July 5, 1932. N. E. WERNBERG 1,865,492

BRISTLE REMOVING MACHINE FOR HOG CARCASSES

Filed July 3, 1930 4 Sheets-Sheet 1

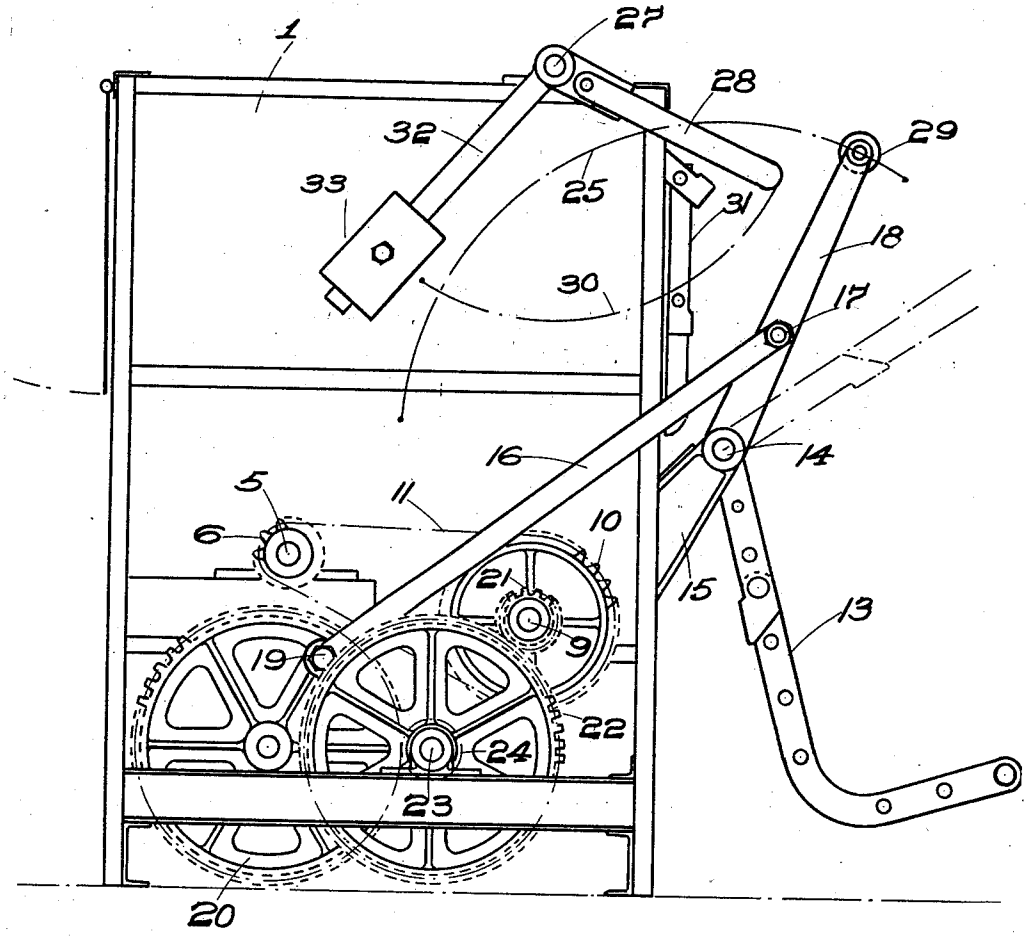


FIG. 1.

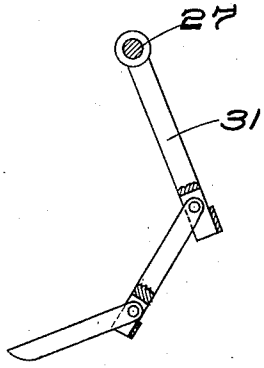


FIG. 8.

