Device for Stuffing Foodstuff Into Tubular Nettings

Inventors: Vittoria Cherio; Giuseppe Mignone, both of Valle San Mattes, Cisterna d'Asti, Italy

Filed: Apr. 17, 1972
Appl. No.: 244,432

Foreign Application Priority Data
Nov. 27, 1971 Italy 70901/71

U.S. Cl. 53/197
Int. Cl. B65b 39/06
Field of Search 53/197, 255, 258; 17/42

References Cited
UNITED STATES PATENTS
3,209,398 10/1965 Ziolkowski 17/42
3,461,484 8/1969 Arnold 17/42 X
3,594,855 7/1971 Urbots 17/42
3,561,192 2/1971 Soodalter 53/197

Primary Examiner—Travis S. McGehee
Assistant Examiner—John Sipos

Abstract

In apparatus for manually stuffing foodstuff into tubular netting and continuously gathering netting about a tubular element, the action of centering, holding on position and aligning of the tubular element is combined with the net-unwinding from spool-feeders in one single improved device which consists of a plurality of rolls located on the tubular element near a constricted section thereof. The tubular element, furthermore, may be contained within a sheath and supported therein by an axial spine with a plurality of spaced annuli. Several modifications of this concept are described and claimed, the concept being applicable to Apparatus of both the reciprocating and continuous net-gathering type.

16 Claims, 26 Drawing Figures
DEVICE FOR STUFFING FOODSTUFF INTO TUBULAR NETTINGS

FIELD OF THE INVENTION

The present invention relates to devices for stuffing foodstuff in general, and roasts, salami and the like in particular, into tubular nettings. It relates, further, to devices used in connection with the gathering of such netting onto tubular extruders, preparatory to said stuffing of foodstuff.

BACKGROUND OF THE INVENTION

There are already available processes for stuffing of foodstuff into tubular nettings, such foodstuff being, for example, roasts, salami, and other solid or paste-like foodstuff. These processes are generally carried out in one of two different manners and, specifically, either by stuffing the food product directly and using a length of netting equal to the length of finished stuffed product, or by gathering the netting about tubular rigid elements, within which foodstuff is introduced. The foodstuff, in this latter process, is extruded from the tubular element and drags a length of netting corresponding to the volume occupied by the foodstuff. To carry out either one of the two processes aforementioned, it is known to use suitable devices, such as those described in co-pending U. S. applications Ser. No. 208,179, now U.S. Pat. No. 3,726,059, filed on Dec. 15, 1971, Ser. No. 204,450, filed on Dec. 3, 1971, now abandoned, and Ser. No. 195619 filed on Nov. 4, 1971, now U.S. Pat. No. 3,719,022, all by the instant inventors, and made herein of reference.

SUMMARY OF THE INVENTION

It is, therefore, the main object of the present invention to provide a device for the manual directstuffing of foodstuff and for the concurrent gathering of the netting onto a removable tubular extruding element suitable for successive stuffing operations.

In general, the above-mentioned known devices employ a tubular extruding element which is rigidly fixed to the stuffing device and employ also mechanical means for the gathering of the netting, which means operate in a reciprocating fashion. These means are provided with net-seizing jaw-like means: and, due to their reciprocating movement, gather the netting about the tubular extruding element, while at the same time unwinding continuously said netting from a suitable feeding spool. To effect such gathering of the netting, the extruding element is provided with a thermal section conically-shaped and on which slides the netting prior to being gathered. This terminal section is connected to the main body of the tubular element through a constriction on which a plurality of rolls act for holding in position and centering said tubular element. These rolls are freely mounted on the constriction section of the tube and rotate about suitable fork-shaped supports.

One purpose of the present invention consists in substituting, at least in part, the pivots, heretofore known, with driving rolls, so that the holding and aligning operations may be coordinated directly with the auxiliary operation of unwinding of the netting, thus preventing possible jamming and rendering the overall operation of the device more regular. The speed of these rolls hereinafter defined as auxiliary unwinding rolls is proportional to the operational speed of the net-gathering means, so that the unwinding of the netting from the feed roll or spool is proportional to the drag rate of the netting by the gathering means, or, respectively, to the rate or cycle of operation of these means.

Generally, therefore, there is provided a kinematic linkage directly between the gathering means for the netting and the auxiliary unwinding rolls thereof, said rolls, as explained hereabove, also serving the purpose of holding the extruder in place and preventing longitudinal displacements thereof.

