

(CONVENTION. By one or more persons and/or a Company.)

Form 4.

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1969

CONVENTION APPLICATION FOR A PATENT

(1) Here insert (in full) Name or Names of Applicant or Applicants, followed by Address(es).

By(1) THE MEAT INDUSTRY RESEARCH INSTITUTE OF NEW ZEALAND
We (INCORPORATED)
of East Street, Hamilton, New Zealand

(2) Here insert Title of Invention.

hereby apply for the grant of a Patent for an invention entitled:(2)
A MEETHOD AND MEANS OF REMOVING AND HANDLING ANIMAL VISCERA

(3) Here insert number(s) of basic application(s).

which is described in the accompanying complete specification. This application is a Convention application and is based on the application numbered(3)
.....231678.....

(4) Here insert Name of basic Country or Countries, and basic date or dates.

for a patent or similar protection made in(4).....New Zealand.....
on 7th December 1989.....

My
Our address for service is WATERMARK PATENT & TRADEMARK ATTORNEYS
290 Burwood Road, Hawthorn, Victoria, Australia.

DATED this7th..... day ofDecember.....1990.....

(5) Signature(s) of Applicant(s) or Seal of Company and Signatures of its Officers as prescribed by its Articles of Association.

(5).....THE MEAT INDUSTRY RESEARCH INSTITUTE OF
NEW ZEALAND (INCORPORATED)
.....by *[Signature]*
Stephen K. Plymin
.....Registered Patent Attorney.....

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To: THE COMMISSIONER OF PATENTS.

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1969

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

(1) Here insert (in full) Name or Names of Applicant or Applicants

In support of the Convention Application made by (1) THE MEAT INDUSTRY RESEARCH INSTITUTE OF NEW ZEALAND (INCORPORATED) (hereinafter referred to as the Applicant)

(2) Here insert title of invention.

for a patent for an invention entitled: A METHOD AND MEANS FOR REMOVAL AND HANDLING OF ANIMAL VISCERA

(3) Here insert (in full) Address or Addresses.

I (1) LYNDON FLETCHER FRAZERHURST of (3) 81 EAST STREET, HAMILTON, NEW ZEALAND

do solemnly and sincerely declare as follows:

(4) Here insert basic Country or Countries followed by date or dates and basic Applicant or Applicants.

1. I am/authorised by the applicant for the patent. to make this Declaration on its behalf. 2. The basic application as defined by Section 141 of the Act was made in (4) NEW ZEALAND on the SEVENTH day of DECEMBER 19 89, by THE MEAT INDUSTRY RESEARCH INSTITUTE OF NEW ZEALAND (INCORPORATED) on the day of by

(5) Here insert full Name(s) and Address(es) of actual Inventor(s) if other than Applicant(s).

the actual inventor of the invention referred to in the basic application We are or 3, (5) PEREHAMA HANARA of 19 Winifreds Avenue, Hamilton, New Zealand; JAAP FRANK AUTHIER, of 66A Grey Street, Cambridge, New Zealand and DOUGLAS CUMMINGS of C/- Pirongia Store, Pirongia, New Zealand are the actual inventor of the invention and the facts upon which I am/the Applt. is entitled to make the application, are as follows:

(6) Full Name of actual Inventor or Inventors.

The Applicant is PEREHAMA HANARA, JAAP FRANK AUTHIER and DOUGLAS CUMMINGS the assignee of the said (6)

(7) Signature of Applicant or Applicants.

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

DECLARED at HAMILTON, NEW ZEALAND this 14th day of DECEMBER 19 90

(7) [Signature] Secretary

To: THE COMMISSIONER OF PATENTS.



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A METHOD AND MEANS OF REMOVING AND HANDLING ANIMAL VISCERA
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- (71) Applicant(s)
THE MEAT INDUSTRY RESEARCH INSTITUTE OF NEW ZEALAND (INCORPORATED)
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- (74) Attorney or Agent
WATERMARK PATENT & TRADEMARK ATTORNEYS , Locked Bag 5, HAWTHORN VIC 3122
- (56) Prior Art Documents
US 4087886
AU 32707/84 A22B 5/20 5/18
AU 615024 29199/89 A22B 5/00 5/06 5/20 7/00

(57) Claim

1. A method for removal of viscera from the carcass of an animal comprising the steps of supporting the carcass from its hind legs with the hind legs being uppermost, cutting the brisket and belly wall of the carcass to expose the viscera, bringing mechanical spreading means into engagement with the carcass and spreading the pre-cut belly apart followed by locating mechanical means within the carcass to push the viscera from the carcass.