INVENTOR
NIELS ERIK WERNBERG
BY
Edward R. Inman
ATTORNEY

July 5, 1932. N. E. WERNBERG 1,865,492

BRISTLE REMOVING MACHINE FOR HOG CARCASSES

Filed July 3, 1930 4 Sheets-Sheet 2

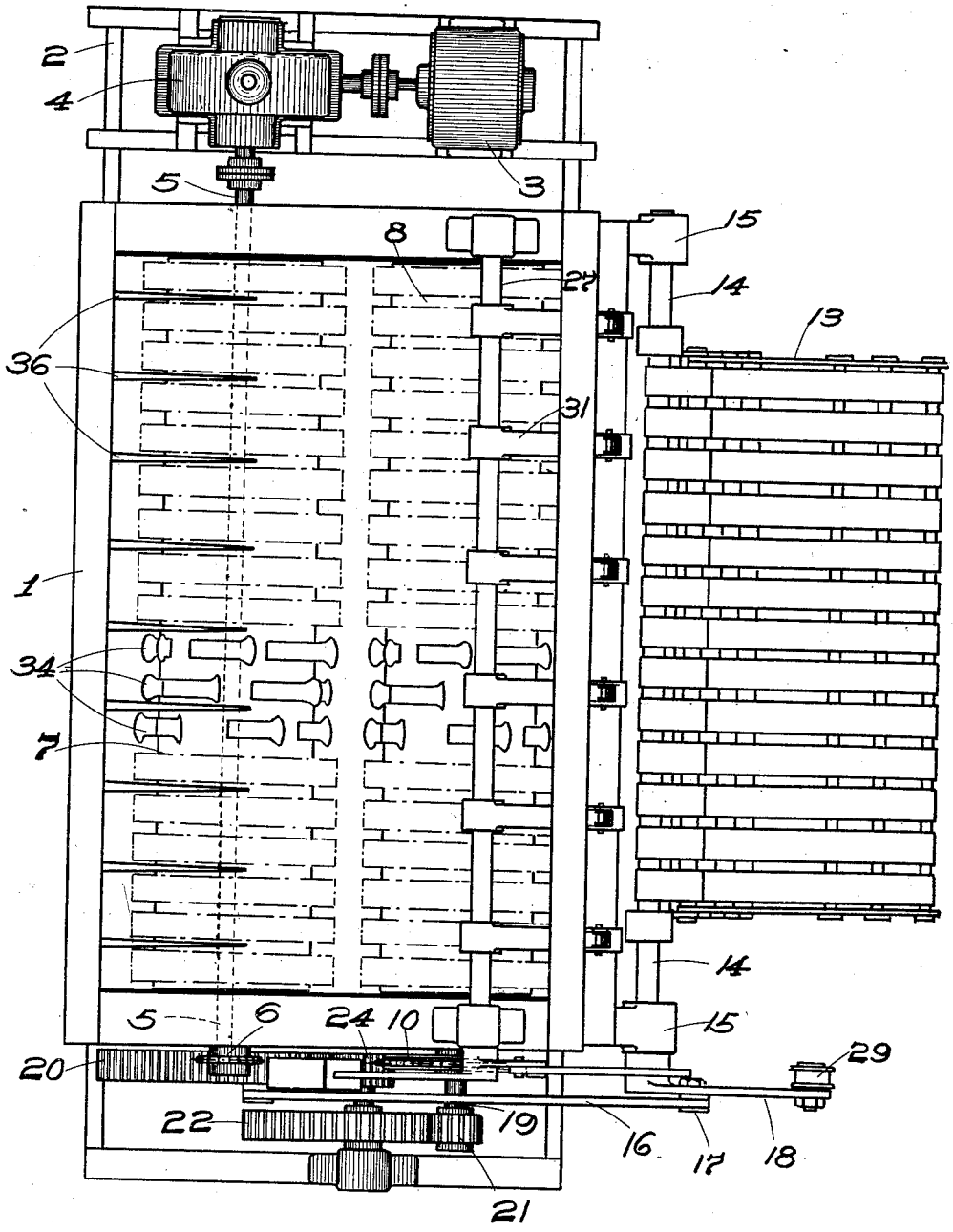


FIG. 2.

