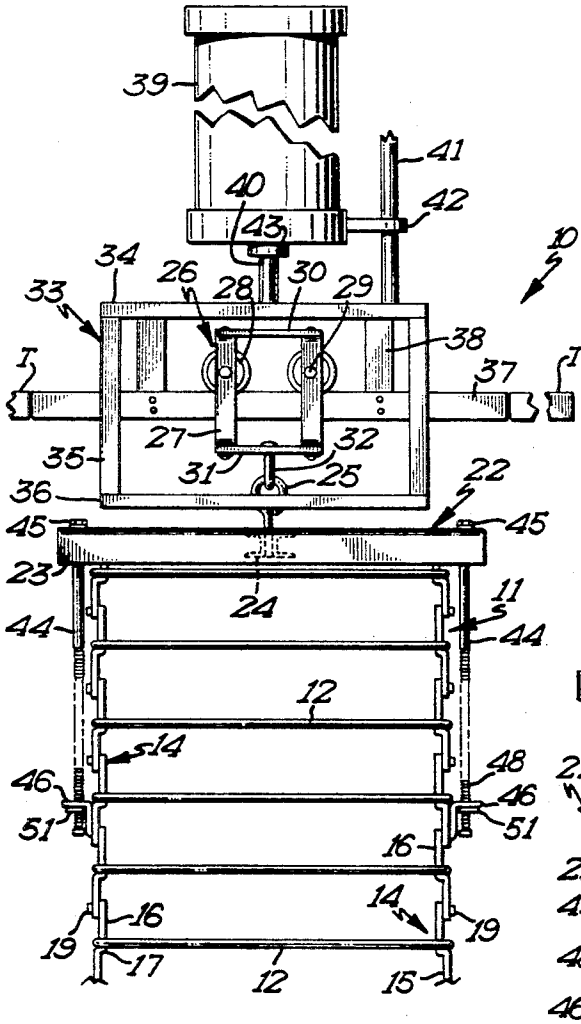
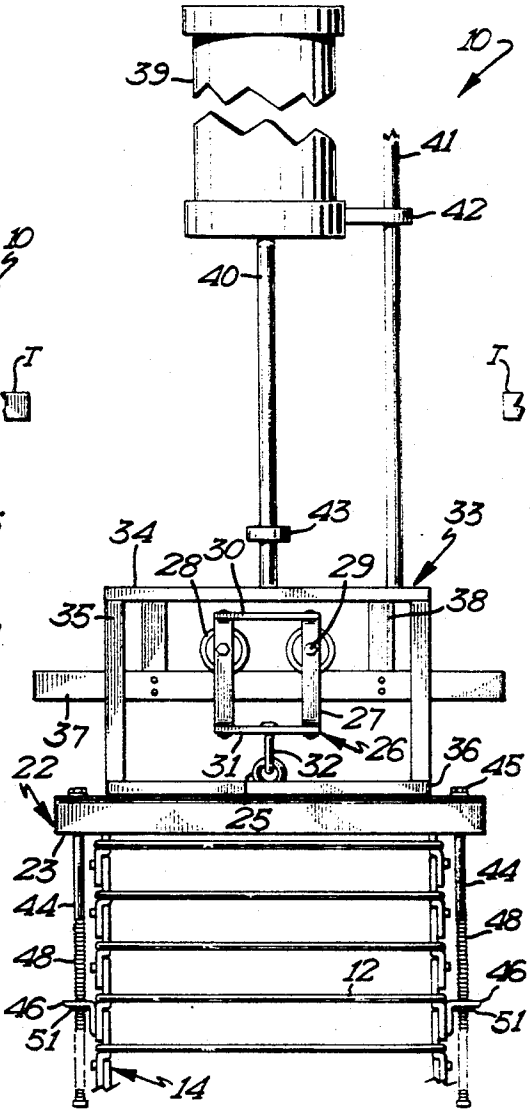
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APPARATUS FOR PRESSING AND SMOKING MEAT

