

Dec. 30, 1952

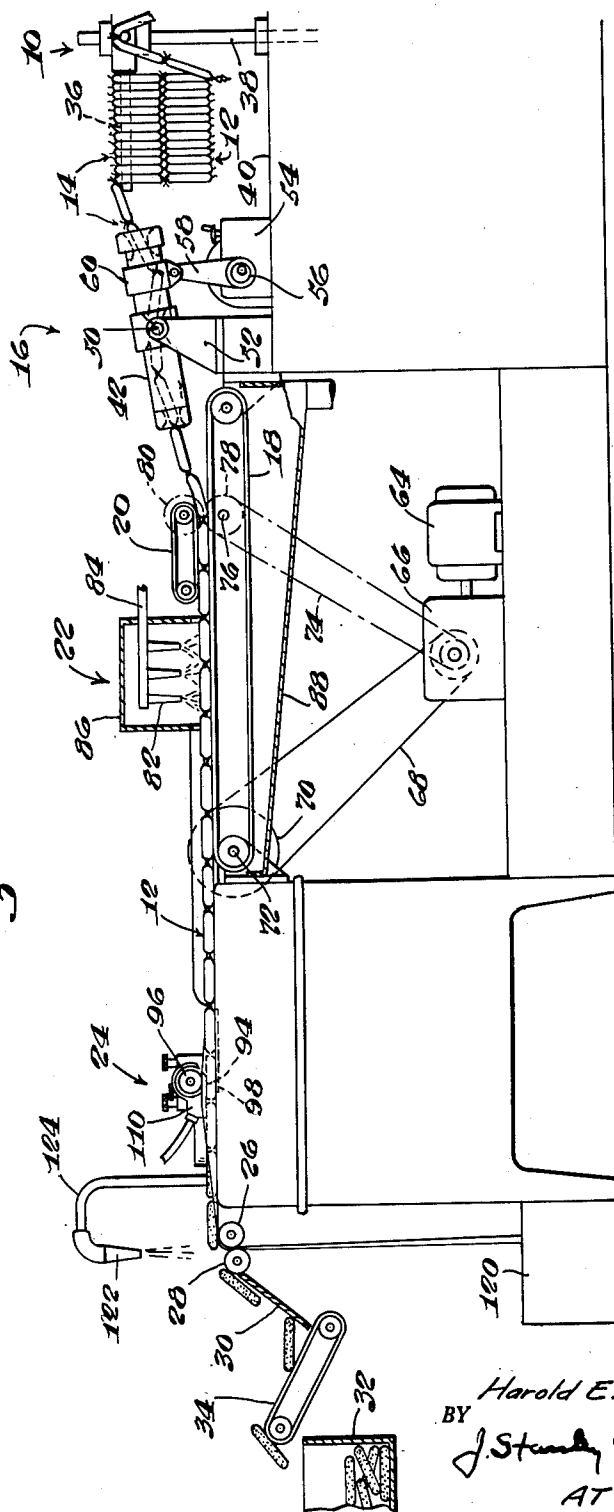
H. E. SCHALLER
APPARATUS FOR OPERATING UPON CHAINS
OF FRANKFURTERS AND THE LIKE

2,623,237

Filed March 16, 1950

4 Sheets-Sheet 1

Fig. 1



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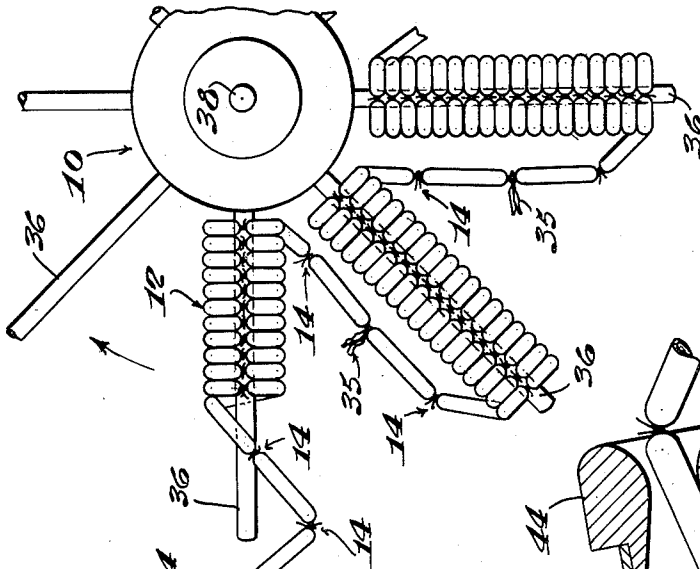