10. A mechanical means for removal of viscera from the carcass of an animal said carcass being supported by its hind legs with its hind legs uppermost, the belly wall and brisket of the carcass having been cut to expose the viscera, said mechanical means including spreader means to spread the belly wall of the carcass and scoop means adapted to be engaged within the carcass and to move therein in a controlled manner to push the viscera from the carcass.

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-69

COMPLETE SPECIFICATION

(ORIGINAL)

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Related Art :

Name of Applicant : THE MEAT INDUSTRY RESEARCH INSTITUTE OF NEW ZEALAND (INCORPORATED)

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Complete Specification for the invention entitled:

A METHOD AND MEANS OF REMOVING AND HANDLING ANIMAL VISCERA

The following statement is a full description of this invention, including the best method of performing it known to us

This invention relates to a method and means for the removal and handling of animal viscera.

During the dressing of animal carcasses in a meat processing works the viscera is removed from the carcass subsequent to removal of the pelt or, in the case of pigs, the hair. Conventionally the method of removing the viscera normally involves clearing the sphincter muscle and cutting the abdominal wall from a point between the rear legs to the brisket thereby removal of the viscera to take place. The process of removing the viscera normally involves two stages. The first stage is to remove the liver, paunch and runners (oesophagus, stomach, spleen, pancreas, deodenum, jejunum, ileum, caecum, colon and rectum). This is followed by the second stage wherein the heart, lungs, trachea, tymus, neck muscle and diaphragm are removed. It is normal practice that the brisket is cut between these two stages.

Further handling of the viscera then takes place and involves separating and sorting of the viscera components this operation being carried out with the viscera being located on a viscera table. The various components are sorted into a series of different disposal chutes which take the components to an offal department where they are further trimmed and packaged.

The conventional method of animal viscera removal and handling is thus labour intensive and involves a high degree of double handling of the final products. It is thus an object of the present invention to provide

a method and means for removal and subsequent handling of viscera from the carcass of an animal which is less labour intensive than conventional methods used at present.

To this end the present invention provides a method which is in part mechanised. There is thus provided by the invention a mechanical arrangement for removing the whole viscera from the carcass as a single unit. As a result all components of the viscera are removed together as a unit and by providing suitable support of the diaphragm after the viscera has been removed from the carcass inspection, transportation, handling and final separation and trimming of the viscera can be readily facilitated.

According to one broad aspect of the invention there is provided a method for removal of viscera from the carcass of an animal comprising the steps of supporting the carcass from its hind legs with the hind legs being uppermost, cutting the brisquet and belly wall of the carcass to expose the viscera, bringing mechanical spreading means into engagement with the carcass and spreading the pre-cut belly apart followed by locating mechanical means within the carcass to push the viscera from the carcass.

According to a preferred form of the method there is also included the step of moving the viscera as supported from the diaphragm to a processing area to permit components of the viscera to be separated and trimmed. In a preferred form the diaphragm is attached



to and supported by a suitable support device whereby the viscera, as supported from the diaphragm, can be moved to the processing area and preferably through an inspection area.

According to a second broad aspect of the invention there is provided a mechanical means for removal of viscera from the carcass of an animal said carcass being supported by its hind legs with its hind legs uppermost, the belly wall and brisket of the carcass having been cut to expose the viscera, said mechanical means including spreader means to spread the belly wall of the carcass and scoop means adapted to be engaged within the carcass and to move therein in a controlled manner to push the viscera from the carcass.

In the following more detailed description of the invention reference will be made to the accompanying drawings in which:-

Figure 1 a is perspective view of the mechanical means for removal of viscera from an animal carcass according to the invention shown in conjunction with an animal carcass,

Figures 2 to 5 are largely schematic views showing the machine at different stages of on operative cycle, and

Figure 6 is a schematic view of a modified form of the scoop means.

To prepare the carcass for viscera removal the carcass is completely opened by both the sternum



(brisket) and the abdominal wall being cut longitudinally of the carcass. This can, for example, be carried out by using a mechanical brisket/belly cutting machine of the type described and claimed in our New Zealand patent specification No. 204013. Following opening of the carcass the sphincter muscle is cut in the conventional manner (an action which is commonly referred to as "ringing") and the colon together with the kidneys and kidney fat pulled downwardly while clearing the backbone with a knife whereby an initial incision is made in the diaphragm. With the completion of this preparatory work the carcass is ready for evisceration.