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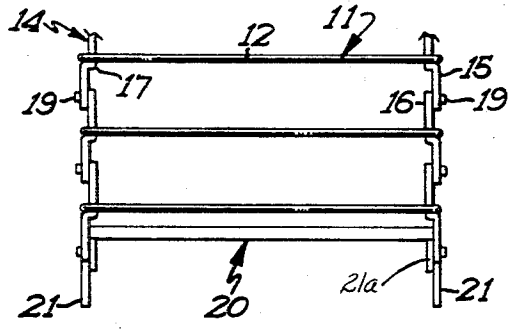


FIG 1

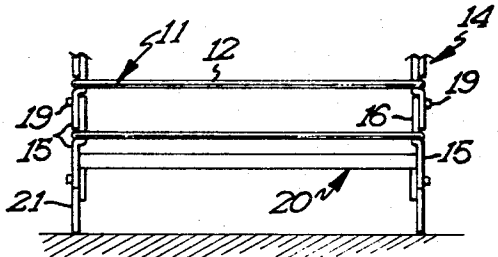


FIG 2

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APPARATUS FOR PRESSING AND SMOKING MEAT

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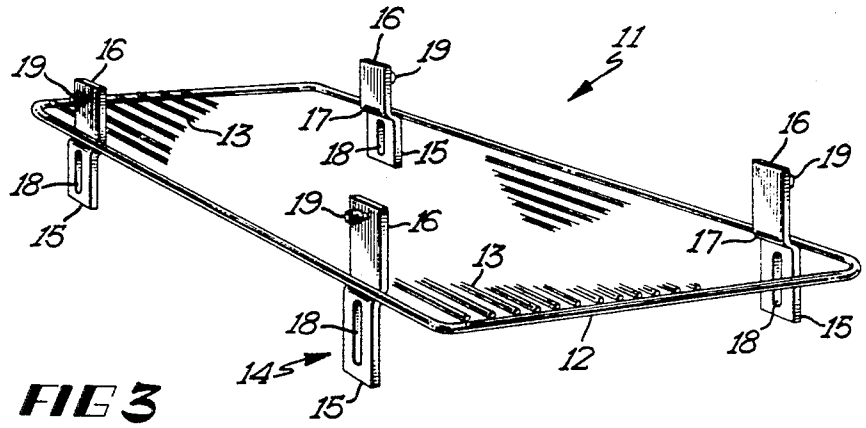


FIG 3

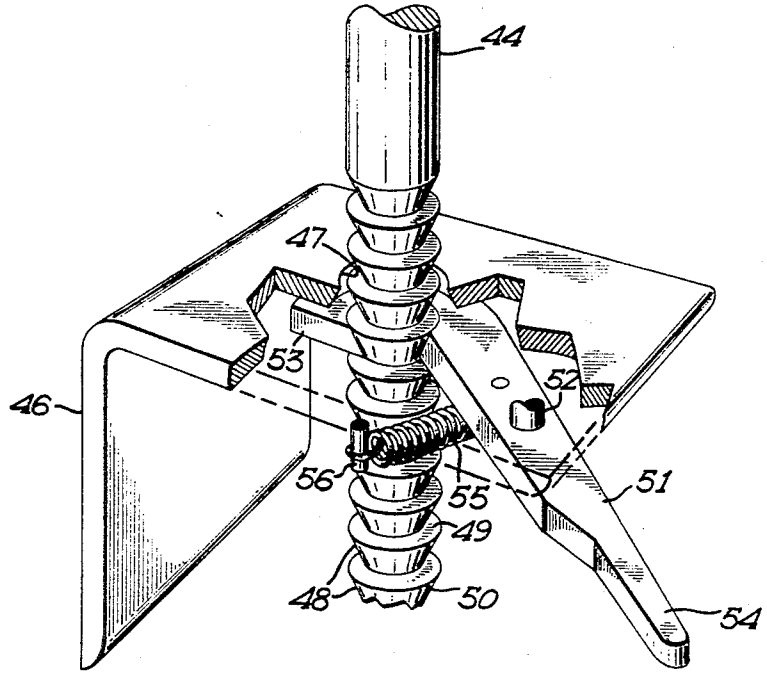


FIG 4

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APPARATUS FOR PRESSING AND SMOKING MEAT