Fig. 2

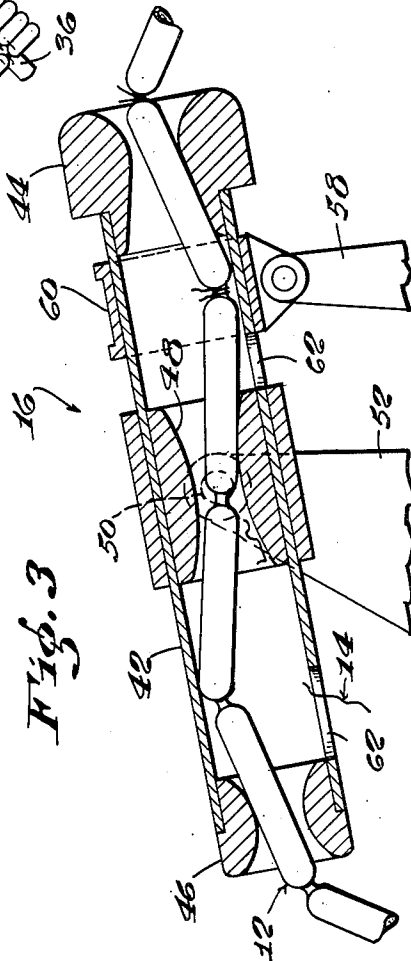
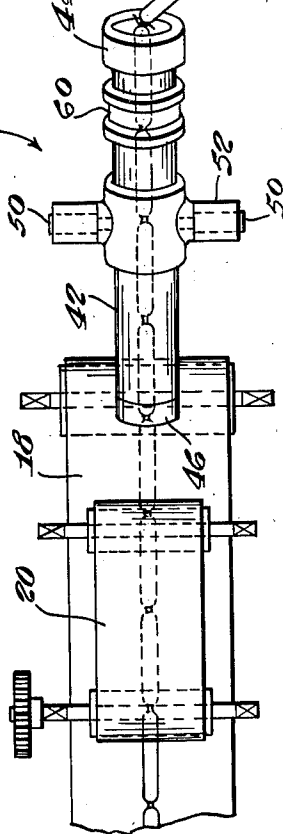


