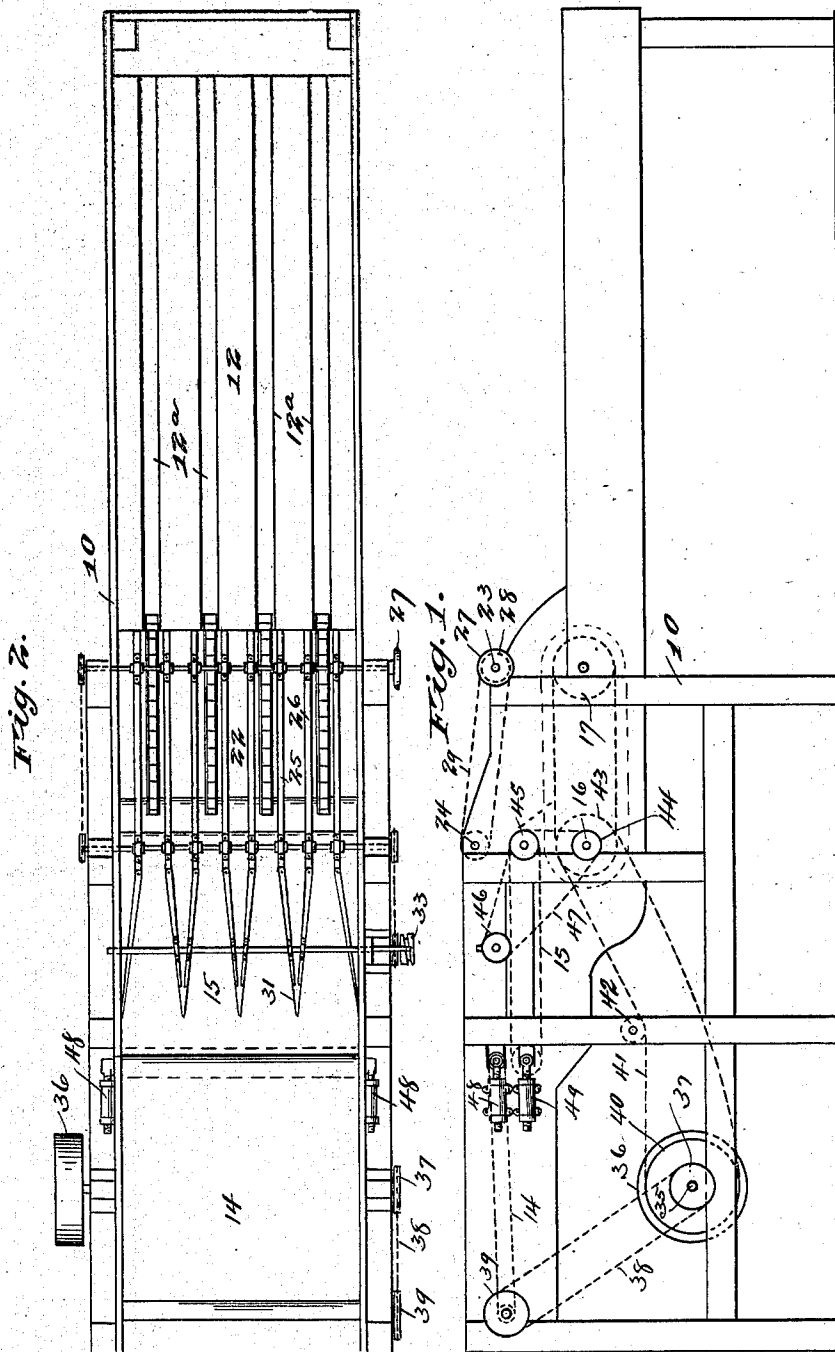


C. J. ALFRED.
CRACKER OR CAKE STACKING MACHINE.

APPLICATION FILED DEC. 8, 1902.

NO MODEL.

4 SHEETS—SHEET 1.



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S. N. Pond.