In accordance with the present invention, the auxiliary unwinding rolls, further, cooperate with winding counter-rolls supported by the terminal portion of the extruding element; this cooperation facilitates even further the unwinding of the netting.

Another feature of the invention resides in that the immobile tubular element may be employed as a sheath which externally surrounds another tubular member which is removable and is capable of telescopically sliding within the sheath, and, thus, receiving, gathered thereon, the netting for the stuffing operation. As a matter of fact, it is the gathering action of the netting that pushes the telescopically sliding tubular member out of the surrounding sheath, which sliding member may then be removed and utilized in the stuffing operation. The gathered netting is obviously severed at its end prior to removal of the net-covered tubular member.

In order to obtain the pushing action the internal tubular member is provided with a frusto-conical terminal opening facing in a direction opposite to the direction of the sheath's terminal section on which the rolls are acting. As the netting is being gathered, it acts on this terminal opening of the tubular member and pushes it slowly out of the sheath.

In accordance with a variant of the present invention, there are provided net-gathering means which operate continuously, instead of reciprocatingly. If, conversely, the gathering means are of the reciprocating type, these are provided with shoes with a cylindrical surface and acting with differential pressure on the netting.

The means for controlling the action of these shoes are, preferably, a sliding carrier operated by the operator in a reciprocating fashion. This carrier, sliding on suitable guides, effects a "positive" displacement during which the netting is gathered, and a "negative" displacement during which the carrier returns to its original position. Another way of operating the carrier is by means of a pitman-linkage system.

Furthermore, the direct-stuffing type device is provided with a pneumatic system for the expulsion of the product from the tubular extruding member and for the sliding therefrom of a quantity of netting equal to the volume of the foodstuff to be used.

THE DRAWINGS

The present invention will become more apparent from the following detailed description thereof and from the accompanying drawings, in which:

FIG. 1 is an elevational view of the device of the invention as applied to direct-stuffing apparatus;
FIG. 2 is a frontal view of the device of FIG. 1 taken in the direction of arrows II--II;
FIG. 3 is a top planar view of the device of FIG. 1;
FIG. 4 is a sectional view taken along the line IV--IV of FIG. 3;
FIG. 5 is a sectional view taken axially along the line V—V of FIG. 3;
FIG. 6 is an elevational view of another embodiment of the device of the invention;
FIG. 7 is a frontal view of the device of FIG. 6 taken in the direction of arrows VII—VII;
FIG. 8 is a top plan view of the device of FIG. 6;
FIG. 9 is a schematic elevational view, partly in cross-section, showing in detail the auxiliary unwinding rolls of the device of the invention;
FIG. 10 is a sectional view of FIG. 9 taken along the line X—X thereof;
FIG. 11 is an elevational view similar to FIG. 9 and showing the application of rolls to the device of the invention;
FIG. 12 is a sectional view of FIG. 11 taken along the line XII—XII thereof;
FIG. 13, 14 and 15 are side elevational, front elevational and top planar views, respectively, of the device of the invention applicable to an apparatus wherein the net-gathering is effected upon a removably connected tubular extruder;
FIG. 16 is another schematic, sectional view illustrating in detail the device of the invention as applicable to a net-gathering apparatus having a removable tubular extruder and using particular netting designs;
FIG. 17 is an elevational view showing in detail a variant of the net-gathering shoes as applied to an apparatus provided with reciprocating netting-means;
FIG. 18 is an elevational sectional view of FIG. 17 taken along the line XVIII—XVIII;
FIG. 19 is a top planar view of FIG. 17;
FIG. 20 is an exploded sectional view of a detail of FIG. 17;
FIG. 21 is a sectional view of FIG. 20 taken along the line XXI—XXI;
FIG. 22 is an elevational view, similar to FIG. 17, showing another variant of the net-gathering shoes;
FIG. 23 is a sectional elevational view of FIG. 22 taken along the line XXIII—XXIII;
FIG. 24 is a top planar view of FIG. 22;
FIG. 25 is an exploded sectional view of a detail of FIG. 22, and
FIG. 26 is a sectional view of FIG. 25 taken along the line XXVI—XXVI.