Fig. 3

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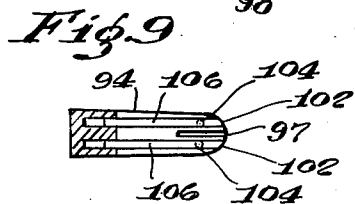
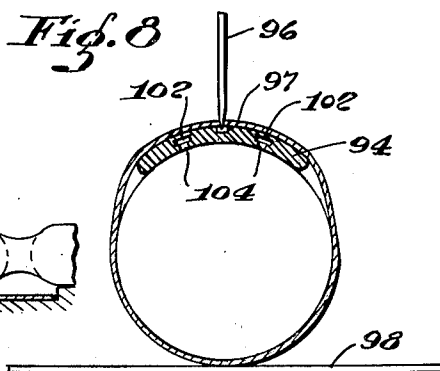
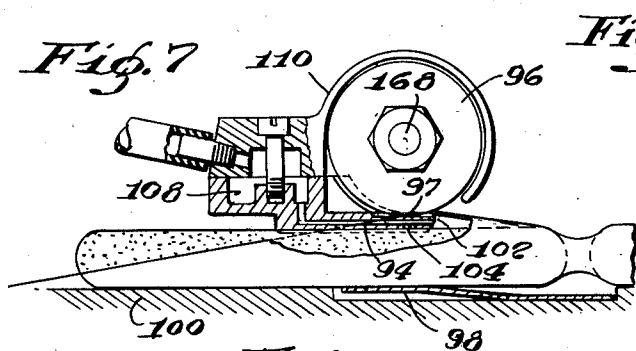
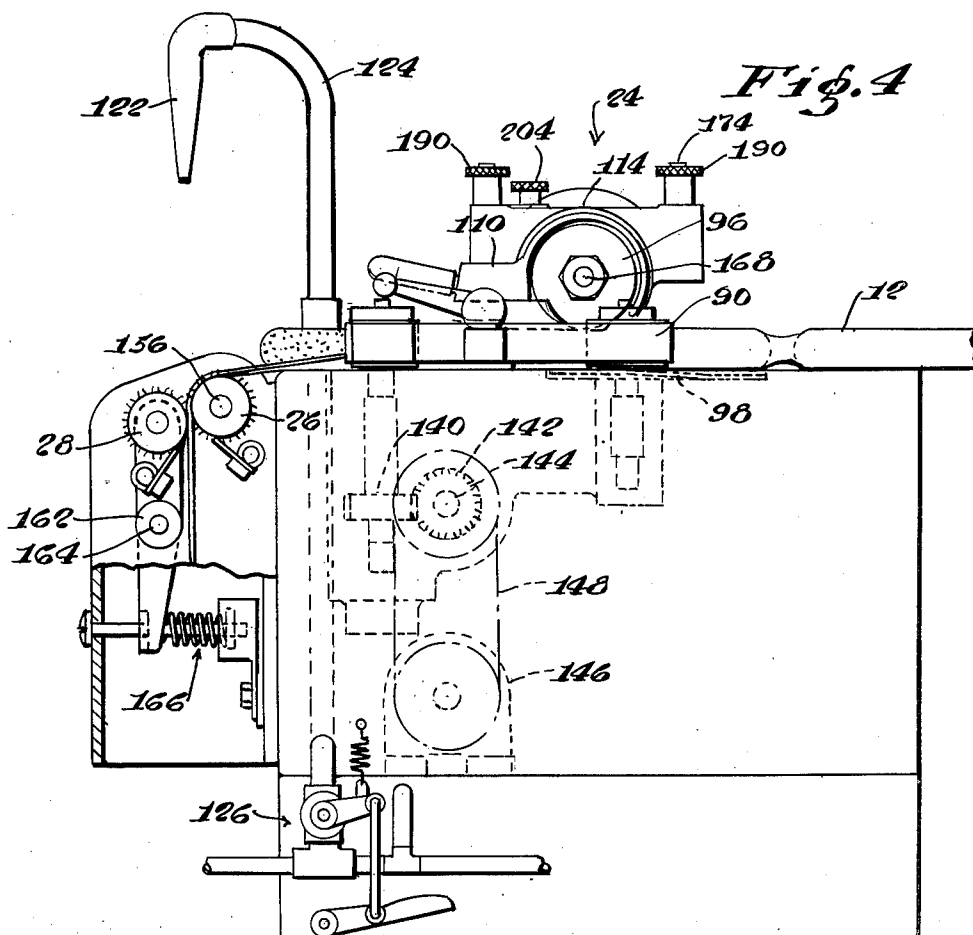