Inventor,
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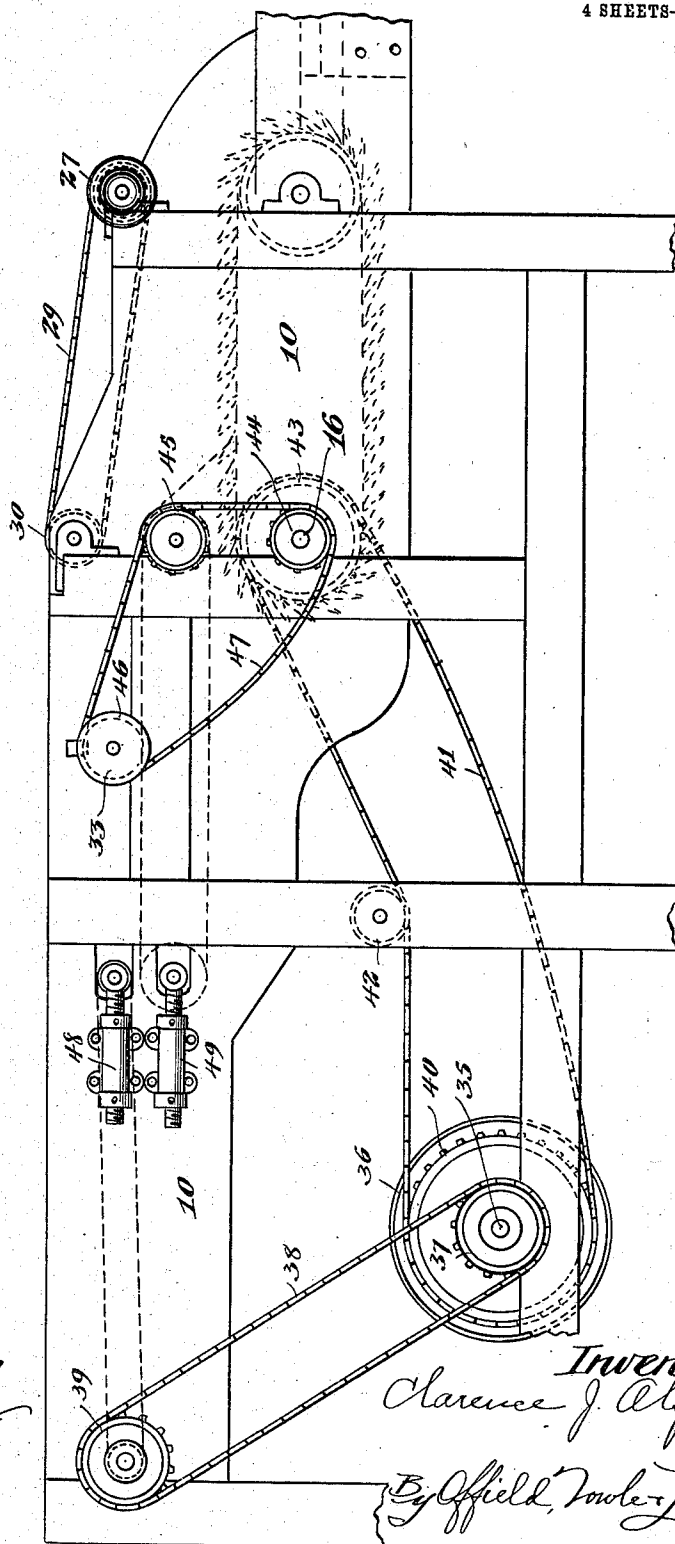
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4 SHEETS—SHEET 2.

Fig. 3.