INVENTOR
NIELS ERIK WERNBERG
BY
Edward R. Inman
ATTORNEY

July 5, 1932. N. E. WERNBERG 1,865,492

BRISTLE REMOVING MACHINE FOR HOG CARCASSES

Filed July 3, 1930 4 Sheets-Sheet 3

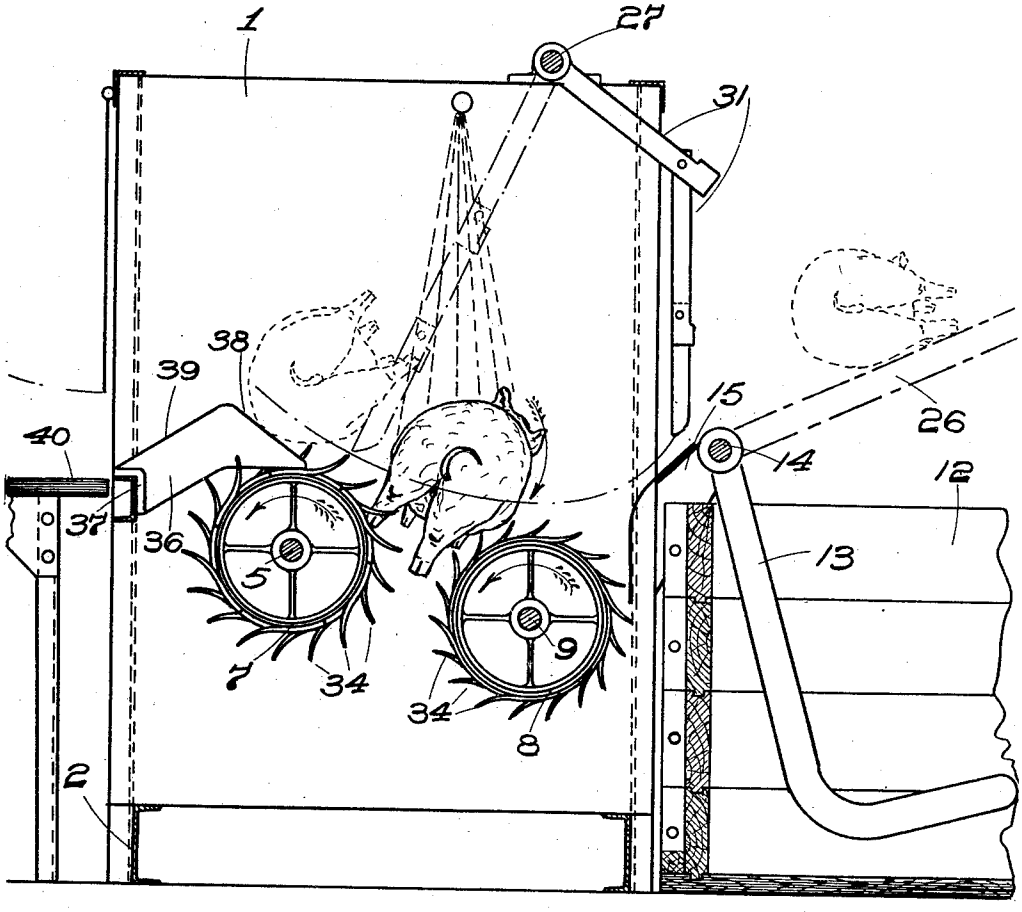


FIG. 3.

INVENTOR
NIELS ERIK WERNBERG
BY
Edward R. Inman
ATTORNEY

July 5, 1932. N. E. WERNBERG 1,865,492

BRISTLE REMOVING MACHINE FOR HOG CARCASSES

Filed July 3, 1930 4 Sheets-Sheet 4

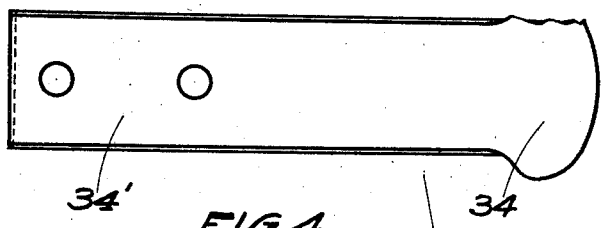


FIG. 4.