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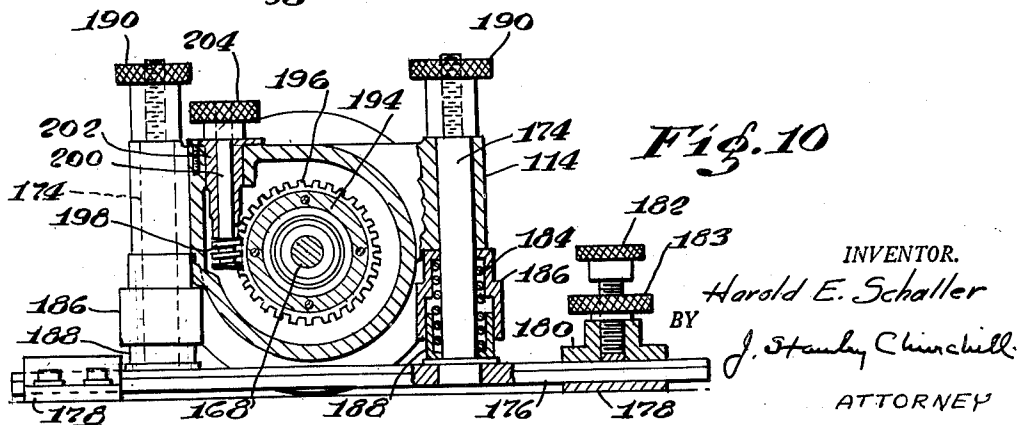
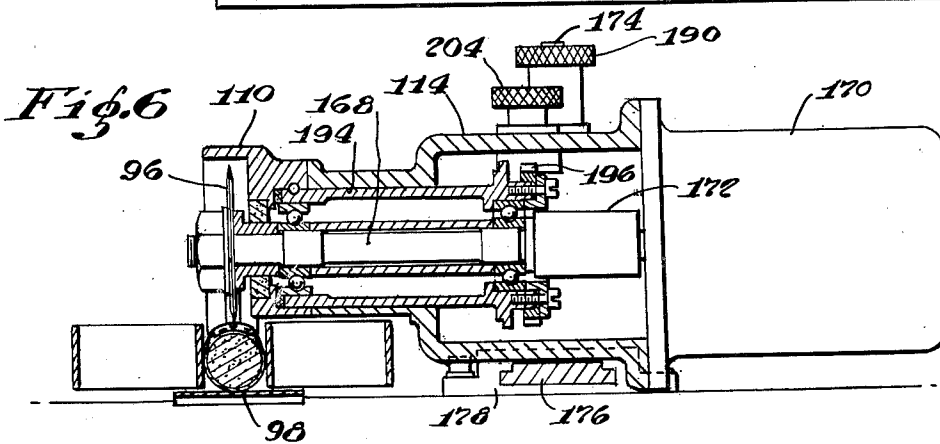
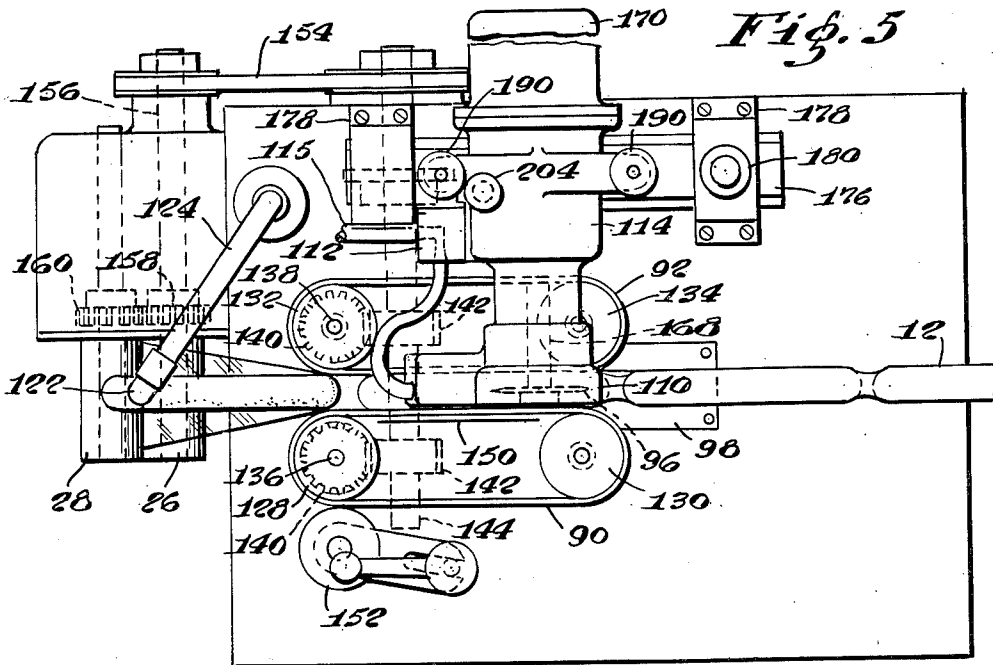
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APPARATUS FOR OPERATING UPON CHAINS
OF FRANKFURTERS AND THE LIKE