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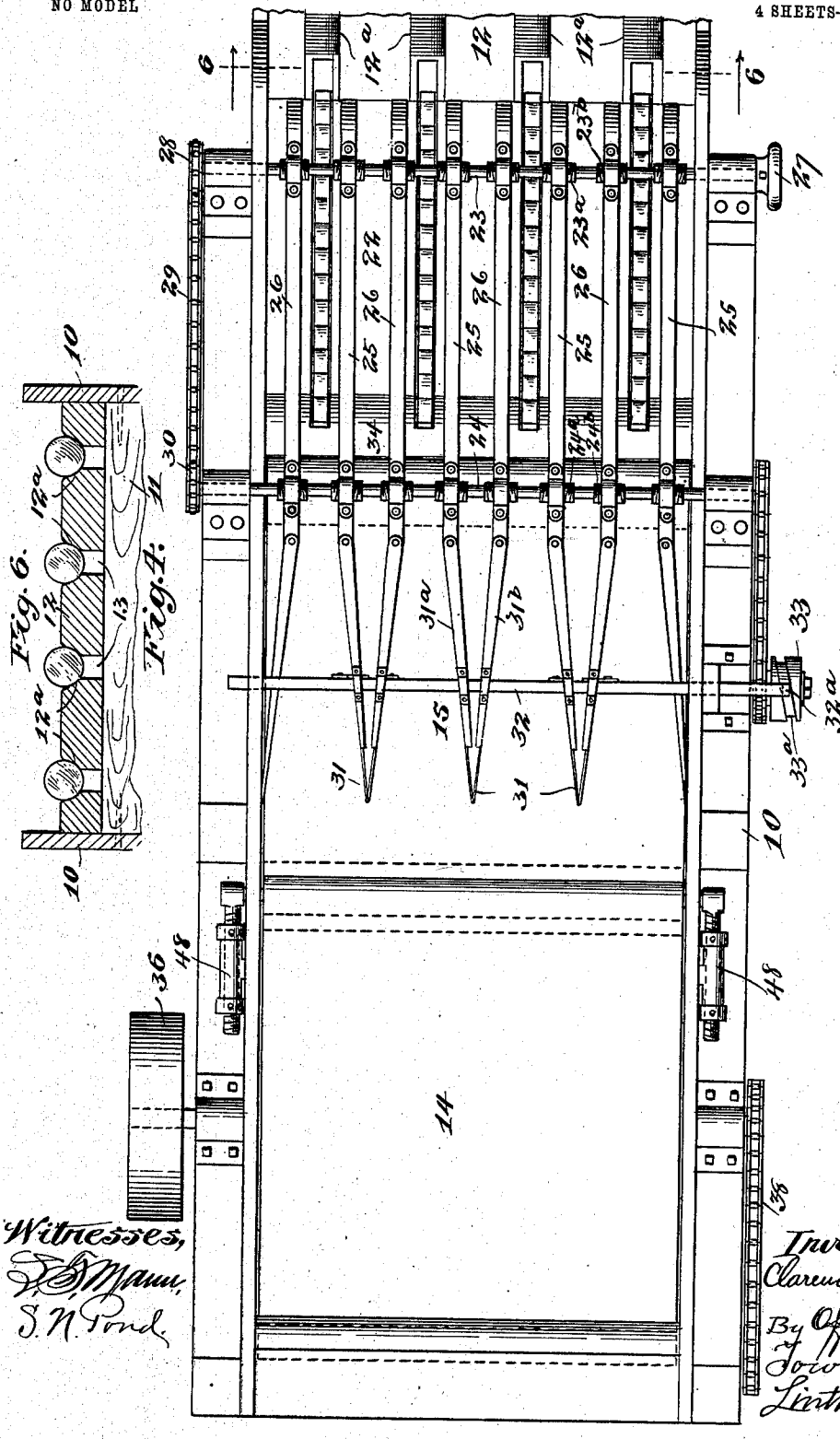
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4 SHEETS—SHEET 3.