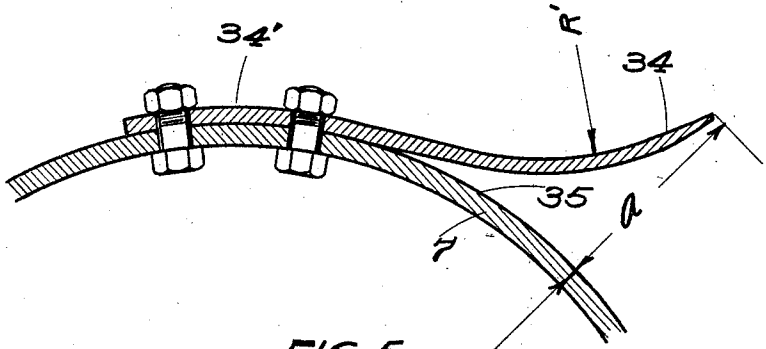


FIG. 5.

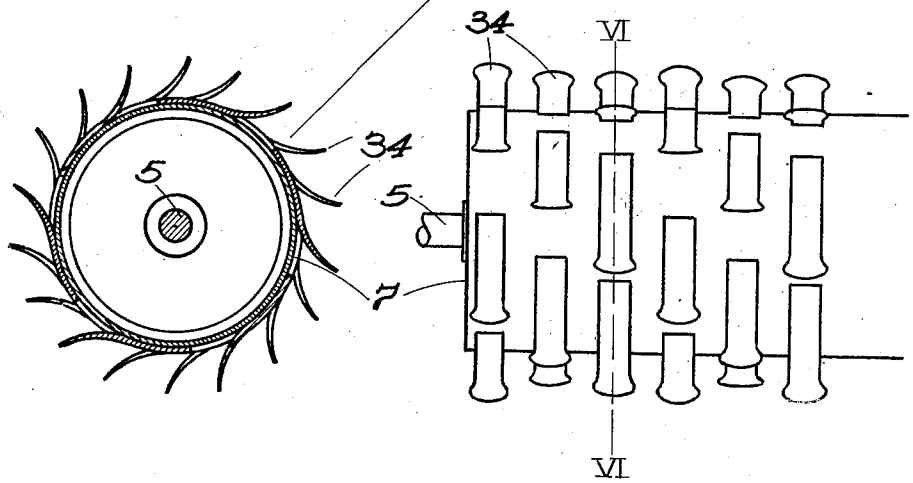


FIG. 6.

FIG. 7.

INVENTOR
NIELS ERIK WERNBERG
BY
Edward R. Inman
ATTORNEY

Patented July 5, 1932

1,865,492

UNITED STATES PATENT OFFICE

NIELS ERIK WERNBERG, OF COPENHAGEN, DENMARK

BRISTLE REMOVING MACHINE FOR HOG CARCASSES

Application filed July 3, 1930. Serial No. 465,619.

This invention relates to a machine for use in slaughter houses for the removal of bristles from hog carcasses, the object of the invention being, to produce a machine which excels in the following points; rapidity of operation and quantity and quality of output; compactness of construction; economy of space occupied; simplicity of construction and consequent reduction in cost of manufacture.

The organization whereby I am enabled to attain said objects is clearly illustrated in the accompanying drawings in which:

Fig. 1 is a left end view of the machine as viewed from the carcass-receiving, cradle-carrying side of the machine.

Fig. 2 is a plan view.

Fig. 3 is a vertical, transverse section which may be at any point intermediate the ends of the scraper cylinders.

Fig. 4 is a face or plan view of one of the steel scraper tongues.

Fig. 5 is a transverse section through a fragment of the scraper cylinders, also a longitudinal section through a scraper tongue or bit.

Fig. 6 is a transverse section through a scraping or dehairing cylinder and a row of scraper bits, as indicated by the line VI—VI of Fig. 7.

Fig. 7 is a side view of a portion of a scraping cylinder.

Fig. 8 is a side view of a carcass-ejecting arm, with its various joints in the respective positions which they assume in their backward movement.