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6 Claims. (Cl. 17—1)

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This invention relates to an apparatus useful in producing skinless frankfurters and like products.

One object of the invention is to provide novel and improved apparatus for producing skinless frankfurters adapted to operate upon a chain of frankfurter links having tie strings between adjacent links to first remove the tie strings in a novel and economical manner, then convey the chain after the strings have been thus removed to present the chain to a skinning apparatus of novel and improved construction and to apply to the chain a lubricant during its movement into operative position with relation to the skinning mechanism.

A further object of the invention is to provide novel destringing apparatus which is highly useful in removing the usual tie strings from a chain of frankfurter links or the like in a novel, rapid and highly economical manner.

Another object of the invention is to provide a novel and improved skinning apparatus which is capable of operating upon a chain of frankfurters or the like from which the tie strings have been removed to efficiently cut the skins or artificial casings and to automatically remove the skins from the chain of frankfurters without injury to the frankfurter meat.

With these general objects in view, and such others as may hereinafter appear, the invention consists in the complete apparatus for producing skinless frankfurters from chains of frankfurter links; in the apparatus for destringing the frankfurters; in the novel skinning apparatus; and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings, Fig. 1 is a side elevation of the apparatus for producing the skinless frankfurters; Fig. 2 is a plan view of a portion of the apparatus shown in Fig. 1, illustrating the supply turret and the destringing device; Fig. 3 is a cross-sectional view of the destringing tube; Figs. 4 and 5 are views in side and plan elevations respectively of the skinning mechanism; Fig. 6 is a cross-sectional view of the cutting or skinning head; Fig. 7 is an enlarged detail view of the cutting blade and cooperating plow; Fig. 8 is a plan view detail of the plow; Fig. 9 is an enlarged cross-sectional view of the plow taken on the line 9—9 of Fig. 8; and Fig. 10 is a cross-sectional view of the cutting or skinning head illustrating the adjusting mechanism.

In general, the present invention in one of its

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aspects contemplates a complete machine for operating upon the usual chain of frankfurter links and the like in which tie strings are tightly wound about the casing between adjacent links to mechanically remove the tie strings in a novel and highly efficient manner as the chain is fed into the machine. Provision is made for feeding the chain after the strings have thus been removed through a spray of a lubricant, preferably water, and then to present the chain to a novel and improved construction of skinning apparatus by which the outer or artificial casing of the chain may be slit longitudinally and removed, thus producing successive skinless frankfurters in an automatic and rapid and economical manner. Both the destringing mechanism and the skinning mechanism of themselves have important commercial utility and are capable of use independently of one another to perform their respective operations in a novel and superior manner.

Provision is also made for handling successive chains of frankfurters and feeding them through the destring apparatus in a novel and superior manner in order that the operations of destringing and skinning the frankfurters may be performed in a substantially continuous and automatic manner.

Referring now to the drawings, and particularly to Fig. 1, the present apparatus for producing skinless frankfurters comprises in general a supply spider or turret 10 supporting a continuous length or chain of frankfurters 12 having tie strings 14 wound about the outer casing between adjacent links as applied by a linking machine, such strings being wound tightly about the casing with three or four loops and with the ends of the strings free. In operation, the leading end of the chain is advanced through destringing mechanism indicated generally at 16, arranged to effect extension and contraction of the chain to loosen and remove the wound strings 14, the chain being drawn through the casing and advanced by a conveyer belt 18 and an upper cooperating belt 20. The chain may then be subjected to a water spray, as indicated at station 22, during the advance of the chain therepast in order to provide lubrication preparatory to the skinning operation. The skinning operation is performed by a cutting head, indicated generally at 24, arranged to slit the outer casing longitudinally, and by stripper rolls 26, 28 between which the casing is advanced, the skinless frankfurters being discharged onto a chute 30 and delivered to a receptacle 32 by a conveyer 34.