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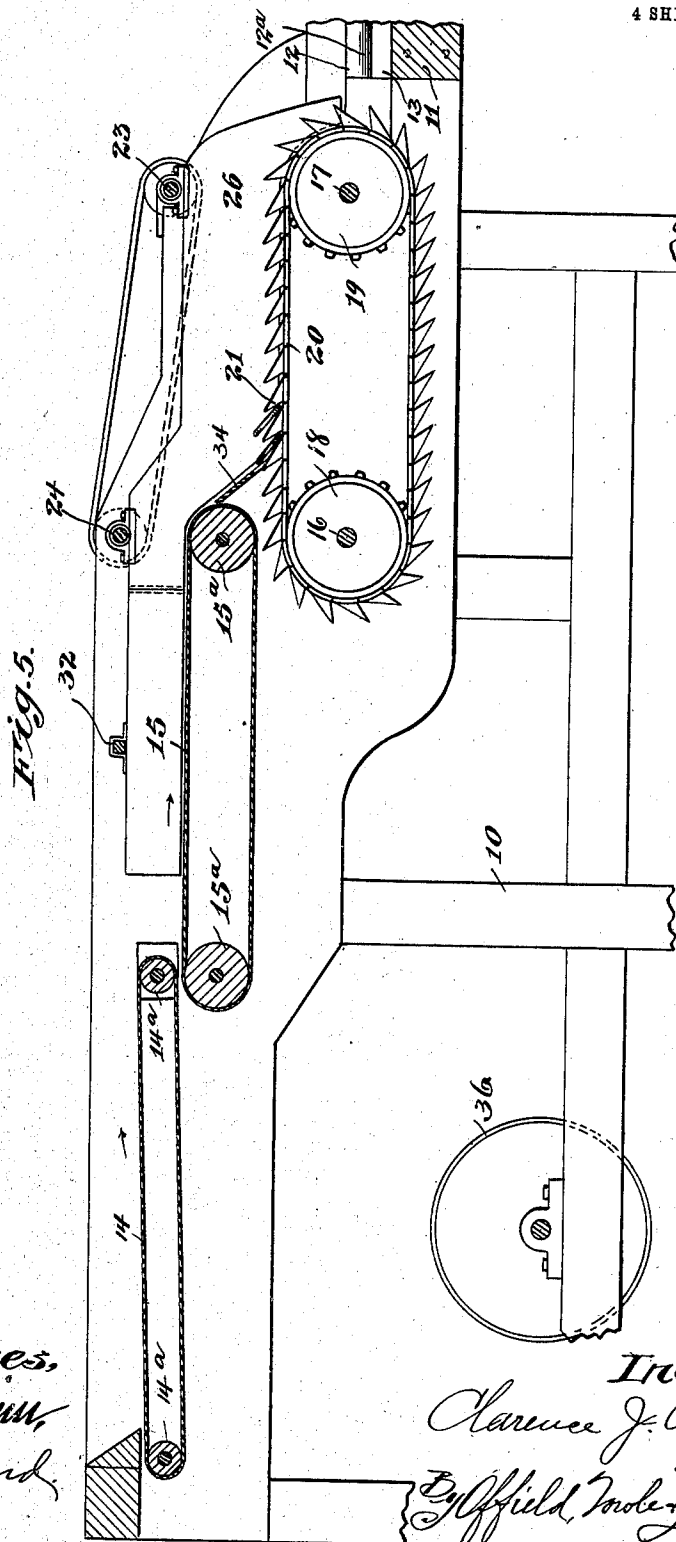
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C. J. ALFRED.
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NO MODEL.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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CRACKER OR CAKE STACKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 738,749, dated September 15, 1903.

Application filed December 8, 1902. Serial No. 134,414. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE J. ALFRED, a citizen of the United States, residing at Lake Geneva, in the county of Walworth and State of Wisconsin, have invented certain new and useful Improvements in Cracker or Cake Stacking Machines, of which the following is a specification.

My invention relates to machines used in the preparation and packaging of manufactured food products, such as are put out by bakeries and similar establishments, and has reference more particularly to a novel machine for facilitating the packing of crackers, cakes, and like bakery products in the boxes, tins, or other packages in which they are sent forth for retail distribution. Crackers, cakes, and like articles are ordinarily packed in superposed rows of articles disposed side by side, and this manner of packing the goods requires their previous assembling in a predetermined order and relation. Hitherto this has been done by hand, the articles being delivered onto a long flat table, on either side of which the operators pick the articles up and assemble them by hand in longitudinal channels disposed on either side of the table, whence the rows or stacks thus formed are taken in proper lengths and bodily transferred to and disposed in the packing-receptacles. This involves considerable labor and time on the part of the operators; and one object of my present invention is to provide a machine which will receive the goods from the conveyers and automatically distribute and assemble the goods in rows or stacks ready for packing, thus doing away with the manual labor heretofore required for that purpose.

