Jan. 1, 1946. B. A. ARVIDSON 2,391,937

SANDWICH MAKING MACHINE

Filed Nov. 5, 1943 4 Sheets-Sheet 1

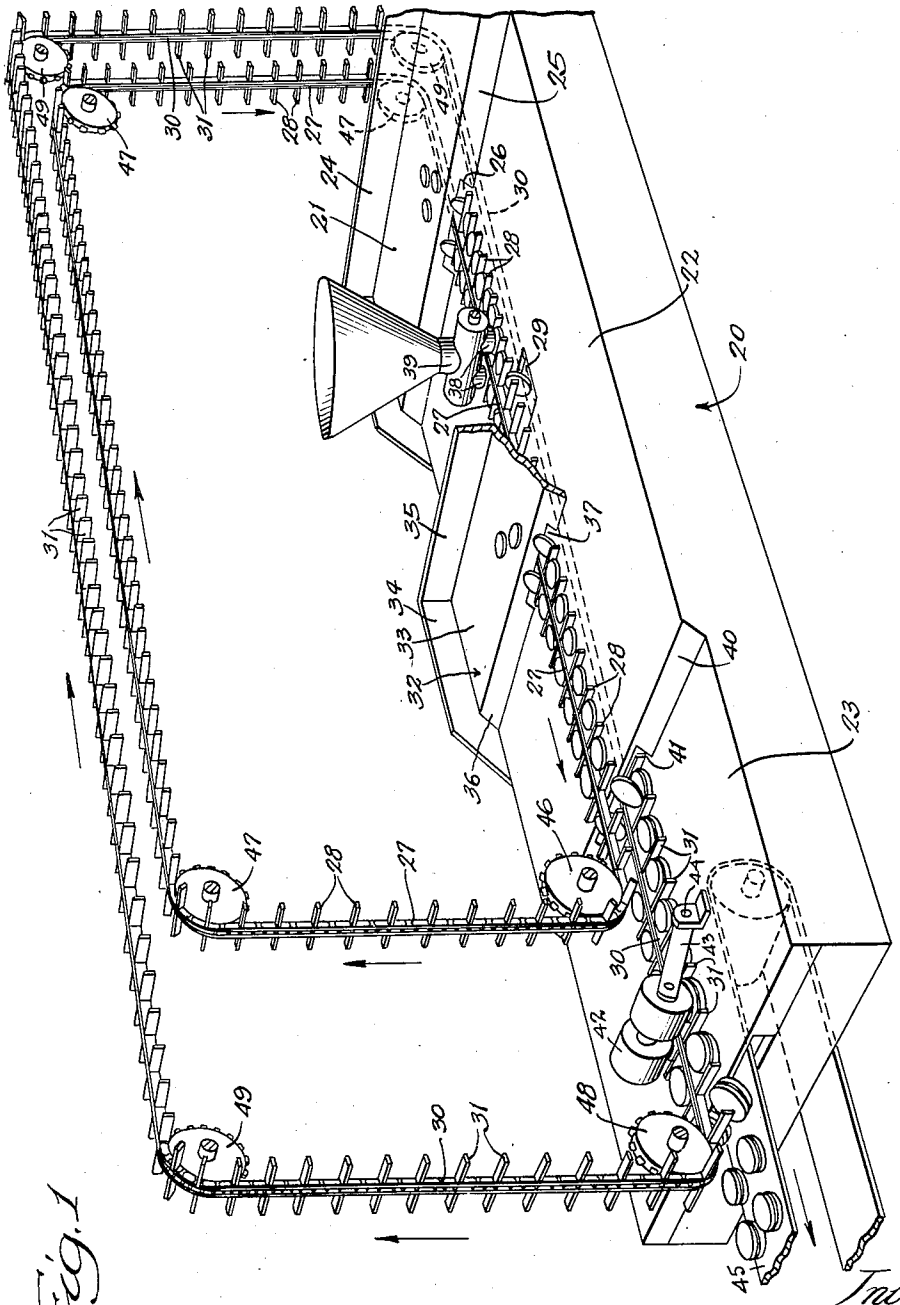


Fig. 1

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SANDWICH MAKING MACHINE

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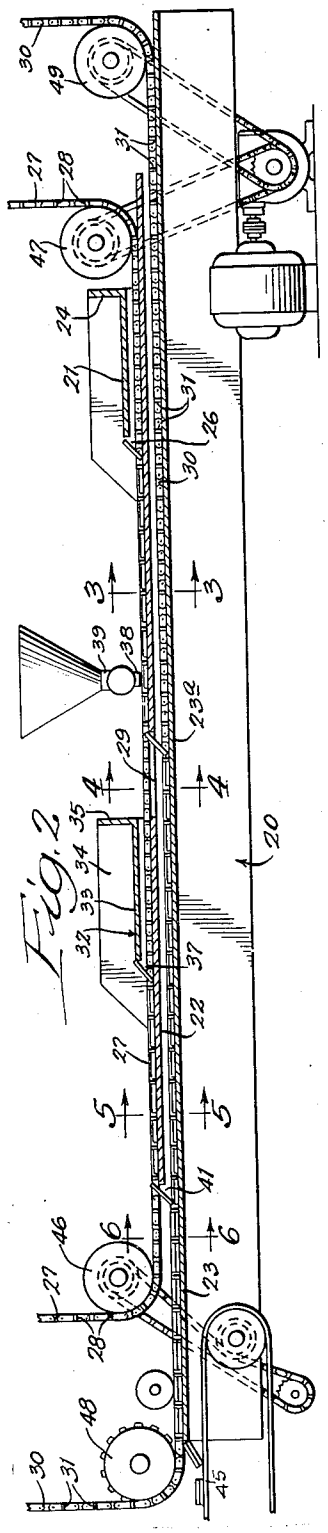