The construction, in detail, as shown in said drawings, is substantially as follows:

The housing in, or upon which, the various operative elements of the organization are mounted, consists of a rectangular, oblong casing 1 constructed of sheet metal and structural steel details such as angles, channels, etc., suitably united in any usual manner. The right-hand end of the casing is supplied with a suitable bed 2 or frame for the reception of a motor 3, and a suitable speed reducing gear 4, the driving shaft 5 of which extends longitudinally through said housing and the projecting end of said shaft, at the left-hand end of the housing, is supplied with a rigidly-affixed sprocket wheel 6; said shaft 5 constitutes the main driving shaft for the operative elements of the machine.

The bristle-removing members of the machine consist of two cylinders supplied with metallic scraper bits one of which cylinders 7 is operatively mounted upon said shaft 5; the other of said cylinders 8 is rigidly mounted upon a revoluble shaft 9 which also extends longitudinally of said housing 1 and is arranged in parallel relation to shaft 7, but somewhat lower down within the housing; the end of said shaft 9 projects at the left-hand end of the housing and is provided with a sprocket 10 which is operatively or rigidly secured to said shaft; motion is transmitted from sprocket 6 to sprocket 10 by means of a chain indicated by the broken line 11 in Fig. 1. It will be noted that sprocket 10 is larger than sprocket 6; the reason for this difference in size will later be set forth. For the purpose of ready identification, cylinder 8 will hereafter be referred to as the receiving cylinder, and cylinder 7 as the delivery cylinder, because cylinder 8 is located upon the carcass-receiving side of the machine and cylinder 7 is located upon the carcass-discharging side of the machine.

For the purpose of delivering carcasses into the machine,—as from a scalding tank 12,— a swinging cradle structure 13 is provided the upper portion of which is rigidly and operably attached to a shaft 14 which is rotatively mounted in bearings 15, which bearings are rigidly secured to the adjacent side of the housing 1. Said cradle is adapted to have a vertical, swinging movement from its lowermost position, as shown in full lines in Figs. 1, 2 and 3 of the drawings, to its uppermost position as partly indicated by dotted or broken lines in Figs. 1 and 3.

For the purpose of imparting said vertically-swinging movement to said cradle, mechanism is employed consisting of a connecting rod 16, one end of which is attached to a pin or the like, as 17, carried by a rocker-bar 18; the other end of said connecting rod is attached to a crankpin 19, which pin is carried by a gear 20; gear 20 is suitably mounted in the housing 1, and is driven in

the following manner. Upon the outer end of shaft 9 is rigidly affixed a pinion 21 which meshes with the gear 22, that is rigidly affixed to shaft 23; also upon said shaft 23 is rigidly affixed a pinion 24; as previously stated, shaft 9 and its sprocket 10 are driven from shaft 5 and its sprocket 6; as gear 20 revolves the rockerbar 18 is caused to rock through an arc 25, and since said bar 18 is rigidly secured to the cradle shaft 14, a corresponding movement is imparted to the cradle 13; the upper limit of the cradle movement is indicated at 26 in Fig. 3 at which position a carcass picked up from the scalding tank 12 is delivered into the machine where it assumes the bristle removing position shown in Fig. 3, in which position it is retained by the weight of the carcass, until its removal is effected by action of the discharge arms, which will now be described.

Referring to Figs. 1 and 2 it will be noted that shaft 27 is mounted upon and extends longitudinally across the top of the housing; this is a rotative shaft to the outer end of which is rigidly affixed an actuator lever 28 for contact with the cooperating and actuating roller 29; as said, roller comes into contact with said arm 28, said arm as actuated and caused to swing through the arc 30, whereby shaft 27 and the discharge arms 31 carried thereby are correspondingly actuated,—that is to say, said discharge arms are actuated to the carcass-ejecting position which is somewhat outwardly and beyond the position indicated by dotted lines in Fig. 3, and at this juncture another carcass is delivered into the machine. Because of this virtually simultaneous discharge from the machine of a cleaned carcass and the reception thereinto of a carcass to be successively cleaned, it is necessary to make the discharge arms flexible with reference to their retractive movement so as to enable or adapt them to pass in their return movement freely over the incoming carcass. One form of such flexible construction is illustrated in the drawings, and especially in Fig. 8. The backward or retractive movement of said discharge arms is automatically accomplished by means of a lever 32 and counterweight 33.