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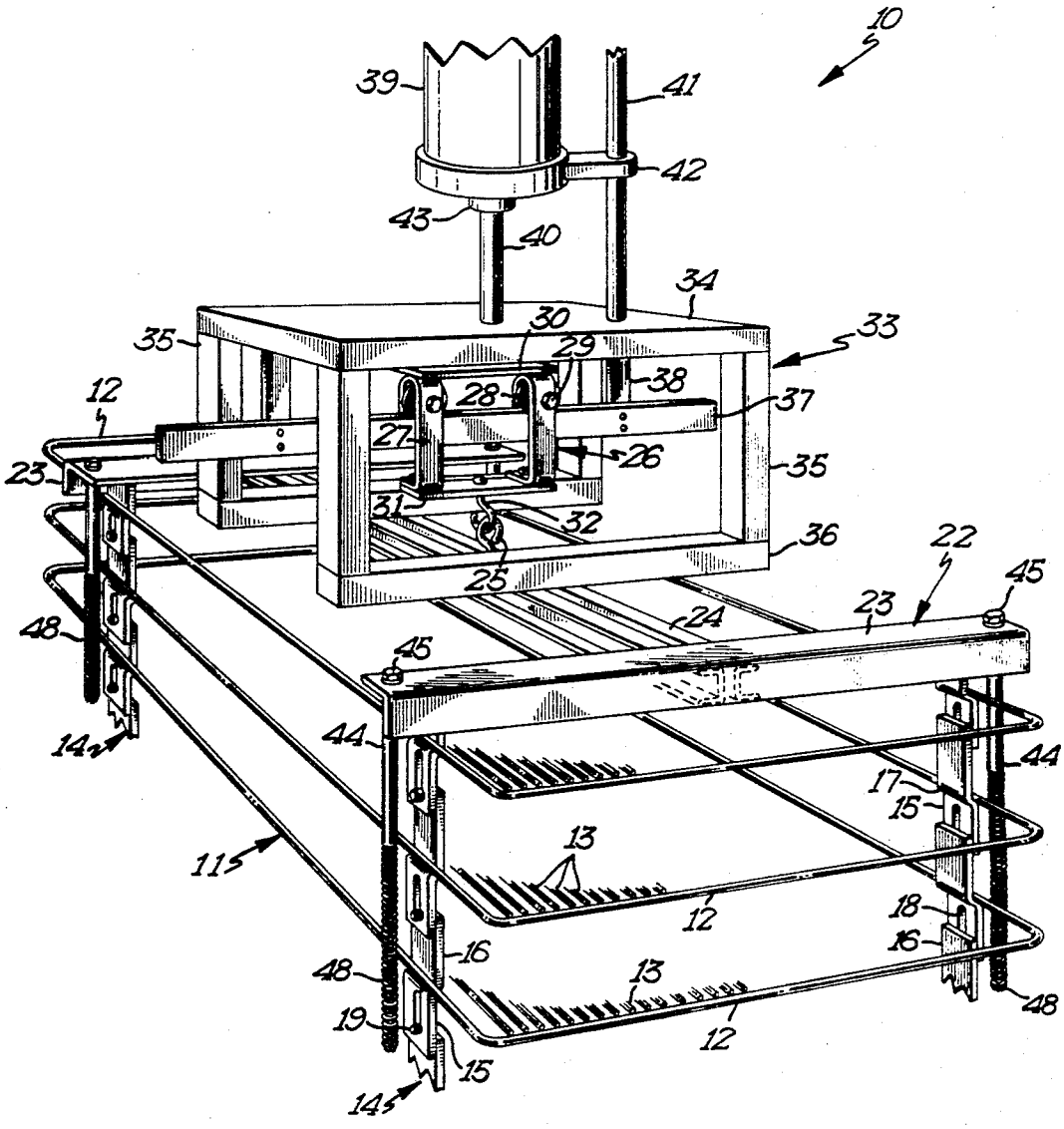


FIG 5

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3,473,465

APPARATUS FOR PRESSING AND SMOKING MEAT

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Int. Cl. A22c 7/00, 15/00
U.S. Cl. 100—194 7 Claims

ABSTRACT OF THE DISCLOSURE

An apparatus for compressing and smoking chunks of meat, such as ham, comprising a plurality of similar racks arranged one above another and interconnected together for limited vertical movement towards and away from each other, between collapsed and expanded positions. Releasable locking means for locking the uppermost group of racks in a collapsed position, and a trolley connectible to the uppermost rack. A pressure applying structure having a track element thereon supporting the trolley. A piston and cylinder connected to the pressure applying structure to vertically shift the same downwardly and thereby compress the racks into the collapsed position, and vertically shifting the pressure applying structure upwardly to align the track element with a track to permit movement of the trolley and the racks, suspended therefrom through a smoking chamber.