Another object of the invention is to effect a saving in breakage of the goods over the method of stacking by hand. One difficulty which has rendered such stacking-machines as have been heretofore attempted, so far as I am familiar therewith, impracticable has been the breakage which such machines have caused, the loss thereby produced more than offsetting the economy in labor and time effected by the machine. In my present machine I believe I have obviated the difficulty above referred to.

To these ends my invention consists in a novel machine of the character specified possessing the organization of parts and mode of operation substantially as hereinafter described, and more particularly defined in the claims.

The principle of my invention and its essential and fundamental coöperating elements may be embodied in machines of various forms; but in the accompanying drawings I have illustrated the best form of machine which I have as yet devised to carry out the principle and purposes of my invention.

Referring to the drawings, Figure 1 is a side elevation, and Fig. 2 a top plan view, of the complete machine. Fig. 3 is a side elevational view, on an enlarged scale, of the receiving and feeding ends of the machine, the stacking-table being shown broken away at the right-hand end thereof. Fig. 4 is a top plan view of that part of the machine shown in Fig. 3. Fig. 5 is a longitudinal sectional view of that portion of the machine shown in Figs. 3 and 4, and Fig. 6 is a cross-sectional view through the stacking-table on the line 6 6 of Fig. 4.

In the drawings, 10 designates a generally rectangular stationary supporting-frame extending the entire length of the machine and composed of rigidly-united horizontal and upright frame members. Between the main horizontal side members of the frame at the right-hand end of the machine, as shown, is removably supported on cross-beams 11 a horizontal table 12, which is provided on its upper surface with a series of parallel longitudinal substantially semicircular channels 12^a, extending the entire length thereof. The inner end of the table 12 is provided with a series of vertical slots 13, disposed centrally in line with the bases of the channels for a purpose hereinafter described, it being noted that these slots are of a width somewhat less than the greatest width of the channels.

14 and 15 designate, respectively, a pair of endwise communicating endless conveyor-aprons, mounted on suitable transversely-extending drums 14^a and 15^a, journaled in and between the upper longitudinal side members of the machine-frame, the delivery end of the

apron 14 overlapping the receiving end of the apron 15.

16 and 17 designate a pair of transversely-extending shafts journaled in and between the main longitudinal side members of the machine-frame at a height slightly below that of the conveyer-apron 15. Fast on these shafts and disposed in longitudinal alinement with the slots 13 of the table 12 are a series of pairs of sprocket-wheels 18 and 19, disposed tandem and operatively connected by sprocket-chains 20. On the outer surface of each of these sprocket-chains is secured a series of triangular-shaped blocks 21, which are preferably made of wood and are independently connected in close relation to the chain. These blocks are so formed and assembled that their longitudinally-adjacent sides diverge outwardly, thereby forming on each chain a longitudinal series of conveyer-receptacles adapted by their peculiar formation to grip and hold the individual crackers or cakes edgewise and deliver them edgewise and in close succession upon the channels of the receiving-table 12, as hereinafter more particularly described.

Extending transversely between the main longitudinal side frame members of the machine and substantially in the plane of the upper sections of the several conveyer-chains 20 is a horizontal supporting-plate 22, which is longitudinally slotted to permit the travel therealong of said conveyer-chains, said plate constituting a support over which ride the side marginal portions of the bases of the blocks 21, thereby supporting also the upper sections of the conveyer-chains to which said blocks are attached, which would otherwise sag.