As illustrated in Fig. 2, the supply spider 10 is

provided with a plurality of radially extended arms 36, each arm supporting a coiled length of connected links as received from the smoke house after processing of the frankfurters, and, in operation, the inner or trailing end of a coil on one arm may be tied to the outer leading end of a coil on an adjacent arm, successive coils being similarly tied together to form a continuous length or chain of frankfurters. In practice, the coils are joined by tying together the extended lengths 35 of the casing material usually provided at each end of the coil. As herein shown, the spider 10 may be supported by and freely rotatable upon a vertical shaft 38 supported in the frame 40 of the machine, and, in operation, when a coil on one arm is entirely withdrawn, the spider will rotate to present the adjacent coil in operative relation to the destringer 16 by virtue of the advancing movement of the chain. In practice, the attendant may place a new coil of frankfurters on the depleted arm of the spider and tie the same to the next adjacent coil to provide a continuous supply.

Referring now to Figs. 2 and 3, the destringing mechanism 16 may comprise an elongated hollow oscillating tube 42 of a diameter substantially greater than the diameter of the chain and having guide plugs 44, 46 at either end, and a similar plug 48, intermediate its ends, each forming restricted openings and through which the chain is drawn during the destringing operation. The tube 42 may be pivotally supported intermediate its ends on studs 50 carried in a bracket 52 attached to the machine frame, the tube being supported in a substantially horizontal position and preferably at a slightly downwardly inclined angle from the horizontal plane in the direction of movement of the chain. Provision is made for rapidly rocking or oscillating the tube in a vertical plane, and, as herein shown, a variable speed driving unit 54 may be provided with an eccentric 56 connected by a link 58 to a strap 60 secured about an intermediate portion of the tube, as illustrated.

In the operation of the oscillating tube destringing unit 16, the chain of frankfurters is rapidly reciprocated against the upper and lower sides of the tube as it is advanced therethrough, and is restricted from substantial relative movement or reciprocation in passing through the restricted openings at the ends and at the center. As a result of such movement the chain is alternately extended and contracted causing stretching of the casing material between the links to effect expansion of the same to exert an outward radial pressure against the inside of the loops of the wound strings so that the loops are loosened and fall off the chain. The removed strings may be discharged through slotted openings 62 provided in the underside of the tube, as illustrated. In practice, the tube may be rapidly oscillated at a rate of about 750 to 1000 oscillations to a minute through a relatively small arcuate distance to effect efficient results. With the arrangement shown the chain is subjected to oscillations of maximum amplitude at the entrance and exit end and no movement at the center.

In operation, the oscillation of the tube, disposed at a slight angle from a horizontal plane, may effect feeding of the chain through the tube at a relatively slow rate without any auxiliary feeding mechanism. However, in practice, it is preferred to pull the chain through the tube at a relatively fast rate, the chain being extended

along the conveyer 18 and under the feed belt 20 to advance the chain. The conveyer 18 may be driven by an electric motor 64 and gear reduction unit 66 connected by a belt 68 to a pulley 70 mounted on the shaft 72 at the leading end of the conveyer. The upper belt 20 may also be driven by a chain and sprocket drive 74 from the gear reduction unit to an auxiliary shaft 76, and by cooperating gears 78, 80 as illustrated.

The lubricating or spray unit 22 may and preferably will comprise a plurality of atomizing spray nozzles 82 connected to a water supply pipe 84, and may be provided with a hood 86 to confine the spray. A drain pan 88 may be provided under the conveyer, as shown, to receive any surplus water from the belt 18. The atomizing nozzles 82 provide a fine spray of water on the chain sufficient to lubricate the outer casing, preparatory to the chain being received by the cutting head 24, without depositing excessive liquid which might penetrate the casing and be absorbed by the frankfurter meat.

Referring now to Figs. 4 and 5, the chain is advanced to the cutting head 24 by a pair of spaced vertically supported feed belts 90, 92, the leading end of the chain being engaged by a plow member or air nozzle 94 inserted under the casing, and, as the chain is advanced, the casing is brought into engagement with a rotary blade 96 arranged to extend into a groove 97 in the upper surface of the plow 94 and is adapted to slit the casing longitudinally along the upper surface of the chain. As illustrated in detail in Figs. 8 and 9, the plow or nozzle 94 may and preferably will be curved in cross section to substantially conform to the upper surface of the upper half section of each link of chain, and a leaf spring 98 attached to the platen 100 of the skinning apparatus may be provided for urging the chain upwardly into operative engagement with the plow and the rotary blade during the continuous advance of the chain.