Fig. 2

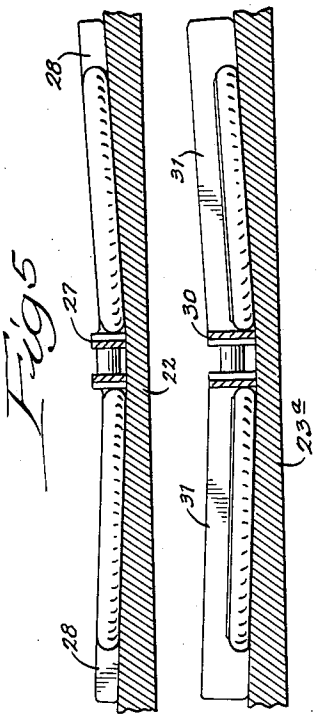


Fig. 5

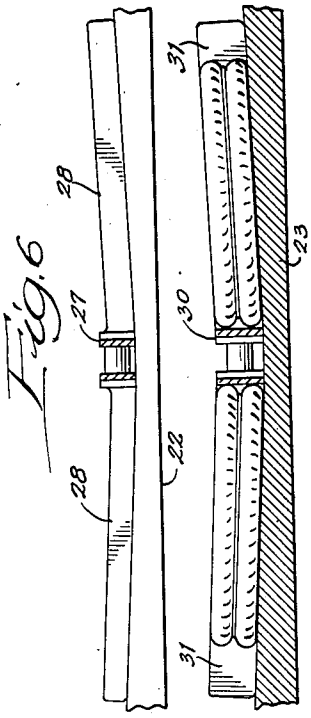


Fig. 6

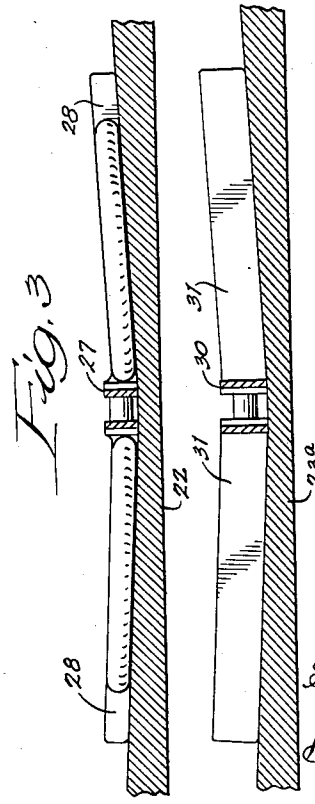


Fig. 3

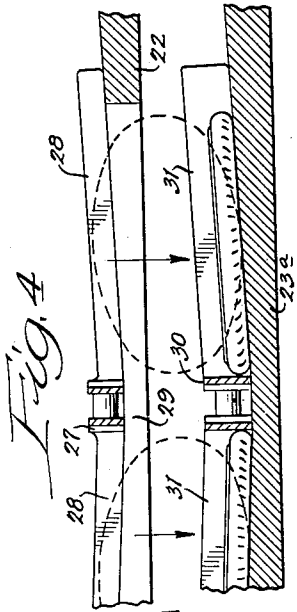