Above the support 22 and the conveyer-chains operating therethrough are mounted transversely of the machine-frame a pair of parallel shafts 23 and 24, on each of which is non-rotatably mounted a series of pairs of sleeves, the companion members of each pair being provided externally with right and left hand threads, as shown at 23^a and 23^b on shaft 23, and 24^a and 24^b on shaft 24. Suspended from these threaded sleeves are a series of pairs of longitudinally-extending adjustable partitions or guides, the members of each pair being designated by 25 and 26, respectively. Each of these partitions possesses substantially the form shown in side elevation in Fig. 5, in which it will be seen that the inner end of the partition overlies the delivery end of the conveyer-apron 15, while its outer end extends down substantially to the inner end of the stacking-table 12, the lower margin of the partition conforming to the path of travel of the crackers or cakes from the conveyer-apron 15 to the stacking-table 12 and being suspended slightly above the horizontal and inclined planes of travel of the articles. On one end of the shaft 23 is a hand-wheel 27 for turning the same, while the opposite end of said shaft carries a sprocket-wheel 28, from

which a sprocket-chain 29 connects the same with a similar sprocket-wheel 30 on the corresponding end of the shaft 24, whereby through the hand-wheel 27 both shafts may be simultaneously and equally rotated. From the described construction it will be seen that the rotation of the hand-wheel 27 will effect the lateral adjustment of the partitions 25 and 26 toward and from each other to vary the width of the passages between said partitions traversed by the conveyer-chains 20. This construction enables the machine to be adjusted to operate upon goods of varying diameters.

In order to insure the proper and uniform delivery of the crackers or cakes from the conveyer-apron 15 to the several conduits or gorges between the partitions 25 and 26 traversed by the conveyer-chains, means are provided directly above the upper surface of the conveyer-apron for separating the articles and directing them into said gorges. These means, as herein shown, consist of a series of V-shaped dividers 31, each of which comprises a pair of rearwardly-extending fingers 31^a and 31^b, pivoted to the inner ends of the partitions 25 and 26, respectively, said fingers meeting in a dividing-point, as shown, whereby adjacent dividers form a gradually-converging introductory passage-way leading to the gorges or conduits traversed by the conveyer-chains 20. I have found in practice that the best results are secured by giving to the free ends or points of the dividers a slight lateral oscillation, which breaks up any tendency of the goods to stick and block at or on the points of the dividers and also by affording a constant widening and narrowing of the introductory converging passage-ways between the dividers prevents clogging of the goods passing through the latter. The means herein shown for this purpose consists of a bar 32, overlying transversely the dividers and rigidly connected thereto. A longitudinal reciprocatory movement is imparted to this bar by means of a cam 33, rotatably mounted on the outer face of one of the longitudinal side frame members of the machine, and having a cam-groove 33^a, which engages a downwardly-extending finger 32^a on the end of the bar 32. All of the dividers 31 may be rigidly connected to the bar 32, if desired, or practically the same results may be secured by connecting only every other one of the dividers to said bar, the latter being allowed to reciprocate idly over the intervening dividers, such an arrangement obviously serving best to effect the alternate widening and narrowing of the introductory passage-ways between the dividers. I have herein shown a series of three dividers 31, the two outermost of which are rigidly connected to the bar 32, while the intermediate divider is loosely mounted thereon. The upper carrying-section of the conveyer-apron 15 being on a somewhat higher level than the corresponding sections of the conveyer-chains 20, I provide means for suitably supporting the

crackers or cakes during their delivery from the conveyer-apron to the conveyer-chains, such means consisting of an inclined plate 34, suitably supported between the side frame members of the machine-frame, the upper margin of this plate lying closely adjacent to the rounding end of the apron 15 and the lower margin lying just above the tips of the carrying-blocks 21 on the conveyer-chains.

Referring now to the mechanism for actuating the several moving parts of the machine, it is evident that any suitable or convenient driving appliances may be employed which will operate the several parts at the desired relative speeds; but a convenient train of driving connections consists of the following:

35 is the main driving-shaft, carrying a power-receiving pulley 36 on one end and on the other end a sprocket-wheel 37, which latter is connected by a sprocket-chain 38 with a sprocket-wheel 39, fast on the overhanging end of the shaft of the outer conveyer-drum 14^a, thereby driving the introductory conveyer-apron 14. On the main shaft 35 intermediate its ends is another sprocket-wheel 40, which by a sprocket-chain 41, tensioned by an idler sprocket-wheel 42, drives a sprocket-wheel 43, fast on the inner chain-conveyer shaft 16, whereby the series of conveyer-chains 20 are positively driven. The overhanging end of the shaft 16 carries a sprocket-wheel 44, which drives the shaft of the overlying drum of the conveyer 15 and the shaft of the cam 33 by means of sprocket-wheels 45 and 46 on said shafts, respectively, and an endless sprocket-chain 47 passing around said sprocket-wheels 44, 45, and 46. The conveyer-aprons 14 and 15 are maintained at the proper tension by means of any known and convenient tensioning devices, such as are shown at 48 and 49, respectively.