The mechanical evisceration machine 10 is, according to the preferred form of the invention, installed at the beginning of and directly above a viscera table 11 and is so designed and operable as to remove the whole viscera as a unit from the carcass and deposit it on the table or preferably in a tray 12 located on the viscera table. In a less preferred form of the invention the initial preparatory work of the carcass could include the removal of certain of the viscera components. Thus while reference may be made in the present specification to the viscera being removed as a whole or as a unit such reference essentially relates to the situation where the viscera, when removed from the carcass, can then essentially be supported as a whole by engagement with and support of the diaphragm.

The evisceration machine 10 according to the invention essentially incorporates two main components being a spreader mechanism 13 and a viscera removal scoop 14. These components of the machine are mounted on a suitable trolley or other mechanical device (not shown) which is able to traverse with the processing chain. Thus correct alignment of the evisceration components of the machine 10 with the carcass C during viscera removal can be maintained as the carcass moves along the conveyor 15 of the processing chain.

At the completion of evisceration the trolley or other mechanical support arrangement is able to reverse its direction of travel so that the machine is once again located at the beginning of the viscera table ready to commence a new cycle. While the trolley or other support means is not shown in the drawings nor further described herein the construction and operation thereof is essentially in accordance with normal practice when a piece of dressing equipment is designed to move simultaneously with a carcass as the carcass moves along the dressing chain.

The spreader mechanism 13 essentially comprises a pair of elongate arms 16 which have hooked portions 17 at their lower ends. The arms 16 are pivotally coupled at 18 to a mounting (formed by or attached to the body of a linear actuator 19) which is carried by a support member 20. The support member 20 is pivotally attached in its length (as at 21) to a fixture 22 formed with or attached to the aforesaid trolley. A linear actuator 23

has its piston rod 24 attached to the upper part of support member 20.

By actuating linear actuator 23 arms 16 are able to be moved such that the hooked ends 17 move toward the carcass C and engage through the cut in the belly wall. By operation of the second linear actuator 19 (which has its piston rod 25 coupled by links 26 to arms 16) the arms 16 are able to move apart. This results in the hooked portions 17 engaging with the edges of the pre-cut belly wall so as to draw it apart and thereby hold open the carcass to enable the evisceration scoop 14 to enter the carcass unhindered. The arrangement with arms 16 in engagement with the belly wall and scoop 14 in position is shown in Figures 1 and 4.

The evisceration scoop 14 is conveniently formed by a suitably profiled broad "blade" member which extends from a stub arm 27 pivotally mounted on a support axle or shaft 28. Pivotal movement of the blade 14 relative to the support axle or shaft 28 is controlled by a linear actuator 29 mounted by a support 30 which also mounts the support axle or shaft 28. The support 30 extends from the trolley or other mechanical support means as aforesaid.

The end of blade 14 opposite to stub arm 27 is provided with a suitably profiled projection 31 the purpose of which will hereinafter become evident. The blade furthermore incorporates a skid 32 which extends downwardly from the blade (see Figure 1) from the stub arm end.

Support 30 is coupled to suitable moving means (such as linear actuator 33) which enables the support to be raised and lowered as well as another linear actuator 34 which enables support 30 to be pivoted toward and away from the carcass.

At the commencement of an operation cycle (see Figure 2) the evisceration scoop 14 is located adjacent the viscera table 11 (see Figure 2). The approach of a carcass C toward the viscera table is detected and this causes linear actuator 29 to pivot blade 14 into an operative position and actuator 34 operates so the support 30 commences to rise. As it does actuator 23 moves the spreader arms 16 into the carcass following which actuators move the arms 16 so the hooked portions pull the belly wall apart as previously described (see Figure 3). As this step is completed support 30 has reached its uppermost point of travel and is then pivoted by actuator 34 (see Figure 4) so that scoop 14 enters through the belly wall and into the carcass. The extreme outer end of projection 31 on blade 14 thus locates on the backbone of the carcass C.

The support 30 is now caused by actuator 33 to move downwardly which causes scoop 14 to move inside the belly cavity above the diaphragm. The leading end projection 31 continues to engage with and move along the backbone until it moves out through the pre-cut sternum thereby pushing the viscera V out of the carcass and onto the viscera table (see Figure 5). The skid 32 engages with the upper and outer area of the viscera to

ensure that there is controlled movement of viscera V as scoop 14 moves within the belly cavity.

Upon completion of the push down action support 30 is pivoted back to its rest position whereupon scoop 14 is withdrawn from the vicinity of the carcass. With the support in its rest position scoop 14 (which has been pivoted about the support axle or shaft 28) is located within a sterilizer cabinet 36. As support 30 is moved back to its initial starting point ready to complete a new cycle the scoop moves within the sterilizer cabinet and is sterilized. The parts of spreader mechanism 13 which come into contact with the carcass are also at this time sterilized before engaging with a new carcass.