Fig. 4

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SANDWICH MAKING MACHINE

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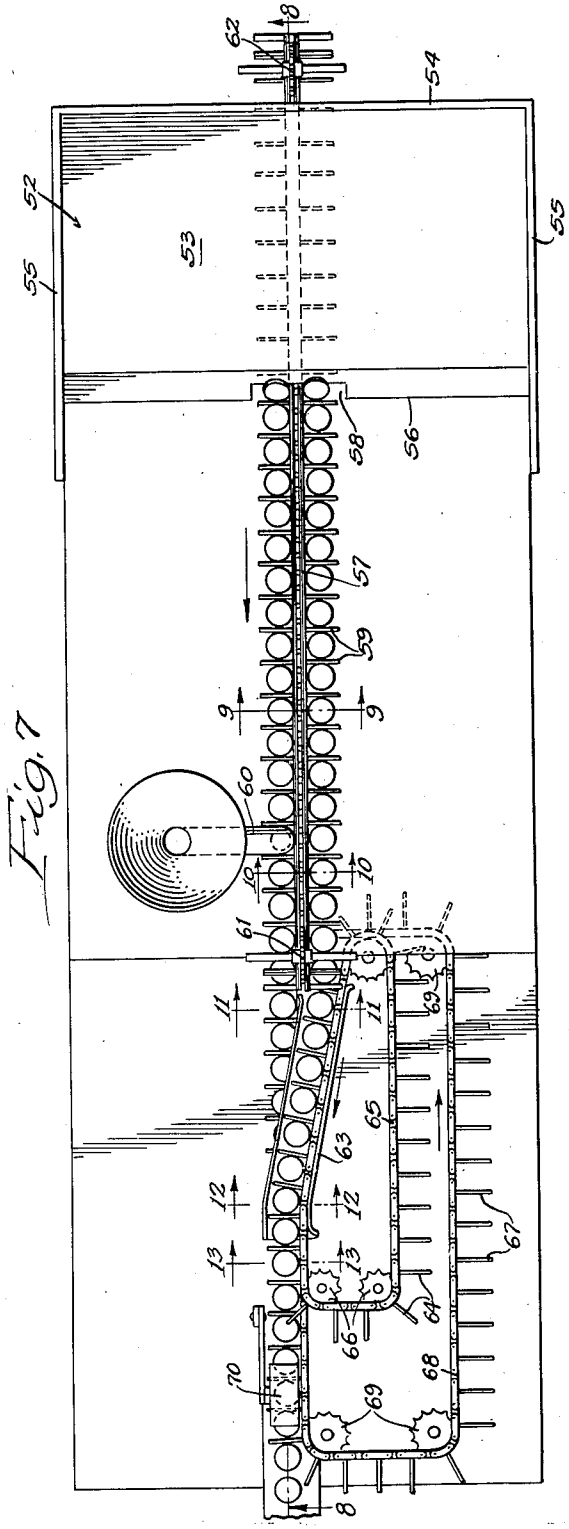