The operation of the machine has already to a considerable extent been indicated, but may be briefly reviewed as follows: The crackers or cakes to be stacked are delivered from the baking-pans face up onto the introductory conveyer-apron 14, which is driven at one-half the speed of the intermediate conveyer-apron 15, the said latter apron being driven at the same speed as the series of conveyer-chains 20. From the apron 14 the crackers are delivered, still face up, onto the receiving end of the intermediate conveyer-apron 15, by which they are more or less separated and carried forward and meeting the oscillating points of the dividers 31 are separated into distinct groups or streams which pass forward on the conveyer-apron between the several converging introductory passage-ways formed between the V-shaped dividers. The several groups or streams of goods thus formed pass off the delivery end of the apron 15 onto the inclined support 34, down which they slide with an accelerating movement and from the latter drop into the successive V-shaped carriers formed between adjacent blocks 21 on the conveyer-chains. The crack-

ers or cakes enter these V-shaped carriers with sufficient momentum to become securely lodged and held edgewise therein, as plainly shown in Fig. 5, and by said conveyers are carried forward down and over that end of the conveyers which coöperates with the adjacent end of the stacking-table, in which travel the goods are prevented from being displaced laterally of the carrying devices on the conveyer-chains by the side walls 25 and 26 of the gorges or channels through which they are passing. As the chains pass downward through the several slots 13 in the meeting end of the stacking-table the crackers or cakes carried thereby are squarely seated on their edges in close succession and face foremost within the channels, the goods being stripped from the chains and detained in the channels by reason of the fact that the latter and the goods are of a diameter greater than the width of the conveyer-carrying devices and the slots 13, through which they pass. As successive quantities of goods are thus rapidly delivered by the conveyer-chains to the channels of the stacking-table the goods last received automatically crowd forward the lines of goods previously received without injury to the goods themselves, and attendants on either side of the stacking-table have simply to pick up out of the channels sections of the stacked goods of suitable length to fit the dimensions of the receiving tins or boxes and pack them in successive overlying rows within said receptacles. The machine may be driven at a high rate of speed and will easily stack the goods as fast as expert attendants can supply the latter to the machine from the ovens and remove the stacked goods therefrom to the packing-receptacles. The crackers or cakes are delivered to and stacked in the channels of the stacking-table all properly faced and in sound and whole condition.

By reason of the fact that the stacking-table 12 is capable of being readily removed and replaced by another table having wider or narrower channels and of the further fact that the partitions 25 and 26 are capable of adjustment toward and from each other to vary the width of the conduits formed thereby, the machine is obviously capable of handling goods of widely-varying sizes. It will be observed that the goods are in constant movement from the time they are received onto the introductory apron 14 until they are removed in stacked condition from the table 12, which fact contributes to the efficiency of the machine in handling the most delicate and brittle products with but a slight and practically negligible percentage of breakage. While the machine as illustrated is best adapted to handling goods that are circular or round in external contour, yet I have found in practice that it will operate equally well upon goods of a more or less oblong contour.

While I have entitled my invention as a "Cracker and cake stacking machine," and while the invention has been devised more par-

particularly with reference to its use upon this class of goods, yet it is evident that the machine can be used in connection with any other articles or products having the general contour of the bakery products specified and designed to be assembled in the manner and relation hereinabove described without departing from the principle or spirit of the invention.

It is evident that the mechanical embodiment of my invention herein shown and described might be variously modified without departing from the principle thereof. I do not, therefore, limit my invention to the particular details of construction or the particular forms and relative arrangement of the several elements shown and described.