The concave shape of the scoop together with the leading projection and the skid ensures that the viscera is completely and cleanly removed from the carcass. This includes the aorta together with the entire diaphragm which tears off at the ribcage attachment thereby leaving a clean carcass not requiring any further trimming in these areas. The angle of attack of the scoop as it moves through the belly cavity also ensures that this end result is achieved.

The spreader mechanism not only permits proper insertion of the scoop and correct location on the backbone but it also steadies the carcass during the viscera removal action thereby enhancing clean removal of the viscera.

The evisceration machine whilst being described and showing only a single scoop and associated spreaders may equally be equipped with two scoops and associated spreader mechanisms. This allows the machine to process two carcasses simultaneously creating more time for sterilizing for a given chain speed. Sterilization of the equipment is of considerable importance where the risk of cross contamination arising from evisceration is considerable.

Subsequent handling of the viscera once it has been removed from the carcass includes inspection, separation, trimming and sorting of the viscera elements. Because the viscera has been removed as a whole advantage can be made of the central attachment of the viscera elements to the diaphragm. Accordingly the complete viscera is placed on a hook of a conveyor positioned just above the viscera table with the hook preferably being inserted through the natural hole in the diaphragm through which the oesophagus passes. It is, however, envisaged that alternative ways of suspending the viscera can be used.

With the viscera being suspended as described all of the edible components, i.e. heart, lung, liver and kidneys are held uppermost while the inedible components are held lower where they cannot easily contaminate the edible components which contamination is a distinct possibility during separation and trimming.

With the viscera suspended on a hook inspection may be carried out provided the kidneys are enucleated, the

liver is partly cut from the diaphragm and the pericardium is cut. After inspection the viscera unit can be broken down whereby each element is trimmed while separated, ready for packaging. With the viscera on a hook, trimming is more easily undertaken because of a consistent location of the components and integral cohesion of the mass assisting the knifing action of the knifehand.

The exact sequence of separation, the degree of trimming and further handling of the trimmed products are dictated by market demands, plant layout and preferred work methods. However, it is normal that the last element to be trimmed is the thick skirt of the diaphragm.

The invention as herein described is open to modification within the scope of the invention as defined in the appendant Claims.

According to one modification the scoop is provided with a clamping arrangement the aim of which is to ensure complete removal of the viscera at all times for all types of stock. This modification is schematically shown in Figure 6 of the drawings. As illustrated the clamp 37 is pivotally coupled at 38 to the scoop 14. An extension piece 39 from clamp 37 is coupled to a pneumatic cylinder/actuator 40.

After support 30 has reached its uppermost point of travel and scoop 14 has entered through the belly wall into the carcass support 30 is caused by actuator 33 to move downwardly inside the belly cavity. At a set time

after commencement of this downward movement clamp 37 closes thereby causing the viscera to be clamped and held firmly while the downward stroke is being completed. At the end of this downward stroke the clamp once again opens thereby releasing the viscera.

This clamp 37 may be installed in lieu of the fixed skid 32. It will be realized that the scoop is in essence the fixed part of a clamping arrangement such that as indicated above the viscera is clamped between the scoop and the clamp 37. To this end clamp 37 is a shaped plate so dimensioned as to fit snugly inside the scoop 14. The arrangement is such that pressure applied to the clamp 37 is such as not to over clamp the viscera and therefore cause damage thereto. To this end pressure sensing means can be provided to ensure that over clamping does not take place.

The method and means of removal and handling of viscera as described herein is believed to be more labour efficient than conventionally used processes in part due to the mechanised evisceration and in part due to only minimal double handling of viscera products. It is believed that the present method and means is also more hygienic due to the reduced manhandling of the viscera products.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A method for removal of viscera from the carcass of an animal comprising the steps of supporting the carcass from its hind legs with the hind legs being uppermost, cutting the brisket and belly wall of the carcass to expose the viscera, bringing mechanical spreading means into engagement with the carcass and spreading the pre-cut belly apart followed by locating mechanical means within the carcass to push the viscera from the carcass.
2. The method according to Claim 1 wherein the mechanical means push the viscera out of the carcass and the spreading means locate the carcass in correct orientation for viscera removal to take place.
3. The method according to Claim 1 or 2 wherein the mechanical means is in the form of scoop means and the locating of the carcass is at least partially effected by a part of the scoop means engaging with and running along the backbone of the carcass as the scoop means carries out the step of pushing the viscera out of the carcass.
4. The method according to any one of Claims 1 to 3 further including the step of moving the viscera as supported from the diaphragm to a processing area to permit components of the viscera to be separated and trimmed.



