the lowermost cake and remove it from the stack, and means to oscillate said holder as the cylinder rotates, said oscillating means acting first to rock the holder to depress its leading edge radially inward of the cylinder periphery as the holder approaches said stack of cakes and subsequently to raise the leading edge of the holder to present its flat face and the stripper in a substantially horizontal position while passing beneath the stack of cakes.

2. Apparatus according to claim 1, and means for holding the stripped cake against said flat face as the continued rotation of the cylinder carries it to the lowermost position of its travel.

3. Apparatus according to claim 2, and means for oscillating said holder to rock it as it approaches said lowermost position and maintain said flat face in a horizontal position as the holder is carried through said lowermost position by the cylinder rotation, and means for releasing the cake when the holder is in said lowermost position.

4. In a sandwich machine, a hollow feed cylinder mounted to rotate on a horizontal axis, means for rotating said cylinder, the hollow cylinder interior providing a suction chamber, a plurality of channels extending axially of the cylinder and opening into its periphery, a holder bar mounted in each channel to oscillate relatively to the cylinder, each holder bar being formed with a flat outer face substantially tangent to a point on the periphery of the feed cylinder, a plurality of radial bores

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extending from the suction chamber one to each of said channels, a passageway formed in each holder bar to extend through the holder bar in the area of said flat face, a fixed shaft on which the cylinder rotates, an axial bore in said shaft adapted to be connected to a source of air pressure, a valve fixed to said shaft and controlling said radial bores at their top and bottom positions during rotation of the cylinder, a radial passage from the shaft bore through said valve adapted to register with said radial bore when the respective holder is at said bottom position, and camming means acting to rock each holder as it travels into and out of its top and bottom positions during rotation of the feed cylinder, the control by said

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valve being independent of the rocking movement of said holders.

References Cited in the file of this patent

UNITED STATES PATENTS

2,031,713	Johnson	Feb. 25, 1936
2,393,961	Almgren	Feb. 5, 1946
2,570,198	Brager	Oct. 9, 1951
2,597,900	Paynter et al.	May 27, 1952
2,600,138	Tesch	June 10, 1952
2,605,017	Bolen	July 29, 1952