DETAILED DESCRIPTION OF THE INVENTION

With reference now to Figs. 1–5 of the accompanying drawings, the device for the direct stuffing of foodstuff into tubular netting is composed of the following structural elements: a rigid frame 1 with vertical uprights 2 and 3 therein. These uprights carry the horizontal sliding guides 4 for the net-gathering carrier indicated generally at 5. The uprights 2 carry, furthermore, a group of four rollers 6 mounted in pairs on the extremity of the bifurcated supports 7 and 8 which serve the function of holding in position and alignment of the immobile stuffing tubular element or tube indicated generally at 9.

Tube 9, preferably of metal, is provided with a feed inlet 9a near which act the centering and positioning rolls 6. Inlet 9a is aligned with a small frame 10 which slidably supports a blade 11 by which the foodstuff 12 is fed within tube 9. Furthermore, tubular element 9 is provided with a terminal section 9b which is rigidly connected to the rest of the tube by means of a constriction 13 in correspondence to which act additional positioning and centering rolls 14. These rolls 14 are rotatably supported on the uprights 3.

Rolls 14 serve furthermore the additional function of unwinding the netting 15 to permit it to be gradually gathered on the tubular element 9 by the reciprocating movement of the carrier 5.

Carrier 5 is provided with handles 16–17 which are manually actuated by the operator in order to effect the reciprocating sliding along the guides 4. During this sliding movement, a pair of jaws 18–19 carried by the carrier 5 gathers, at each ‘‘positive’’ displacement, a quantity of netting commensurate to the length of such displacement. The gathering takes place near the feed inlet 9a of tube 9. These jaws 18–19, therefore, effect a dragging action on the netting, unwinding it from suitable spools (not shown). The netting slides on the terminal section 9b of the tube and such sliding action is aided by the rotation of the rolls 14. Rolls 14 derive their reciprocating motion from the carrier 5 through a return chain 20 which is trained about a sprocket 21, carried by the shaft of one of the rolls 14, and a return idle pinion. The chain is rigidly connected at one point thereof with the carrier 5 so that when the carrier 5 reciprocates, so does the chain 20 thereby causing the sprocket 21 to reciprocate. A pair of gears 21b connects, furthermore, the rolls mutually to one another and since their peripheral velocity is equal to the drag velocity of the netting, the rolls effect their auxiliary net-dragging action preventing, at the same time, the net from becoming jammed or overstretched and possibly broken.

Reference numeral 22 shows a cutting means positioned intermediate the feed inlet 9a of the tube 9 and the small frame 10 and serving the purpose of severing the netting 15 after the stuffing operation is finished. The device, furthermore, provided with a pneumatic system of expulsion of the foodstuff introduced in the tubular element. To this purpose, (see FIG. 5), the tube is provided with a piston 23 which freely slides therein. In correspondence with the ‘‘blind’’ extremity of the tubular element there is an opening 24 cooperating with a nozzle 25 for the injection of compressed air. When the foodstuff 12 is introduced in the tubular element, the piston 23 is displaced toward the ‘‘blind’’ end of the tube 9 in correspondence with the location of the opening 24. To expel the foodstuff, the nozzle 25 is brought into contact with opening 24 into which compressed air is injected. The nozzle is supported by an oscillating yoke 26 controlled by a pull rod 27 in cooperation with a pedal 28. By acting upon the pedal, the nozzle is set in oscillating motion and brought into contact with the opening 24, as described hereabove, and a source of compressed air (not shown) is activated by means of a microswitch 29 associated with the yoke 26.

The variant of FIGS. 6–8 of the accompanying drawings refers to a stuffing device of the type hereabovedescribed (direct stuffing), which however employs different means for the gathering of the netting. To these figures, wherein similar elements are represented by similar reference numerals, the sliding carrier 5 is replaced by mechanical means 30 subdivided into two groups positioned diametrically opposite to each other on the tubular element 9, intermediate the extremities thereof. The two groups 30–30a are capable of axial displacement with respect to the tubular element 9, so
as to obtain the desired gathering of the netting 15. The members of each group 30-30a are mounted on respective support chains 31-31a, each chain engaging a corresponding toothed group of pinions 32-32a of which at least one is a driving pinion.