Summary of invention

Apparatus for compressing and smoking chunks of meat, such as ham, including a plurality of similar article supporting units which are interconnected together for movement between expanded and collapsed conditions. Each article supporting unit or rack being arranged and constructed to cooperate with other racks to effectively compress the ham prior to smoking and each being of open frame work construction to permit air and/or smoke to circulate between and through the racks and around the hams. Means engageable with the racks to compress the same during the compression operation and being operable to elevate the racks to an expanded suspended position for ready transfer of the trolley which supports the racks to a track so that the racks may be moved through a smoking chamber. The entire apparatus permits transfer, compressing and smoking of a plurality of hams in a highly efficient manner without handling of the chunks of meat other than the loading and unloading from the system.

Brief description of the figures of the drawings

FIG. 1 is a side elevational view of the novel apparatus foreshortened for clarity and illustrating the apparatus in an expanded condition,

FIG. 2 is a side elevational view of the apparatus similar to FIG. 1 and foreshortened for clarity, but illustrating the apparatus in a collapsed condition,

FIG. 3 is a perspective view on an enlarged scale of one of the article handling units,

FIG. 4 is a fragmentary perspective view of a locking mechanism with certain parts thereof broken away for clarity and illustrating details of construction thereof, and

FIG. 5 is a fragmentary perspective view illustrating the upper portion of the apparatus.

Detailed description of the invention

Referring now to the drawings and more specifically to FIGS. 1, 2 and 5, it will be seen that one embodiment of the apparatus is designated in its entirety by the reference numeral **10**. The apparatus includes a plurality of article handling units or racks **11**, each comprising a generally rectangular shaped frame **12** formed of suitable metallic stock. A plurality of spaced apart elongate identical longitudinal frame elements **13** have their ends rigidly secured to the end portions of the frame **12** so that each article holding unit or rack is of generally open frame work construction.

Each article handling unit or rack **11** has a plurality of coupling members **14** secured thereto adjacent the respective corners thereof. These coupling members **14**, as best seen in FIG. 3, are secured to the longitudinal portions of the frame **12** and are of identical construction. These coupling members are also of generally rectangular configuration, each including a lower portion **15** and an upper portion **16** interconnected by an intermediate portion **17**. It will be noted that the coupling members are vertically oriented and that the intermediate portion **17** extends substantially horizontally so that the upper and lower portions are laterally offset with respect to each other. The lower portion **15** has an elongate vertical extending slot **18** therein and the upper portion **16** has an outwardly projecting pin **19** which has a threaded end which is threadedly engaged in a threaded aperture in the coupling member. The pin of one coupling member is positioned in the slot of the coupling member of the next adjacent rack or article handling unit so that the racks are interconnected together for vertical movement relative to each other between a collapsed position and an expanded condition.

It will be noted that when the racks or article handling units are in the collapsed position, the pin and slot arrangement limits movement of adjacent racks towards each other. It will also be noted that an additional stop surface is defined by the upper edge of one coupling member and the lower surface of the intermediate portion **17** of the next adjacent coupling member.

A suitable support frame **20** having depending legs **21** is rigidly attached to the lowermost unit **11** so that the lowermost unit is spaced above a supporting surface such as a floor or the like when the apparatus is in the collapsed position. It will be noted that the frame **20** includes a pair of bars **21***a* which support a collection tray (not shown) in which are collected any juices that exude from the hams or other chunks of meat. The uppermost article handling unit **11** has a mounting frame **22** rigidly secured thereto and this frame is comprised of a pair of transverse elongate frame members **23** which are of angle construction and each being secured to a pair of the coupling members **14** adjacent one end of the uppermost article handling unit. A pair of longitudinally extending frame members **24** each being of generally channel shaped construction have their ends rigidly affixed to the transverse frame members **22** adjacent the mid portion of the latter. These longitudinal frame members **24** are positioned in close proximity to each other and an eyelet type coupling element **25** is rigidly secured to the members **24** intermediate the ends thereof.