5. A method according to Claim 3 wherein the diaphragm is attached to and supported by a suitable support device whereby the viscera, as supported from the diaphragm, can be moved to the processing area.

6. The method according to any one of Claims 2 to 5 wherein the viscera is clamped with the scoop means as the viscera is pushed from the carcass.

7. The method according to any one of the preceding Claims wherein the carcass is moved along a processing conveyor or chain during removal of the viscera.

8. The method according to any one of the preceding Claims wherein the viscera is partially severed prior to the mechanical means working on the carcass.

9. A method for removal of viscera from the carcass of an animal substantially as herein described with reference to the accompanying drawings.

10. A mechanical means for removal of viscera from the carcass of an animal said carcass being supported by its hind legs with its hind legs uppermost, the belly wall and brisket of the carcass having been cut to expose the viscera, said mechanical means including spreader means to spread the belly wall of the carcass and scoop means adapted to be engaged within the carcass and to move



therein in a controlled manner to push the viscera from the carcass.

11. The viscera removal means of Claim 10 wherein the carcass is located in position at least in part by the spreader means engaging with and spreading the pre-cut belly wall apart, said spreader means and said scoop means being movably mounted such as to be movable in a synchronized manner with movement of said carcass along a conveyor means from which said carcass is supported.

12. Viscera removal means as claimed in Claim 11 wherein the spreader means includes a pair of elongate arms adapted at their free ends for engagement within the cut in the carcass, said arms being mounted for movement in a lateral direction relative to the length of the carcass.

13. Viscera removal means as claimed in Claim 12 wherein first moving means are provided for moving the free ends of the arms into engagement within the cut in the carcass and second moving means which is operative to move said free ends transversely apart.

14. Viscera removal means as claimed in any one of Claims 10 to 13 wherein the scoop means incorporates a skid which extends substantially in the direction which the scoop means is moved during evisceration, said skid being adapted to engage with the viscera such as to



apply a controlled movement of the viscera as the scoop means moves within the carcass.

15. Viscera removal means as claimed in any one of Claims 10 to 14 wherein the scoop means includes a shaped leading end which is adapted to engage with and move along the backbone of the carcass as the scoop means is moved within the belly cavity of the carcass.

16. Viscera removal means as claimed in Claim 15 wherein the scoop means is of concave shape.

17. The viscera removal means according to any one of Claims 10 to 16 wherein the scoop means is associated with clamp means whereby the viscera can become clamped to the scoop means.