Fig. 7

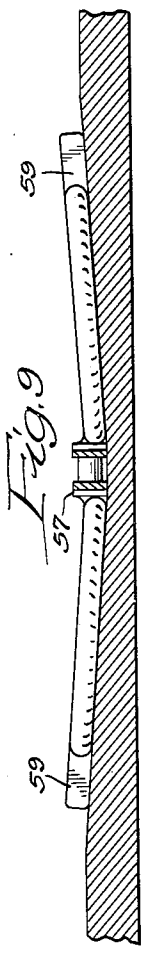


Fig. 9

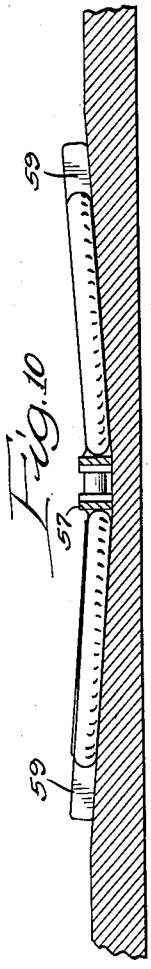


Fig. 10

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SANDWICH MAKING MACHINE

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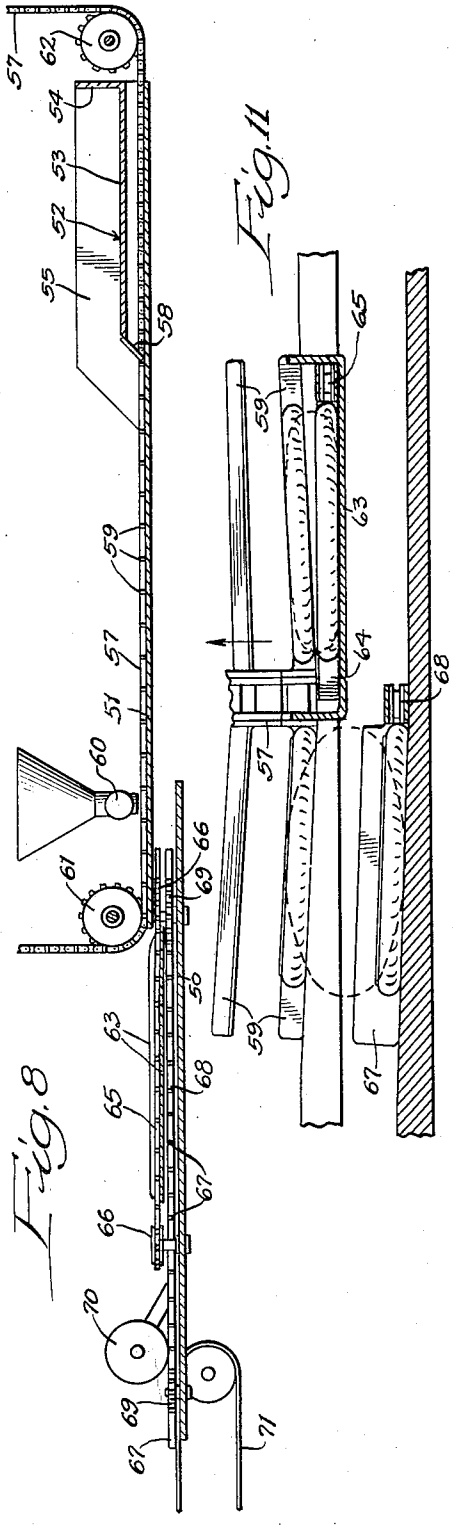


Fig. 8

Fig. 11

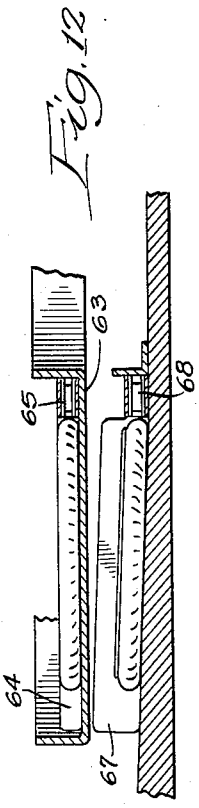


Fig. 12

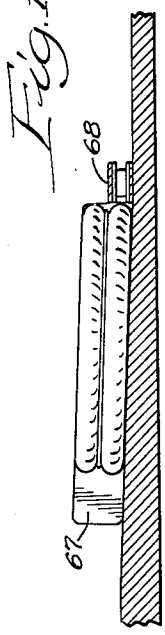


Fig. 13

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Patented Jan. 1, 1946 2,391,937

UNITED STATES PATENT OFFICE

2,391,937

SANDWICH-MAKING MACHINE

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Application November 5, 1943, Serial No. 509,075

8 Claims. (Cl. 107—1)

This invention is designed primarily for the coating and uniting of crackers or the like (hereinafter referred to as layers) into sandwiches comprising a lower layer coated with peanut-butter, cheese, or other filler, and an upper layer in register and adherence therewith. The special features of invention pertain mainly to the employment of endless feeder chains or conveyors provided with laterally projecting prongs affording cells or pockets for the reception of the sandwich layers, which prongs serve to sweep a procession of layers along the surface of a table or the like until they come into registration with an offset or aperture which permits them to drop singly to a lower level in the maneuvering of the layers which ultimately are united by pairs in the formation of a sandwich.