A trolley **26** is provided for supporting the inter-connected article handling units therefrom when the units are in supporting relation with respect to a plurality of hams and are to be moved through a smoking chamber. This trolley **26** comprises a pair of U-shaped straps **27** each having a flanged wheel **28** journalled thereon by an axle **29**. Each trolley includes an upper plate **30** and a lower plate **31**, the latter being secured to the inturned lower ends of the straps **27**. A hook-shaped coupling element **32** is rigidly affixed to the lower plate **31** adjacent the central portion thereof and is adapted to releasably engage the coupling element **25** which is secured to the mounting frame **22**. Thus the article handling units may be suspended from the trolley for movement along the track or guide rail through the smoking chamber.

Means are provided for shifting the article handling units into the collapsed condition and for compressing hams mounted on these units during the compressing operation. This means includes a pressure applying structure **33** which is comprised of a top plate or member **34** which, as best seen in FIG. 5, is of generally rectangular configuration. This top plate **34** is the embodiment shown has four legs or posts rigidly affixed thereto and depending therefrom adjacent the corners thereof. Each post **35** is aligned longitudinally with another of the posts and it will be noted that each aligned pair has an elongate pressure applying member rigidly affixed to the lower surface thereof. The pressure applying members **36** are adapted to engage the longitudinal frame members **24** of the mounting frame **22** and are adapted to apply pressure to the interconnected article handling units so that these units are urged into the collapsed condition.

The pressure applying structure **33** is also adapted to have the article handling units when loaded with hams or the like suspended therefrom. To this end it will be seen that an elongate horizontally oriented track or rail element **37** is rigidly affixed to the pressure applying structure **33** by means of a pair of straps **38**. It will be noted that these straps **38** are fixedly connected to the rail element **37** adjacent at their lower ends and are affixed to the top plate **34** at their respective upper ends. With this arrangement, the rail element has its upper surface unobstructed to permit the flanged wheels of the trolley to move therealong. When the ends of the rail element **37** are disposed in alignment with the ends of the rail which extends through the smoking chamber, then the article handling units when suspended from the trolley may be moved through the smoking chamber.

Means are provided for shifting the pressure applying structure **33** vertically and this means comprises a fluid pressure piston and cylinder unit which is comprised of a cylinder **39**. Cylinder **39** is vertically oriented and is rigidly mounted or otherwise secured to a suitable supporting structure located above the tracks T along which the trolley **26** moves. Cylinder **39** has a conventional piston positioned therein and movable axially thereof and the piston is connected to a piston rod **40** which projects axially from the cylinder and is rigidly connected to the top plate **34**. It is pointed out that the piston and cylinder unit is preferably a double acting pneumatic unit although a double acting hydraulic unit may also be utilized.

Means are provided for guiding the pressure applying structure **33** and the article handling units suspended thereby during vertical shifting movements thereof and this means comprises an elongate guide rod **41** rigidly affixed to the top plate **34** and projecting upwardly therefrom adjacent the piston and cylinder unit. The cylinder **39** has a guide element **42** affixed thereto and this guide element has an aperture therein through which the guide rod **41** projects. With this arrangement, the pressure applying structure will be maintained in predetermined relation during vertical translation thereof even though a pressure applying structure will be in supporting relation with a plurality of ham laden article handling units. The piston rod **40** also has an adjustable stop collar **43** secured thereto and this stop collar serves to limit upward or retractive movement of the piston rod **40** whereby the ends of the rail element **37** are disposed in longitudinal alignment with the ends of the track T. It is pointed out that the collar **43** is adjustable so that it may be positioned at any convenient point along the piston rod.

During the pressing operation, it has been found that it is necessary to releasably lock the uppermost article handling units in a compressed collapsed condition. Therefore, suitable releasable locking means are provided for releasably retaining the uppermost group of article handling units in the compressed collapsed position. This releasable locking means comprises a plurality of similar locking mechanisms each including an elongate locking rod **44**, each being threaded at its uppermost end and projecting through an aperture in the ends of one of the transverse frame members **23** and secured thereto by a suitable nut **45**. It will be noted that four such rods are provided, a pair of such rods being secured to each of the transverse frame members **23**. Each rod projects downwardly through an opening **47** formed in a bracket **46**. It will be noted that the brackets **46** are each secured to the lower portion **15** of the coupling members **14** located on one of the article handling units remotely disposed with respect to the uppermost and lowermost article handling units.