18. Viscera removal means substantially as herein described with reference to the accompanying drawings.

DATED this day of July 1993

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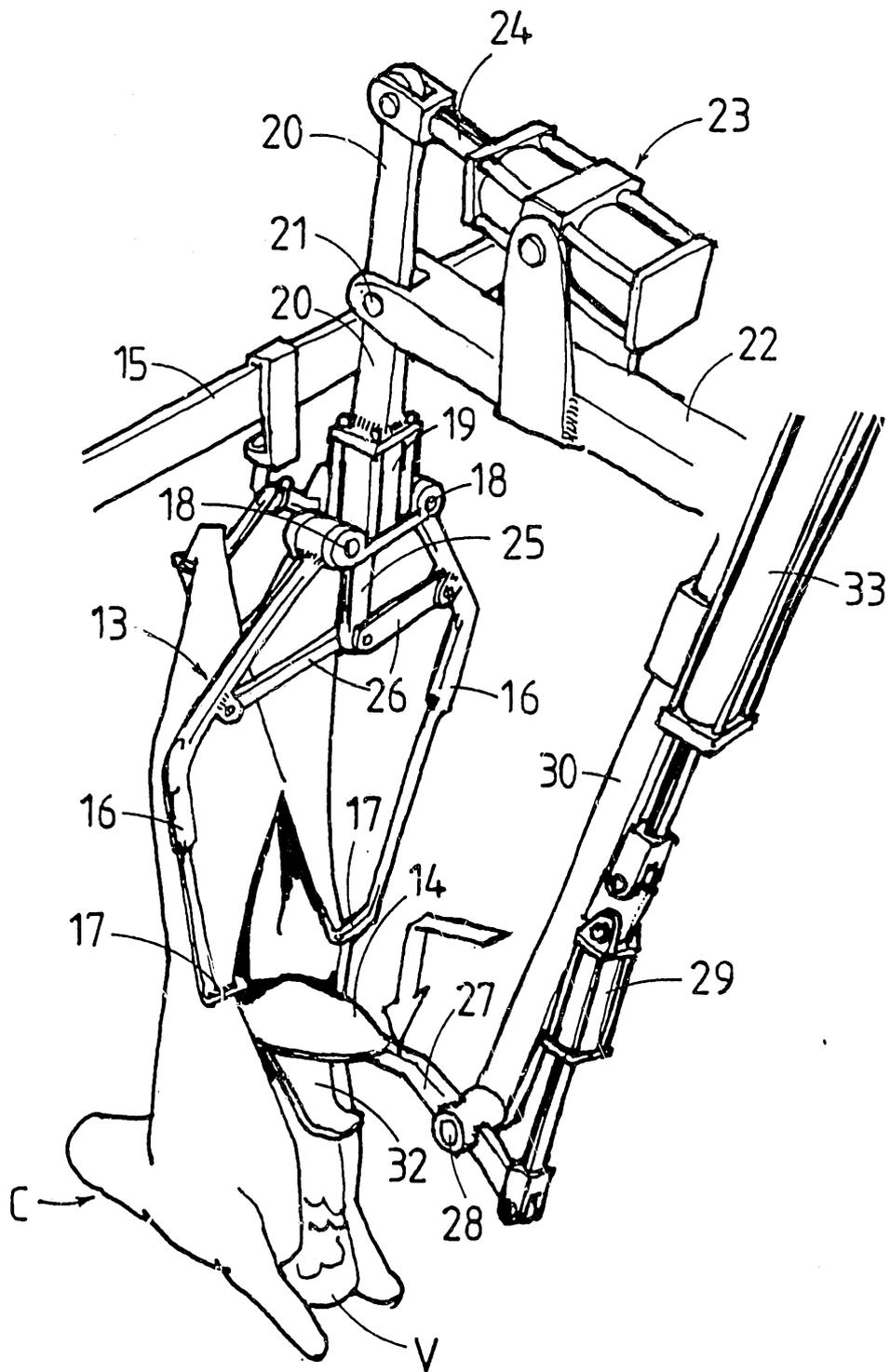
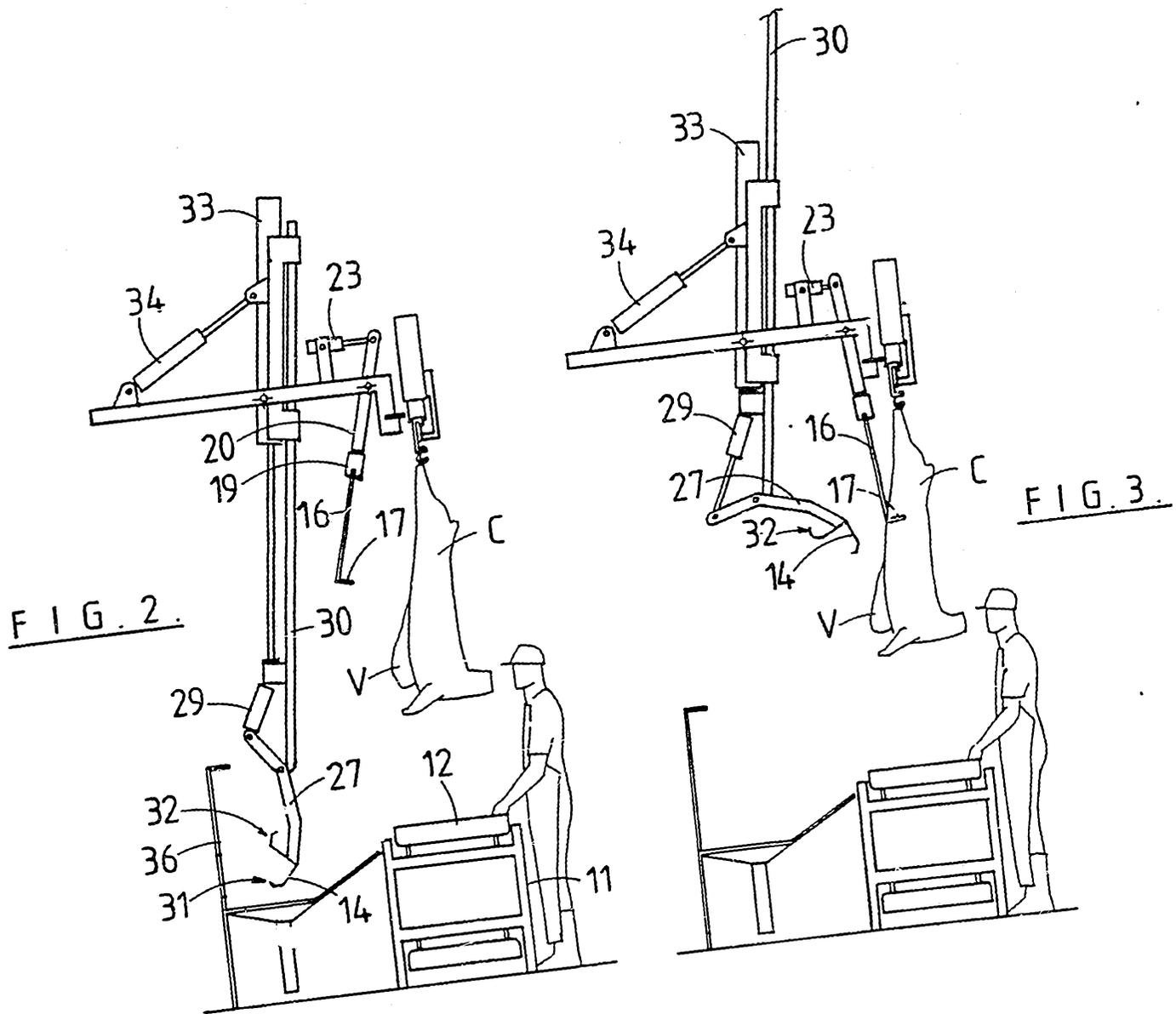
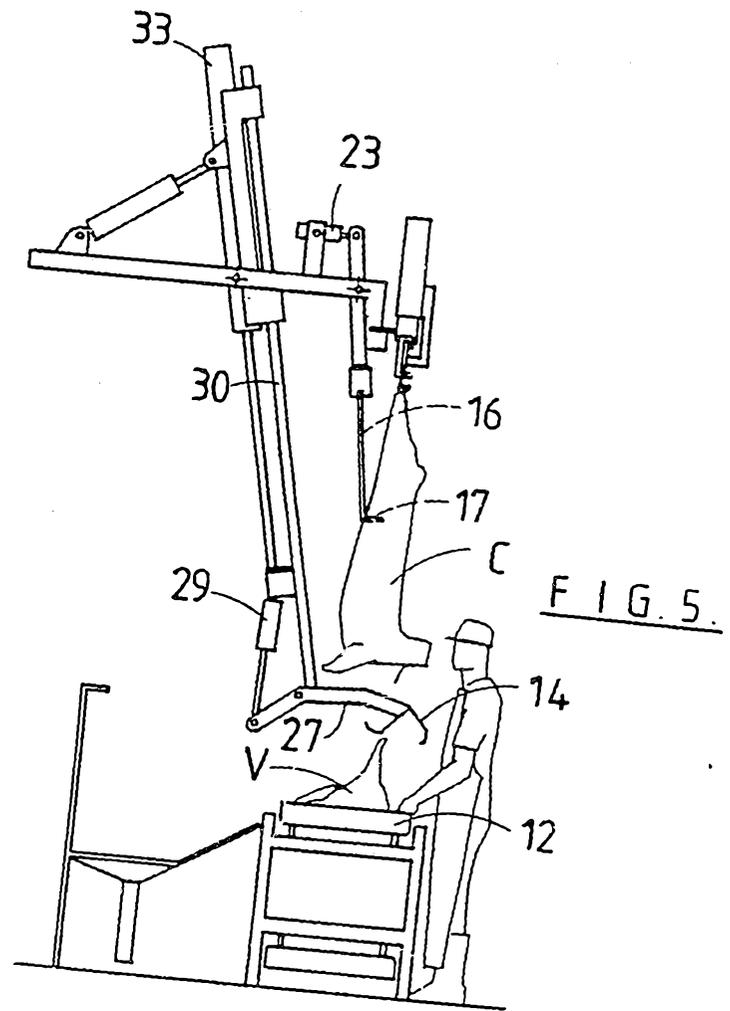
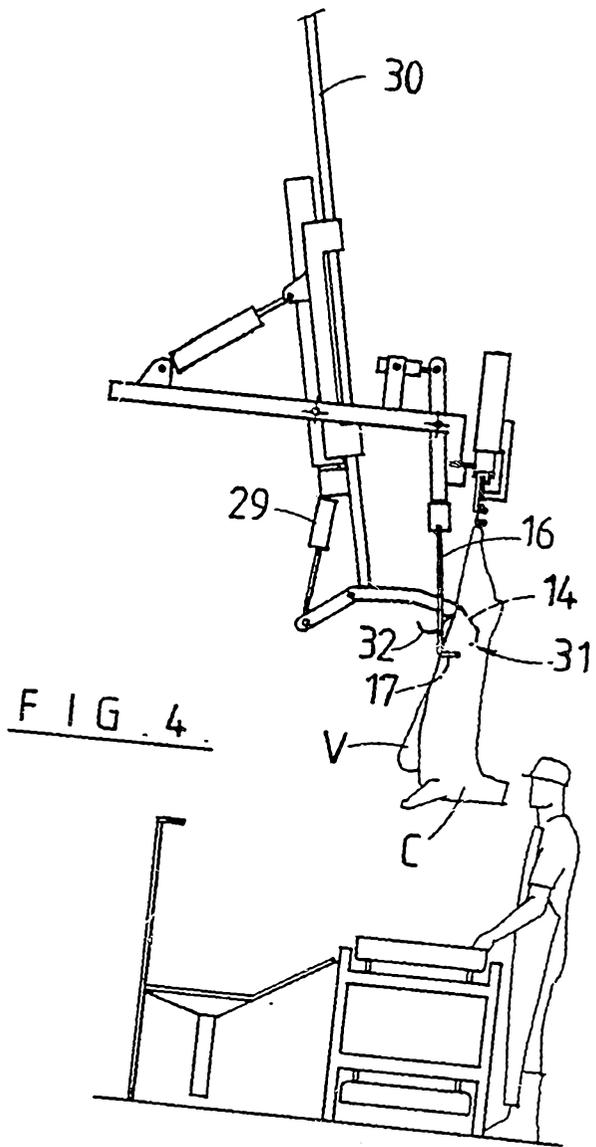