The invention admits of certain variations in the feeding and superposing of the layers which variations, however, necessarily conform to the general feeding and superposing scheme of operations which characterizes the present invention. Two such exemplifications of the nature of the invention will hereinafter be described in detail in conjunction with the accompanying drawings wherein,

Figure 1 is a perspective top view of a machine embodying the principles of the present invention;

Fig. 2 is a longitudinal section taken through the center of the machine;

Figs. 3, 4, 5, and 6 are sections taken respectively on lines 3—3, 4—4, 5—5, and 6—6 of Fig. 2 showing the progress of the sandwich layers through the machine;

Fig. 7 is a plan view of a modified form of construction;

Fig. 8 is a longitudinal section taken on line 8—8 of Fig. 7; and

Figs. 9, 10, 11, 12, and 13 are sections taken respectively on lines 9—9, 10—10, 11—11, 12—12 and 13—13 of Fig. 7.

Referring first to Figs. 1 to 6 inclusive, the machine is mounted on a base 20, having a stepped surface comprising three levels; an upper level in the nature of a platform 21, an upper table top 22, and a lower table 23. The platform constitutes a bin and is surrounded on the rear and two sides by a wall 24 which affords a partial enclosure for the deposit of crackers or like sandwich layers, being defined on its inner edge by a sloping step 25 down which the layers are slid by an attendant. The sandwich layers fed from the upper level platform are afterwards coated and ultimately become the under layers of the sandwiches.

The step 25 is provided with an aperture 26 which affords clearance for the travel of the lower run of an inner feeding conveyor 27, provided on each side with laterally projecting spaced prongs 28 which afford open bottomless cells or pockets for the reception, singly, of the layers fed down from the platform.

The lower run of the conveyor 27 after its emergence from the aperture 26 travels along the surface of the intermediate level 22 (upper table top, which as shown in Figs. 3-6 is convergently sloped inwardly toward the feeding conveyor so that the layers deposited between the prongs on each side of the conveyor in two abreast advancing columns, will tend to maintain contact with the conveyor and will not be displaced from the open outer sides of the pockets afforded by the prongs.

The sandwich layers thus deposited and swept forwardly along the surface of the table, will maintain contact with the conveyor 27 until the latter traverses a trap opening 29 in the table top at which point the layers, being deprived of support, will fall to a lower table surface afforded by a continuation 23a of the lower table surface 23 as shown in Fig. 2. This lower surface is traversed by the lower run of an outer conveyor 30 which encircles and is an elongated counterpart of the conveyor 27 and travels in register therewith around an outer circuit.

The conveyor 30 is provided on each side with spaced prongs 31 affording open bottomless cells or pockets, so disposed that when the sandwich sections drop through the opening 29, they will fall singly into the underlying pockets and advance at a lower level beneath the now depleted pockets of the inner conveyor 27 which passes beneath the upper table surface 22.

The table surface 22, at a point beyond the trap opening 29, supports a forward platform 32 having a floor 33, side walls 34, a rear wall 35, and a sloping forward step 36. The conveyor 27 passes under the platform and emerges through an aperture 37 in the step 36 in position to receive sandwich layers fed down by a second attendant, from the platform above and carry them forwardly in registering relation to the layers being carried at a lower level by the conveyor 30.

Before the two rows of sandwich sections delivered from the platform 21 drop through the trap opening 29 they are coated by a layer of peanut butter or other coating ejected from spouts 38 depending from a feeder 39 of any approved

construction so that as the layers drop through the trap opening, coated side uppermost, they will be in position to have the top layers of the sandwich superposed singly upon them.

These top layers, which are delivered from the platform **33** will advance along the table surface **22** until they reach the forward edge thereof which is afforded by a step **40** having an aperture **41** through which the lower run of the outer conveyor **30** advances carrying on each side a load of coated lower sandwich layers. As the top layers fall down from between the prongs of the conveyor **27** they will register singly with the coated layers and advance therewith beneath pressure rolls **42** carried by bracket arms **43** pivoted upon a pintle **44**, which rolls exert sufficient pressure upon the two layers to cause adherence after which they are discharged at the end of the lower table surface onto a conveyor belt **45** in the form of completed sandwiches.

As shown, the inner conveyor **27** is carried around a rectangular inner circuit over sprocket **46**, which may be power driven, and guide sprockets **47**. The outer conveyor **30** is likewise carried around an outer rectangular circuit over sprocket **48**, which may be power driven, and guide sprockets **49**. It will be understood, however, that the circuit arrangement of the conveyors here shown serves merely for purposes of illustration, and that any suitable variation thereof may be made so long as the active runs of the conveyors maintain the co-acting relationship described and cooperate in the manner indicated.