The motion is achieved by means of a pair of chains 33-33a, each of which has a link rigidly connected to the carrier 5 and engages a sprocket 34-34a integral with its corresponding driving pinion. The chains are returned by toothed sprockets 35-35a. The device is also provided with rolls as shown at 14 which serve the additional purpose of unwinding the netting 15. Rolls 14 derive their motion from pinions 32-32a through transmission shafts 36-36a, with the immediately located pairs of conical members 37-37a. To aid in this, it is advantageous to associate with the rolls 14 the idle counter-rolls as indicated at 38 and 39 of FIG. 9. These counter-rolls are positioned tangentially to the rolls 14 and are supported by the terminal portion 9b of the tubular element 9.

In FIG. 10, it can be readily seen that, by employing the counter-rolls, the constriction 13 between the tube 9 and its terminal portion 9b is provided, advantageously, with a section with flat and parallel faces, as indicated at S. It should, however, be pointed out that the positioning of rolls 14, eventually cooperating with the counter-rolls 38-39 as mentioned above, is not limited. In a device for stuffing of foodstuffs in accordance with the invention, the rolls 14 may be replaced by holding pins as shown at 6a in FIGS. 11 and 12. In these figures, it can be seen that the holding and centering pins are supported two-by-two by the corresponding forks 7-8 to engage the circular constriction 13 which connects the tube 9 with its terminal section 9b.

FIGS. 13-15 of the accompanying drawings refer to a device of the type described hereabove, but restricted to the gathering of an amount of netting greater than one single length of stuffing. Also in this case the device may be provided with a net-gathering carrier 5 with drag jaws 19 capable of reciprocating movement and with auxiliary unwinding rolls 14 operatively associated with carrier 5 by means of a chain 20 and a free wheel pinion 21, as described. However, according to this variant, the device is provided with an external sheath, as shown at 9', rigidly mounted and carrying a terminal section 9b' separated by a constriction 13 on which act the net-dragging rolls 14. In the sheath 9' there is contained a removable cylindrical member 40 provided with a frusto-conical opening 40a which protrudes beyond the sheath proper. Member 40 is supported inside the sheath 9', as well as outside of it, by a bracket 41 with a frusto-conical plug 41a, which bracket slides on guides 42.

In operation, the device works as follows: a quantity of netting is gathered by the jaws 18-19 onto the extremity of the rigid sheath 9' and from this point it is reversed onto the tubular member 40. As the gathering proceeds, member 40 is slid from the sheath 9', thus repelling the carrier 41 to its original starting position. At this point, the removable member 40 is fully removed from the sheath 9', fully covered with gathered netting, the end of which is severed by means of cutters 22.

FIG. 16 illustrates a variant of the arrangement hereabove described. It relates to the gathering of netting made of rhombic mesh, or the like, which is susceptible of non-uniform stretching. According to this variant, the tubular element 40 is supported within the surrounding sheath 9' by an axial spine 43 having intermediate spaced annular elements 44. The axial spine 43 is in turn supported by a terminal support 45 provided with at least one base bar 46 telescopically sliding within a guide 47 which is rigidly fixed to frame 1 of the apparatus. In this arrangement, also, the tube 40 is expelled from the sheath 9' by the net-gathering action. When the carrier 5 has reached its original starting position, tube 40 may be removed by causing the base bar 46 to slide on its guide 47, so as to extract the spine 43 from the sheath 9'. Here also there are provided the cutting means (not shown) for severing the netting at the extremity of the tubular element 40 and permit the complete removal thereof.

FIGS. 17-21 refer to another variant suitable for devices having net-gathering means provided with reciprocating motion. According to this variant, the sliding carrier 5 is provided with shoes 48 (instead of jaws 19) capable of engaging a larger quantity of netting and of preventing possible damage thereto. As shown in FIGS. 17-21, there are provided three shoes 48 positioned at 120° from one another. Each shoe is comprised of a cylindrical block of plastic material or the like and is provided with an appendix 49 which has an opening therein for the passage of the holding means carried by the carrier. These holding means preferably consist of a pin 50 for each shoe and bent so as to show a lower horizontal portion 50a with its axis convergent with the axis of tube 9. On this portion 50a slides the appendix 49 of the shoe against the action of a spring 51, which spring tends to push the shoe in engaging contact with the netting 15.

At it is evident from the drawings, the arrangement is such that, as the carrier slides in the net-gathering direction, the shoes 48 are caused to contact the netting and to gather it. Conversely, as the carrier slides in the opposite direction, the shoes will disengage from the netting and remain idle while the carrier completes the displacement.