Each rod **44** has a plurality of locking elements **48** formed thereon each comprised of a substantially flat annular locking surface **49** and a generally frusto-conical camming surface **50** extending downwardly from the associated locking surface **49**. Each bracket **46** has an elongate locking member **51** integrally connected thereto by pivot **52** for pivotal movement about a substantially vertical axis. The locking member **51** has a hook-shaped locking element **53** as one end thereof while the other end defines a handle **54**. A coil spring **55** has one end secured to the locking member **51** and has its other end secured to a pin **56** to normally urge the hook element of the locking member toward the rod **44**.

With this arrangement, when the locking rod **44** is moved downwardly, the locking elements will cam past the hooked shaped locking element until the desired collapsed position of the uppermost group of article handling units is obtained. The locking member **51** will then releasably lock the uppermost units in this downwardly compressed condition until released by a user. The interrelation of the spring **55** with the locking member is preferably an over center arrangement so that it is merely necessary to swing the locking member to the unlocked condition for the purpose of releasing the locking member. It is also pointed out that the locking surface of the hooked shaped locking element **53** is also tapered in the manner of the frustoconical camming surfaces **50**.

During use of the apparatus, the article handling units **11** will be in an expanded condition prior to loading of the hams or other chunks of meat thereon. A plurality of hams will then be loaded upon the article handling units and the units will then be lowered from their suspended expanded condition to a collapsed position. In this regard, it is pointed out that if the trolley **26** which supports the article handling unit is upon the track T, the trolley must then be moved upon the rail element **37** to permit the piston and cylinder unit to lower the article handling units. Extension of the piston rod **40** will cause the article handling units to be moved to the collapsed compressed condition since the pressure applying structure **33** will engage the mounting frame of the uppermost article handling unit and will urge the same downwardly. During this movement, the rods **44** will be moved downwardly and the camming surfaces **50** will cam past the locking member **51** until the desired degree of compression is reached, or alternatively until the article handling units have reached their lowermost limits of

travel. The hook-shaped locking elements will interlock with certain of the locking elements **48** on the rods **44** and will retain the uppermost units in their collapsed compressed condition. The coupling elements **25** and **32** may be disengaged from each other to permit the pressure applying structure to be elevated for handling of the next group of article handling units.

It is pointed out that during the processing of ham, it is desirable to compress the hams during the curing step to impart a natural loaf shape to the ham and to eliminate any voids or spaces that might occur within a ham. Hams which have had the bone removed therefrom will have a void therein which results from the removal of the bone. Pressing of such boned hams during curing causes the interfacial surfaces that define the void to intimately contact each other and adhere together.

The ends are retained in pressed relation during curing for a period of approximately seven days. During this pressing action, the hams will be cured to impart the desired flavor. It is necessary during this curing step that air be free to circulate over the surfaces of the ham. The open frame work construction of the article handling units readily permit air to circulate therethrough. Even though there may be slight scoring of the ham by the engagement of the ham surfaces with the longitudinal frame elements, any such scoring will readily disappear during the smoking step.

After the hams have been pressed and cured for the desired period of time, the piston rod **40** of the piston and cylinder unit will be extended so that the coupling element on the trolley **26** may readily engage the coupling element **25** on the mounting frame **22**. The locking members **51** will then be disengaged from the locking elements on the locking rods. The overcenter arrangement of the springs **55** permits the locking members to be maintained out of locking relation with respect to the locking elements until repositioned again. Retraction of the piston rod **40** elevates the interconnected article handling units until the stop collar engages a cylinder at which time the rail element **37** will be disposed in alignment with the respective ends of the track T. The trolley **26** may then be moved along the track T into the smoke house or smoking zone where it will remain the desired period of time to accomplish the smoking. Smoking under conventional practices may be accomplished during a period of approximately 16 hours after which the apparatus is removed from the smokehouse and smoking zone and the hams are chilled while remaining on the article handling units for a period of approximately three days.