The machine of Figs. 7–13 conforms to the general scheme of operations first described, but differs in detail and serves to illustrate one of many modifications which may be made in the location and arrangement of the feeding conveyors employed to bring the sandwich layers into superposed relation to one another. In Figs. 7 and 8 I show a table and platform arrangement which comprises a lower forward table surface **50** and an upper rear table surface **51** which overlaps the former. At the rear end of the upper surface is located an elevated platform **52** comprising a bottom **53**, a rear wall **54**, side walls **55**, and a sloping forward step **56** down which the sandwich layers are fed to the upper table surface **51**.

In this form of construction a rear feeding conveyor **57** is employed to carry the sandwich layers along the upper table surface. This conveyor passes beneath the platform **52** and through an aperture **58** and is provided on each side with prongs **59** providing open ended bottomless cells or pockets while the table surfaces laterally adjacent the conveyor slope inwardly as shown in Figs. 11, 12, and 13. In this arrangement one row only of the sandwich sections (the upper row in Fig. 7) is subjected to a coating operation which is performed by a feeder **60** which ejects a suitable spread or coating of peanut butter or the like upon the surface of each sandwich layer in the underlying row which later become the bottom layers of sandwiches in union with the uncoated top layers delivered by the opposite side of the conveyor feed.

The conveyor **57** passes around a sprocket **61** and thence upwardly and rearwardly and downwardly around guide sprockets **62** (one only being shown) and by this arrangement the lower run is diverted upwardly at the forward edge of the elevated rear table surface so that at this point both the coated and uncoated layers which theretofore had been advancing abreast and at the same level will drop downwardly to different levels as indicated in Fig. 11. That is to say, the coated layers at the left of said figure will drop onto the inwardly sloping lower table surface, while the uncoated layers will fall into a laterally diverging runway **63**, where they will be stepped off and forced obliquely by the prongs **64** of an endless conveyor **65** travelling within the runway and around sprockets **66**, each centered upon a vertical axis so that the conveyor as a whole will travel around a circuit in a substantially horizontal plane and pick off the uncoated layers singly and without disarranging their order as they slip over the edge of the upper table surface and are released from contact with the prongs of the feeding conveyor **57**.

Meanwhile, the coated layers are advanced in a straight line by the prongs **67** of a secondary feeding conveyor **68** carried around sprockets **69** and maintaining a circuit in a horizontal plane below the plane of the conveyor **65**, it being understood that both of said conveyors are power driven by suitable connections.

The runway **63**, being diverted laterally in oblique relation to the acting run (the upper in Fig. 7) of the secondary conveyor **65**, the uncoated layers, when they reach the end of the runway, will register directly with the underlying coated layers onto which they will fall in succession in the building up of the individual sandwiches. Thereafter the united layers will pass under a weighted roller **70** or other pressure applying means which ensures proper adherence of the sections in the completed sandwich which is thereafter discharged onto a conveyor **71** or otherwise removed from the machine.

Operation

The general scheme of operations will be understood in the main from the foregoing description. The machine of Fig. 1 will ordinarily have a greater capacity than the machine of Fig. 7 since in the former machine two platforms are provided from which the sandwich layers are fed simultaneously by two attendants and at a speed which is limited only by the ability of the attendants to fill the cells or pockets in the respective conveyors as they advance beneath the respective platforms and along the table surfaces.

It will be understood, however, that instead of manual feeding the pockets may be loaded by automatic feeders of any suitable character and the method of advancing and superposing and finally uniting the layers is not dependent upon the manner in which the conveyor pockets are loaded. However, for manual feeding the employment of elevated platforms beneath which the conveyors are carried affords a most convenient and satisfactory arrangement where manual feeding by two attendants is deemed desirable.

The employment of superposed active runs in the feeding conveyors, and the provision of open bottomed cells or pockets provided between the prongs, permits the sandwich layers to be swept along the table surfaces at the required level until the support thus afforded terminates and permits the layers to fall by gravity to a lower level. The arrangement of Fig. 1 is such that the inner conveyor **27** will first act as a feeder for two rows of sandwich layers which are coated and dropped and afterwards carried forward by the underlying run of the outer conveyor, while the inner conveyor thereafter receives a second load of layers delivered from the forward plat-

form 32 which remain uncoated and, when released by the inner conveyor, ultimately become the top layers of the completed sandwich and are thence carried on by the outer conveyor to the point of discharge. Each of the conveyors therefore is made to sequentially perform a dual function in that the rear portion of the lower run of the inner conveyor will be carrying two abreast rows of coated layers while the more advanced portion of the same conveyor is carrying uncoated sections and simultaneously the lower run of the other conveyor will be carrying coated layers at its rear end and built up sandwiches at its forward end. This arrangement therefore utilizes the conveyors to their fullest capacity.