If the supports 50 are employed as illustrated in the drawings, it is advantageous to have the vertical portion of such supports seated within the cylindrical seat 52 and retained thereby by fastener 53. This arrangement is such as to allow a radial control of the position of each shoe with respect to the tube 9.

Finally, FIGS. 22-26 of the drawings illustrate still another variant with respect to the mode of connecting each shoe 48 to its respective support 50. In accordance with this variant, the support consists of the single vertical position 50 of the pin, said portion 50 being contained slidably within seat 52 and being herein held by the fastener 53. To the extremity of each vertical rod there is movably connected the shoe 48, a double-link pitman 54 being interposed between the shoe and the vertical rod. The support 50 is also provided with a finger 55 on which acts a spring 56 to push the shoe radially into engagement with the surface of the tube 9. The operation of this structural arrangement is equivalent to the one described in detail hereinabove: each shoe 48 is actuated into contact engagement with tube 9 during each positive displacement of the carrier 5 and, conversely, actuated into disengagement from said tube 9 during the negative displacement of the carrier 5. Obviously, the details of execution of the operation and of the various structural elements of the device may be altered and varied without in the least exiting.
What we claim and wish to secure by Letters Patent of the United States is:

1. In a device for stuffing foodstuff into tubular netting and for gathering continuously said tubular netting on stuffing tubular elements, the improvement comprising, in combination, a stuffing tubular element; means for introducing and pneumatically expelling foodstuff from said tubular element; mechanical means manually operated for gathering said netting onto said tubular element; net-dragging means positioned on said mechanical means; means for holding and positioning said tubular element and for concurrently unwinding said netting during said gathering; said holding and positioning means being kinematically connected to said gathering means.

2. The improvement according to claim 1, wherein said tubular element is immobile.

3. The improvement according to claim 1, wherein said tubular element is removably supported within a tubular sheath surrounding it; and wherein said sheath is actuated upon centering, aligning, net-unwinding rolls; and wherein said tubular element is expelled from said sheath by the gathering action of said netting.

4. The improvement according to claim 3, wherein said removable tubular element is provided with a frusto-conical terminal upon which acts said netting for expelling, when gathering, said tubular element from said sheath.

5. The improvement according to claim 4, wherein said tubular element is supported externally to and in correspondence of said frusto-conical terminal by a carrier slidably dischargeable on supporting guides.

6. The improvement according to claim 3, wherein said removable tubular element is centered within said sheath by means of an axial spine having a plurality of spaced annuli intermediate the ends thereof, and wherein said spine is in turn supported by a sliding terminal supporting means.

7. The improvement according to claim 1, wherein said net-gathering means are reciprocating means.

8. The improvement according to claim 1, wherein said net-gathering means are continuously-operating means.

9. The improvement according to claim 1, wherein said holding and positioning means comprise a plurality of driving rolls; and wherein said tubular element is provided in correspondence of said rolls with a constriction section; said rolls deriving their motion from said net-gathering means by means of a combination chain-pinion-sprocket.

10. The improvement according to claim 9, wherein said driving rolls cooperate with a plurality of counter-rolls carried on said tubular element and sheath.

11. The improvement according to claim 1, wherein said net-gathering means include a sliding carrier capable of reciprocating motion and carrying net-dragging means which are engaging said netting only during the displacement of the carrier in one single direction.

12. The improvement according to claim 11, wherein said net-dragging means are composed of a plurality of shoes having a cylindrical surface and acting on said netting by exerting a differential pressure thereon.

13. The improvement according to claim 12, wherein said shoes are supported by means of a pin the axis of which is convergent with the axis of said tubular element; and wherein said shoes are freely sliding against the action of a spring and the direction of convergence of said pin coincides with the direction of return sliding of said carrier.

14. The improvement according to claim 12, wherein said shoes are supported by rods radially positioned with respect to said tubular element; and wherein a double-link pitman is interposed between each shoe and each radial rod, said pitman being actuated by a spring to cause the engagement and disengagement of said shoe in its radial displacements.

15. The improvement according to claim 12, wherein said net-gathering means are means supported by continuously moving chains, said chains being actuated by said carrier through dragging chains.

16. The improvement according to claim 11, wherein said net-gathering carrier is reciprocatingly driven by a mechanical system comprising a pitman and a handle.