In order to separate the casing from the frankfurters, air is projected through small openings 102 in the front end of the plow, and through openings 104 in the underside of the plow. As herein shown, air is provided through longitudinal parallel channels 106 formed in the plow and in communication with a chamber 108 formed in a plow supporting member 110. The chamber 108 is connected by a flexible tube to a second chamber formed in a member 112 connected by a flexible tube 115 to any usual or preferred source of air under pressure. In operation, the air projected through the spaced front openings 102 serve to inflate and separate the casing from the meat of the frankfurters for a substantial distance in advance of the cutter, and, the air projected through the openings in the underside of the curved plow serve to separate the casing from the meat around the sides of the frankfurter and in addition provide an air cushion or air lubricant to facilitate passage of the frankfurters under the plow.

In order to strip the slit and separated casing from the chain, the leading end of the casing is guided over and between a pair of driven stripping rollers 26, 28 arranged to guide the casing material into a receptacle 120, the driven rollers effecting a pull on the casing and the individual skinless frankfurters are carried over the stripping rollers to be discharged from the apparatus. The leading end of the casing may and preferably will be automatically inserted between the stripping rollers 26, 28 by an air blast directed against

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the casing through a nozzle 122 attached to an air pipe 124. The pipe 124 may be supplied with compressed air from any usual source, and, as herein shown may be provided with a foot operated valve 126 controlled by the operator to effect a blast of air against the leading end of the casing until the latter is engaged in the bight of the rollers whereupon the air blast may be discontinued.

The feed belts 90, 92 are arranged to run around pulleys 128, 130, and 132, 134, respectively, the driving pulleys 128, 132 being fast on vertical shafts 136, 138 and are arranged to be rotated through intermeshing spiral gears 140, 142, the latter being fast on a main drive shaft 144. The main drive shaft may be driven by a motor 146 through a chain and sprocket connection 148. Suitable vertically arranged backing rails 150 may be provided in engagement with the inner surfaces of the feed belts, and, adjustably mounted idler rolls 152 may be provided for cooperation with the belts, as shown.

As shown in Fig. 5, the stripping rollers 26, 28 may be driven through connections from the main drive shaft 144 to the roller shaft 156 carrying the roller 28, and the latter is connected with the roller 26 by meshing spur gears 158, 160. The roller 28 may be carried by an arm 162 pivotally mounted at 164 and may be yieldingly urged against the roller 26 by a spring unit 166, as illustrated.

Referring now to Fig. 6, the rotary blade 96 is mounted on a shaft 168 journaled in ball bearings supported in the housing 114 and is arranged to be rotated by an electric motor 170 secured to the housing and connected to the shaft 168 by a flexible coupling 172. As better shown in Fig. 10, the housing is mounted for longitudinal and vertical adjustment, the housing being adjustably carried on vertical studs 174 fast in an elongated bar 176. The bar 176 is mounted for longitudinal adjustment in grooved blocks 178 attached to the platen, one of the blocks having a cap member 180 secured thereto and provided with a clamp screw 182 and lock nut 183 for securing the unit in its longitudinally adjusted position. As shown in Fig. 10, the housing unit 114 is yieldingly urged upwardly on its supporting studs 174 by springs 184 interposed between upper and lower spring caps 186, 188 and is limited in its upward movement by adjusting screws 190 threadedly engaged with the upper ends of the studs 174 and having a shouldered portion engageable with the upper surfaces of the housing. Thus, the entire cutting head may be raised or lowered relative to the chain of frankfurters by adjustment of the screws 190.