The bristle-removing cylinders revolve in the direction indicated by the arrows in Fig. 3 and this causes the carcass that is being cleaned by said cylinders to turn or roll somewhat, in the direction indicated by the arrow adjacent thereto. As previously mentioned, sprocket 10, by means of which cylinder 8 is driven, is larger than its driving sprocket 6, and since said sprocket 6 is carried by the shaft 5 upon which cylinder 7 is mounted it will then be seen that cylinder 8 revolves at a slower speed than cylinder 7; the object of such differential speed is twofold, the first of which is, that it produces a more effectual removal of bristles and the second is, that, if the cylinders (which are identical in construction, number and arrangement of scrapers) were to revolve at the same speed, it would produce an isochronal impingement of the individual scrapers of the two cylinders upon the carcass and thereby cause a coordinated vibration or bouncing of the carcass, and an erratic and uneven, instead of an even and uniform scraping action of the scraper bits, in respect to their removal of bristles. Such differential speed has been found to materially increase the cleaning efficiency and the productive output of the machine.

I have also discovered another point of relative construction between the two cylinders and especially of the scraper bits thereon which further adds to the efficiency of their action, namely;

Referring to Fig. 5 of the drawings and especially to the dimension "a" indicated thereon, which relates to the extent of the spacing of the point of the scrapers from the periphery 35 of the cylinder, to which said scrapers are attached, it has been found that if this dimension is made to differ on the respective cylinders, it increases their active or scraping efficiency. As an illustration, of such difference in said dimension "a," it has been found advantageous to make this height about thirty per cent greater on the discharge drum 7 than on the receiving drum 8.

The construction of the scrapers 34 is clearly shown in Figs. 4 and 5. They are composed of resilient metal such as steel or brass, and the free end of each scraper is preferably laterally broadened and made somewhat thinner than the shank 34′. They may be secured to the periphery 35 of the shell of the cylinder by means of bolts, or in any other suitable way. Longitudinally considered, these scrapers have a substantially o-gee form in which the radius R of the attached end conforms to the periphery of the cylinder shell 35 and the reverse curve of the free end is curved from a shorter radius R′. The scrapers are preferably arranged in helical order around the cylinder, thus insuring that nearly the full weight of the carcass will rest upon each of the scrapers as they pass under it. Said spiral arrangement of the scrapers also imparts a slight lengthwise motion to the carcass, thus presenting the whole surface to the cleaning action of the scrapers.

For the purpose of preventing the premature discharge of the carcass from the machine, also to prevent the jamming of the carcass between discharge drums 7 and the adjacent inner face of the discharge side of the casing, guards or bridges 36 are employed the base 37 of which is attached to the adjacent wall of said discharge side of the housing and the points of said guards extend in between the scrapers, and into proximity to the top of the periphery of the discharge cyl-

inder 7 whereby a stationary bridge is formed across the intervening space between said discharge cylinder and the adjacent inner face of the wall of the housing. The inner edge 38 of said guards slope upwardly to form a barrier or keeper against the accidental discharge of the carcass, but the discharge arm, actuates the carcass over said upward slope onto the discharge outer downwardly disposed decline whereupon it moves by gravity onto the receiving table 40. Said guards also serve to insure a true sidewise discharge of the carcass, instead of askewing one such as might occur were the upwardly extending guards not provided.

I claim the following:

1. A machine for removing bristles from hog carcasses comprising in combination with a suitable housing, certain operative structures carried within and upon said housing, namely, a carcass-supplying cradle operative to deliver carcasses into bristle-removing relation to bristle-removing drums, two bristle-removing drums revolubly mounted in said housing in such juxtaposition to each other and revolving at differing speeds so as to cause them to cooperatively act to retain the carcass in functional relation thereto and remove the bristles therefrom, a stationary, upwardly inclined barrier positioned in carcass-retaining relation to one of said drums, a swinging arm mounted above said drums operative to remove the cleaned carcass over said barrier whereby the same is discharged from said housing, and power generating and transmission means for driving said operative structures whereby they are caused to perform the respective functions set forth.