The hams may be readily unloaded from the article handling units while it is in suspended relation from the overhead track T so that the apparatus may be returned to the washing and cleaning area where the units may be readily cleaned in the suspended expanded condition.

The present apparatus, as clearly set forth hereinabove, not only minimizes handling of the hams by workers, but the entire apparatus is arranged and constructed to minimize the labor involved in processing the hams. The apparatus is also arranged and constructed to permit ready cleaning thereof and to generally minimize contamination of the products.

Finally, it will be seen that the apparatus is not only of simple inexpensive construction, but one which functions in a more efficient manner than heretofore known for the purpose of smoking and pressing chunks of meat.

What I claim is:

1. Apparatus for supporting and pressing meat products comprising:

a mounting frame,

a coupling element on said mounting frame,

a plurality of similar article handling units arranged one above the other, the uppermost unit being rigidly secured to said mounting frame,

each unit comprising a generally rectangular shaped frame, a plurality of spaced apart generally parallel elongate frame elements secured to said rectangular shaped frame whereby each unit is of open framework construction,

each rectangular shaped frame having a plurality of similar coupling members secured thereto and projecting vertically therefrom, each coupling member having a pin projecting therefrom and an elongate slot therein, the pin of one coupling member on one unit being positioned into the slot of the coupling member on the next adjacent unit whereby said units are connected together for limited vertical movement towards and away from each other between collapsed and expanded positions,

cooperating abutting surfaces on vertically adjacent coupling members of vertically adjacent units for limiting movement of adjacent units towards each other whereby chunks of meat positioned on one unit will be engaged and compressed by the next adjacent unit positioned thereabove,

a plurality of locking members on said mounting frame, cooperating locking members on an intermediate unit remotely located with respect to the uppermost and lowermost units, and releasably engageable with said first-mentioned locking members to releasably lock a plurality of the uppermost units in a collapsed position.

2. The apparatus as defined in claim **1** wherein said first-mentioned locking members comprises a plurality of elongate rods each being connected with said uppermost unit and depending vertically therefrom, each of said rods having a plurality of locking elements thereon, said second-mentioned locking members comprising a plurality of elongate levers each being pivotally mounted on its associated article handling unit and being swingable into and out of engagement with one of said rods.

3. The apparatus as defined in claim **1** and a pressure applying structure, a track element on said pressure applying structure adapted to be positioned into aligned relation with an elongate trolley supporting track, a trolley positioned on said track element and shiftable therealong, said trolley having a coupling element thereon connectible with said coupling element on said mounting frame, a power unit connected with said pressure applying structure and being operable to shift the pressure applying structure between a lower and an upper position, said pressure applying structure when in said lowered position engaging said mounting frame to urge the units into the collapsed position and when in the upper position adapted to suspend the units in an expanded condition therefrom.

4. Apparatus for supporting and compressing a rack device used in pressing and smoking meat and the like, said apparatus comprising a pressure applying structure, an elongate horizontally oriented track element on said pressure structure adapted to be positioned into aligned relation with an elongate trolley supporting track,

a trolley positioned on said track element and being shiftable therealong, said trolley having a coupling element thereon adapted to be connected to a plurality of similar interconnected open framework rack devices to permit the interconnected racks to be suspended from the trolley,

a power unit connected with said pressure applying structure to shift the same between a lower position and an upper position, said pressure applying structure when in said lower position being engagable with the rack devices to compress the same, and when in the upper position adapted to suspend the rack devices therefrom and to align the track element with an elongate trolley supporting track.

5. The apparatus as defined in claim **4** wherein said power unit comprises a vertically oriented piston and cylinder unit which is extensible and retractable for raising and lowering said pressure applying structure.

6. The apparatus as defined in claim **5** wherein said piston and cylinder unit is provided with a stop element

located exteriorly of the cylinder for limiting retractive movement of the piston and cylinder unit to a point whereby said track element is aligned with the elongate trolley supporting track.

7. The apparatus as defined in claim 5 and cooperating guide means on said piston and cylinder units and on said pressure applying structure to guide the latter during vertical movement thereof.

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BILLY J. WHITE, Primary Examiner

U.S. Cl. X.R.

17—44.2; 99—261, 349; 100—215, 219, 229, 269, 295; 211—113