Referring again to Fig. 6, it will be observed that the plow 94 is carried by the supporting member 110 shaped to form a guard for the blade and forming an extension of and concentrically mounted with relation to the outer end of the housing 114, and, provision is made for rotatably adjusting the plow carrying member 110 in order to vary the angular position of the plow or air nozzle with relation to the chain of frankfurters. As herein shown, the member 110 may be keyed to an elongated bearing sleeve 194 supported for rotation in the housing 114, the other end of the sleeve being provided with a worm gear 196 fast thereon. As better shown in Fig. 10, the gear 196 is arranged to be rotated to effect angular adjustment of the plow member to a substantially horizontal position by a worm pinion 198 fast on a pin 200 supported in a bearing member 202 car-

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ried by the housing 114, and adjustment of the unit may be effected by a knob 204 fast on the upper end of the pin 200.

By reference to Fig. 3, it will be observed that the length of the tube 42 approximates the length of four links, and with this arrangement the two links at each end of the tube are subjected to transverse movement to rock the intermediate portion of the two links back and forth to thereby alternately stretch and contract the casing at the point at which the tie strings occur. The result of this operation is the removal of most of the tie strings during the travel of the chain through the first half of the tube and the removal of the remaining tie strings during the travel of the chain through the remainder of the tube.

As used throughout the specification and claims the term "frankfurter" is intended to also define and include any other encased food product such as sausage, Bologna, and similar products.

Having thus described the invention, what is claimed is:

1. A machine for operating upon a chain of frankfurters having tie strings between adjacent links thereof, comprising a hollow member of a length sufficient to enclose a plurality of links of the chain and of a sectional size substantially greater than that of the frankfurters of the chain, means associated with said hollow member for feeding the chain through said hollow member under tension, and means associated with said hollow member operating simultaneously with the operation of said feeding means for imparting rapid reciprocatory movement to the hollow member in a direction transversely of the movement of the chain through the hollow member whereby the combined effect of such movements causes the links of the chain within the hollow member to be stretched to effect the loosening, unwinding and removal of said tie strings.

2. A machine for operating upon a chain of frankfurters having tie strings between adjacent links thereof, comprising a hollow member of a sectional size substantially greater than the frankfurter links, means pivotally mounting the hollow member to permit oscillation thereof, means connected to the hollow member for oscillating the same at relatively high frequency and means associated with said hollow member for feeding a chain of frankfurters under tension through said oscillating hollow member whereby the combined effect of such movements causes the links of the chain within the hollow member to be stretched to effect the loosening, unwinding and removal of said tie strings.

3. A machine for operating upon a chain of frankfurters having tie strings between adjacent links thereof comprising a hollow member of a length sufficient to enclose a plurality of the links of the chain and of a sectional size substantially greater than the frankfurter links, means mounting the hollow member to permit oscillation thereof in a direction transversely of the movement of the chain therethrough, means associated with said hollow member for oscillating the hollow member at a frequency of between 750 and 1000 cycles per minute and means associated with said hollow member for feeding a chain of frankfurters under tension through said oscillating hollow member during the oscillation thereof whereby the combined effect of such movements causes the links of the chain within the hollow

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member to be stretched to effect the loosening, unwinding and removal of said tie strings.

4. A machine for operating upon a chain of frankfurters as defined in claim 2 wherein the hollow member is provided with means forming a rounded surface at the entrance and exit ends of the hollow member and over which the chain of frankfurters is drawn.

5. In a machine for operating upon a chain of frankfurter links having casing and tie strings wound around the casing between adjacent links, in combination, a rotatable spider having a plurality of radial arms upon each of which a portion of a chain of frankfurters may be supported in coil relation to be capable of being drawn therefrom, hollow oscillatory member in substantial alignment with one of the radial arms of said spider, means associated with said hollow member for feeding the chain of frankfurters to withdraw successive portions of the chain from successive arms of the spider and to effect rotation of the spider to cause successive arms to be moved into substantial alignment with the hollow member through said hollow member,

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means associated with said hollow member for effecting rapid oscillation of said hollow member in a direction transversely of the movement of the chain of frankfurters therethrough to effect the removal of the tie strings.

6. A machine as defined in claim 2 wherein the hollow member is provided with restricting orifices disposed in spaced relation along the length of the tube for the purpose of restricting the transverse movement of the chain at such points.

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