2. A machine for removing bristles from hog carcasses, comprising in combination with a suitable housing, certain operative structures carried within and upon said housing, namely, a cradle operative to deliver carcasses to bristle-removing drums located within said housing, two revolving, cooperatively acting, bristle-removing drums mounted in parallel relation to each other within said housing, the relative positions, proximity and direction of revolution of said drums being such as to cause them to cooperatively remove the bristles from a carcass delivered thereto by said delivery means, a fixed barrier positioned in carcass-retaining relation to said drums, a swinging arm operative to remove said carcass from over said barrier the action of said drums and power generating means together with transmissive means therefor whereby said operative structures are caused to operate as and for the respective purposes set forth.

3. A machine for removing bristles from hog carcasses, comprising in combination with a suitable housing, certain operative structures carried within and upon said housing, namely, a cradle operative to deliver carcasses to bristle-removing drums located within said housing, two co-operatively acting, revolving, bristle-removing drums mounted in parallel relation to each other within said housing, the relative positions, proximity and direction of revolution of said drums being such as to cause them to co-operatively remove the bristles from a carcass delivered thereto by said delivery means a stationary carcass-retaining barrier positioned in carcass-retaining relation to one of said drums, a swinging arm operative to remove said carcass over said barrier from the action of said drums and to discharge same from said housing and power generating means together with transmissive means therefor whereby said operative structures are caused to operate as and for the respective purposes set forth.

4. A machine for removing bristles from hog carcasses, comprising in combination with a suitable housing, certain operative structures carried within and upon said housing, namely, a cradle operative to deliver carcasses to bristle-removing drums located within said housing, two revolving, co-operatively acting, bristle-removing drums mounted in parallel relation to each other within said housing, the relative positions, proximity and direction of revolution of said drums being such as to cause them to co-operatively retain a carcass in the bristle-removing relation thereto and to remove the bristles from said carcass delivered thereto by said delivery means an upwardly-inclined, fixed carcass-retaining bridge over which the carcass is discharged from said housing, a swinging arm operative to release said carcass from the action of said drums and actuate same over said bridge whereby it is discharged from said housing, and power generating means together with transmissive means extending therefrom to said operative structures whereby they are caused to operate as and for the respective purposes set forth.

5. A machine for removing bristles from hog carcasses, comprising in combination with a suitable housing, certain operative structures carried within and upon said housing, namely, a cradle operative to deliver carcasses to bristle-removing drums located within said housing, two co-operatively acting, revolving, bristle-removing drums mounted in parallel relation to each other within said housing, the relative positions, proximity and direction of revolution of said drums being such as to cause them to co-operatively to remove the bristles from a carcass delivered thereto by said delivery means, one of said drums being positioned adjacent the carcass-receiving side of said housing and the other drum positioned toward the delivery side of said housing, a bridge extending from said last-named drum to said

carcass delivery side of said housing whereupon the carcass moves by gravity out of said housing, a swinging arm operative to remove said carcass from the action of said drums and to deposit same upon said bridge and power generating means together with transmissive means therefor whereby said operative structures are caused to operate as and for the respective purposes set forth.

6. A machine for removing bristles from hog carcasses comprising in combination with a suitable housing through which the carcasses are passed for the removal of bristles therefrom, the following operative structures carried by and with said housing, namely; a cradle for delivering carcasses into the carcass receiving side of said housing, a first or carcass receiving and scraping drum revolubly mounted in proximity and in carcass receiving relation to the delivery point of said delivery means, a second scraping drum revolubly mounted adjacent the carcass delivery side of said housing in parallel relation to said first drum and in cooperative, carcass-retaining, also cooperative bristle removing relation to said first drum, a double incline bridge interposed between the delivery side of said housing and said second drum, which bridge structure inclines upwardly from said second drum then downwardly to a carcass-receiving table, a swinging, carcass-ejecting arm arranged to cause by its swinging action the removal of the cleaned carcass over the upward incline of said bridge to the downwardly inclined side thereof and the consequent ejection from the housing, and power means together with transmission appliances therefor whereby said operative structures are respectively actuated as and for the purpose set forth.

In testimony whereof I affix my signature.

NIELS ERIK WERNBERG.