The arrangement shown in Fig. 7 is designed to permit the sandwich layers to be manipulated by a single attendant since all are fed downwardly from a single platform on opposite sides of a single conveyor and since the coating is applied to one only of the two rows which advance abreast of one another.

It will be noted that the layers of the row being coated ultimately drop to a lower level while the companion uncoated layers first drop into the rear end of the diverging trough 63 through which they are fed and laterally diverted into register with the coated layers so that all the operations, after the first delivery of sections from a single pile on the platform, will be performed automatically, in proper sequence, without further attention on the part of the operator.

The invention in either form is extremely simple in construction since the conveyor feeders constitute the only moving parts employed and since each of these is fed continuously throughout its circuit of movement, mechanical complications are avoided. The two conveyor arrangements here shown in conjunction with supporting surfaces arranged on different levels, serve to exemplify the principles of operation involved, but it will be understood that numerous mechanical variations in the application of the same principle may be employed.

I have heretofore referred to the use of conveyor feeders, but it will be understood that the term "conveyor" is intended to cover and include any flexible feeding mechanism which travels around a circuit after the manner of a chain and that in the claims where I employ the term "feeding means," I intend to include any form of feeding agency which is adapted to advance the layers in processional relation and in a manner conformable to the requirements of the present invention.

I claim:

1. In a machine for uniting layers into sandwich form, the combination of a high level table and a low level table, a conveyor so disposed as to cause its active run to traverse the surface of the high level table, said conveyor being provided on each side with projecting members affording upwardly open bottomless pockets for the reception of sandwich layers in processional arrangement and supported on the high level table surface, a coating device positioned to spread a coating on the top of those layers only which are contained within certain of the pockets at the instant said pockets pass under the coating device, the remainder of the pockets being positioned to receive a group of layers which are not brought beneath the coating device, the high level table surface being interrupted at a point beyond the coating device and beneath the portion of the conveyor carrying coated layers to permit said layers to drop to the low level table surface, a supplemental conveyor provided with pockets adapted to receive the coated layers falling to the low level table surface and carry them forward in processional relation before assembly and in register with overlying uncoated layers, and the high level table beneath the portion of the conveyor carrying uncoated layers terminating beyond the dropping point for the coated layers to permit the uncoated layers to fall singly onto single coated layers to form a sandwich.

2. In a machine for uniting layers into sandwich form, the combination of a high level table and an underlying low level table, a rear platform and a forward platform each located above the high level table and positioned to permit layers to be fed downwardly therefrom and onto the surface of the high level table, a conveyor so disposed as to cause its active run to traverse the surface of said high level table, said conveyor being provided with bottomless pockets for the reception of sandwich layers in processional arrangement, a coating device located between the platforms and positioned to spread a coating on the top of the layers fed downwardly from the rear platform, the high level table surface being interrupted at a point behind the point of discharge of layers fed from the forward platform to permit coated layers to drop to the low level table surface, a lower conveyor so disposed as to cause its active run to traverse the said table surface and carry forward coated layers dropped thereon from the high level table surface, said conveyor being provided with bottomless pockets of the character first described, said pockets registering singly with overlying pockets in the first mentioned conveyor, the high level table surface being further interrupted in position to permit uncoated layers to drop onto and register singly with coated layers to form a sandwich.

3. In a machine for uniting layers into sandwich form, the combination of a high level table and an underlying low level table, a rear platform and a forward platform each located above the high level table and positioned to permit layers to be fed downwardly therefrom and onto the surface of the high level table, a conveyor so disposed as to cause its active run to traverse the surface of said high level table, said conveyor being provided on each side with laterally projecting members affording upwardly open bottomless pockets for the reception of sandwich layers in processional arrangement, a coating device located between the platforms and positioned to spread a coating on the top of the layers fed downwardly from the rear platform, the high level table surface being interrupted at a point behind the point of discharge of layers fed from the forward platform to permit coated layers to drop to the low level table surface, a lower conveyor so disposed as to cause its active run to traverse the said table surface and carry forward coated layers dropped thereon from the high level table surface, said conveyor being provided with bottomless pockets of the character first described, said pockets registering singly with overlying pockets in the first mentioned conveyor, the high level table surface being further interrupted in position to permit uncoated layers to drop onto and register singly with coated layers to form a sandwich.