FIG. 1.





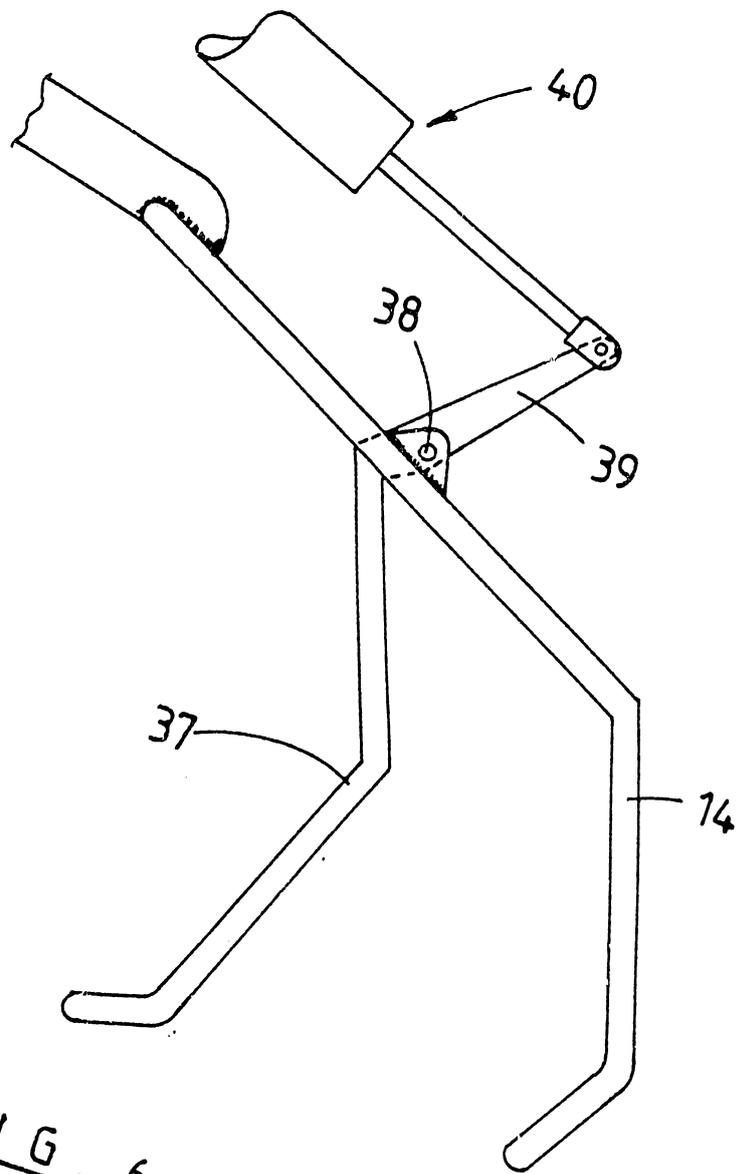


FIG. 6.