I claim—

1. In a machine of the character described, the combination with a stacking-table having a channel in its upper surface and apertured through the base of said channel, of an endless conveyer for crackers, cakes, and the like traveling through said aperture and operating to deliver said articles edgewise in stacked condition to and upon said channel, substantially as described.

2. In a machine of the character described, the combination with a stacking-table having a channel in its upper surface and apertured through the base of said channel, of an endless conveyer for crackers, cakes, and the like traveling through said apertures and operating to deliver said articles edgewise in stacked condition to and upon said channel, and means for feeding said articles edge foremost to and upon said endless conveyer, substantially as described.

3. In a machine of the character described, the combination with a stacking-table having a channel in its upper surface and apertured through the base of said channel, of an endless conveyer-chain traveling through said aperture and having on its outer surface a series of carrying devices adapted to grip and convey crackers, cakes, and the like by their edges and operating to deliver said articles edgewise to and upon said channel, and means for feeding said articles edge foremost to said carrying devices of the conveyer-chain, substantially as described.

4. In a machine of the character described, the combination with a longitudinally-channeled stacking-table apertured through the bases of the channels, of a series of endless conveyers for crackers, cakes, and the like traveling respectively through said apertures and operating to deliver said articles edgewise in stacked form to and upon said channels, a conveyer-apron, and a series of dividers disposed directly over said conveyer-apron and serving to divide said articles into separate groups or streams and guide them to the respective conveyers, substantially as described.

5. In a machine of the character described, the combination with a longitudinally-chan-

neled stacking-table apertured through the bases of the channels, of a series of endless conveyers for crackers, cakes, and the like traveling respectively through said apertures and operating to deliver said articles edgewise in stacked form to and upon said channels, a conveyer-apron, a series of hinged dividers directly overlying said conveyer-apron, and means for laterally oscillating the free ends of said dividers, substantially as described.

6. In a machine of the character specified, the combination with a longitudinally-channeled stacking-table apertured through the bases of the channels, of a series of endless conveyers for crackers, cakes, and the like traveling through said apertures, respectively, and operating to deliver said articles edgewise in stacked form to and upon said channels, a pair of parallel laterally-adjustable partitions inclosing the conveying-section of each of said conveyers and constituting lateral guides and supports for the articles carried by the latter, and means for feeding and directing the articles between said partitions onto the conveyers, substantially as described.

7. In a machine of the character described, the combination with a longitudinally-channeled stacking-table apertured through the bases of the channels, of a series of endless conveyers for crackers, cakes, and the like traveling through said apertures, respectively, and operating to deliver said articles edgewise in stacked form to and upon said channels, a pair of parallel laterally-adjustable partitions inclosing the carrying-section of each of said conveyers and constituting lateral guides and supports for the articles carried by the latter, a conveyer-apron, and a series of dividers hinged to the ends of said partitions and directly overlying said conveyer-apron, substantially as described.

8. In a machine of the character described, the combination with a series of endless conveyers for crackers, cakes, and the like adapted to grip, carry and stack the articles edgewise, of a pair of parallel laterally-adjustable partitions inclosing the carrying-section of each of said conveyers and constituting lateral guides and supports for the articles carried by the latter, and a table-support located at the delivery ends of said conveyers adapted to removably receive tables having longitudinal channels of varying widths corresponding with the lateral adjustments of said partitions, substantially as described.

9. In a machine of the character described, the combination with a conveyer-apron and a series of laterally-adjacent distributing-conduits to which said conveyer-apron delivers, of a series of V-shaped dividers hinged to the ends of the walls of said conduits and overlying said conveyer-apron and forming with the latter converging entrances to said distributing-conduits, and means for laterally oscillating the points of said dividers, substantially as described.

10. In a machine of the character described,

an endless conveyer-chain operating in a vertical plane and having attached to its outer surface a series of triangular-shaped blocks the adjacent faces of which form wedge-shaped receptacles adapted to grip and hold edgewise crackers, cakes, and the like fed thereto, in combination with a stacking-table having a longitudinal channel one end of which is vertically slotted and straddles the descending section of said conveyer-chain, substantially as described.

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