4. In a machine for uniting layers into sandwich form, the combination of a structure affording a feeding surface, a feeding platform elevated above the rear end of said structure, feeding

means so disposed as to cause an active portion thereof to traverse the surface of said structure below the platform, said active portion having bottomless pockets on each side for the reception singly of layers fed downwardly from the platform to slidably advance the same in two abreast rows in processional relation, a coating device positioned to coat the tops of only one of said rows, means for bringing said respective rows into different levels, said means including a feeding element and an underlying surface having its terminus above the coated layers to permit uncoated layers to drop singly onto the coated layers to form sandwiches.

5. In a machine for uniting layers into sandwich form, the combination of a high level table and a low level table in adjacent feeding relation, a feeding platform elevated above the rear end of the high level table, feeding means so disposed as to cause its active portion to traverse the surface of the high level table below the platform, and means having bottomless pockets on each side for the reception singly of layers fed downwardly from the platform to slidably advance the same in two abreast rows in processional relation, a coating device positioned to coat the tops of only one of said rows, the table surface being interrupted beyond the coating device on the coating side of said feeding means to permit layers carried thereby to drop to the low level table surface, a portion of the feeding means being adapted to continue the advance of the dropped layers in processional relation, a runway configured to divert the uncoated layers into position to overlie and register singly with underlying coated layers and at its terminus permitting such uncoated layers to drop singly onto coated layers, and means for feeding a procession of uncoated layers along said runway to the terminus thereof.

6. In a machine for uniting layers into sandwich form, the combination of a high level table and a low level table in adjacent relation to one another, a feeding platform elevated above the rear end of the high level table, feeding means having a portion so disposed as to cause its active portion to traverse the surface of the high level table below the platform, said means having bottomless pockets on each side for the reception singly of layers fed downwardly from the platform to slidably advance the same in two abreast rows in processional relation, a coating device positioned to coat the tops of only one of said rows, the table surface beyond said coating device being interrupted on the coating side of said feeding means to permit layers carried thereby to drop to the low level table surface, another portion of the feeding means being adapted to continue the advance of the dropped layers in processional relation, a runway configured to divert the uncoated layers into position to overlie and register singly with underlying coated layers and at its terminus permitting such uncoated layers to drop singly onto coated layers, an endless chain positioned to have its active run advance along said runway and provided with laterally projecting spaced prongs adapted to engage singly between uncoated layers delivered from one side only of the first mentioned feeding means and continue the advance thereof along said runway, and sprockets centered on vertical axes for mounting said endless chain.

7. In a machine for uniting layers into sandwich form, the combination of a high level table and a low level table, a conveyor so disposed as to cause its active run to traverse the surface of the high level table, said conveyor being provided with pockets for the reception of sandwich layers in processional arrangement, a coating device positioned to spread a coating on the layers contained in certain of said pockets, other of the pockets being meanwhile positioned to receive uncoated layers, the high level table surface being interrupted to permit the coated layers to drop to the low level table surface after they have been carried by the conveyor past the coating device, a supplemental conveyor provided with pockets to receive the coated layers falling onto the low level table and carry them forward in processional relation prior to their assembly with overlying uncoated layers, and the high level table terminating in position to permit the uncoated layers to fall singly onto single coated layers to form a sandwich.

8. In a device for uniting layers into sandwich form, the combination of a high level table and a low level table, conveyor means including an active run located to traverse the surface of a high level table, said conveyor being provided with side projections affording upwardly open, bottomless, pockets for the reception of sandwich layers in processional arrangement supported on the high level table surface, coating mechanism positioned to spread coating material on the top of layers contained within certain of said pockets, said conveyor means being provided with pockets to receive uncoated layers, the high level table surface being interrupted to permit the coated layers to drop to the low level table surface after they have been carried by the conveyor past the coating device, said conveyor means having pockets to receive the coated layers falling to the low level table surface, and advance them in processional relation in registration with overlying uncoated layers prior to assembly therewith, and the support for the uncoated layers terminating in a manner to permit them to fall one by one, each on a single coated layer to form a sandwich.

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