Nov. 1, 1932. N. E. WERNBERG 1,885,161

MACHINE FOR CLEANING CARCASSES OF HOGS

Filed July 3, 1930 4 Sheets-Sheet 1

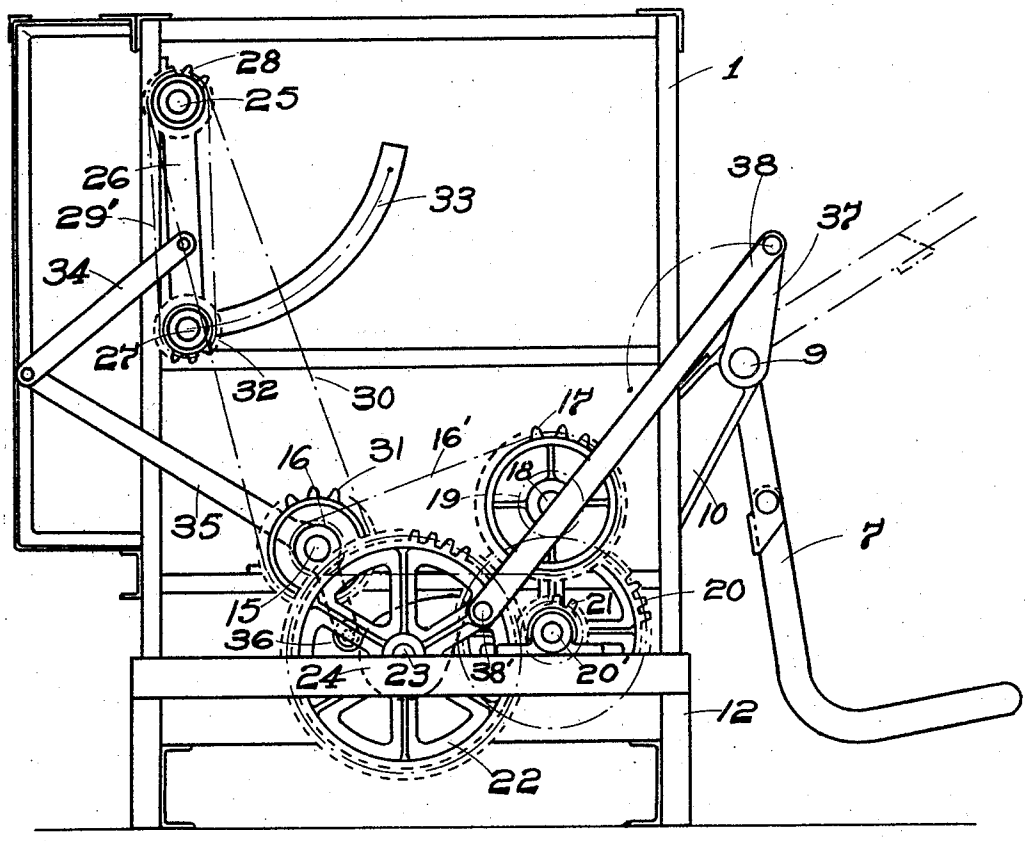


FIG. 1.

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MACHINE FOR CLEANING CARCASSES OF HOGS

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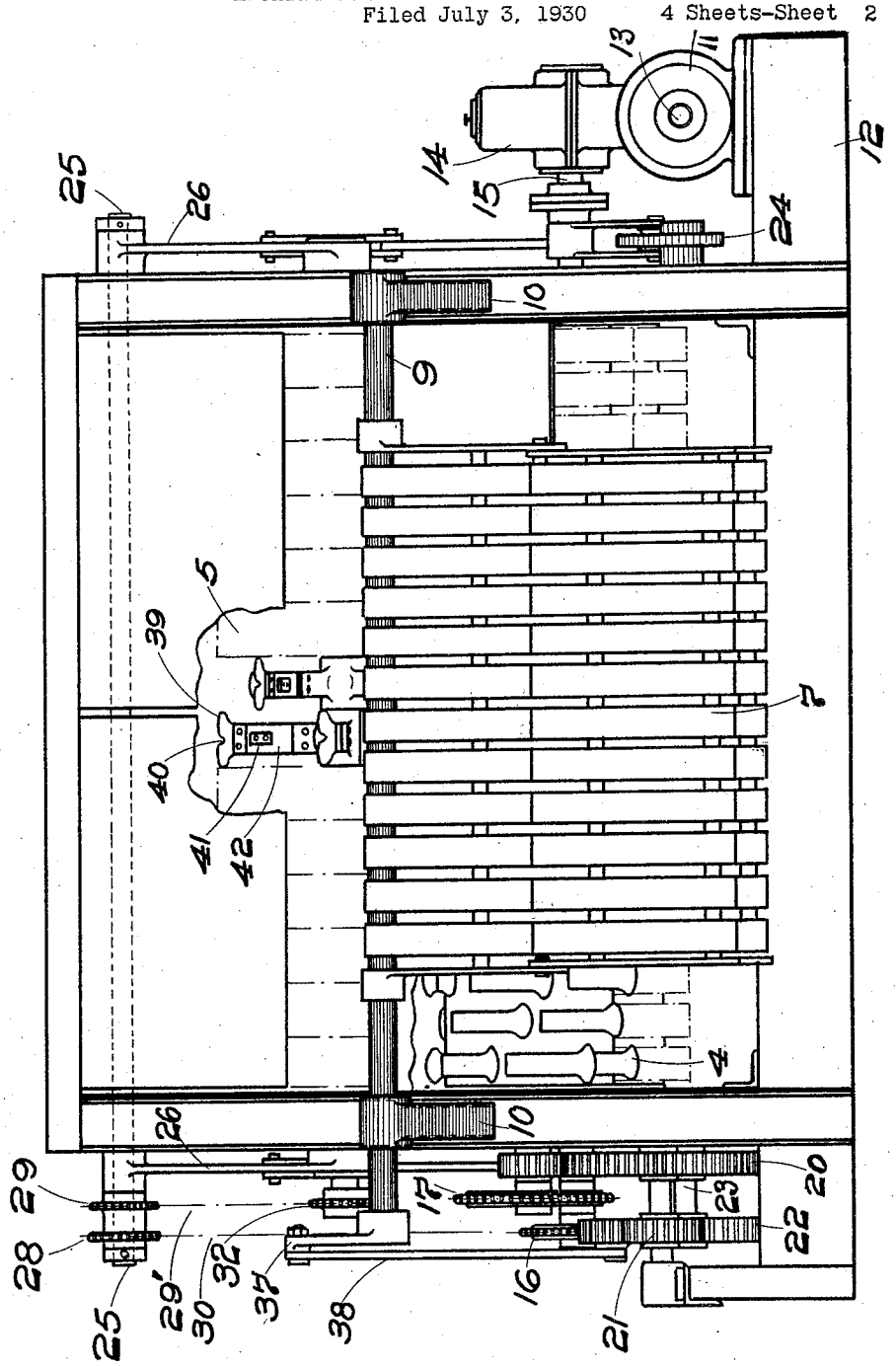


FIG. 2.

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MACHINE FOR CLEANING CARCASSES OF HOGS

Filed July 3, 1930 4 Sheets-Sheet 3

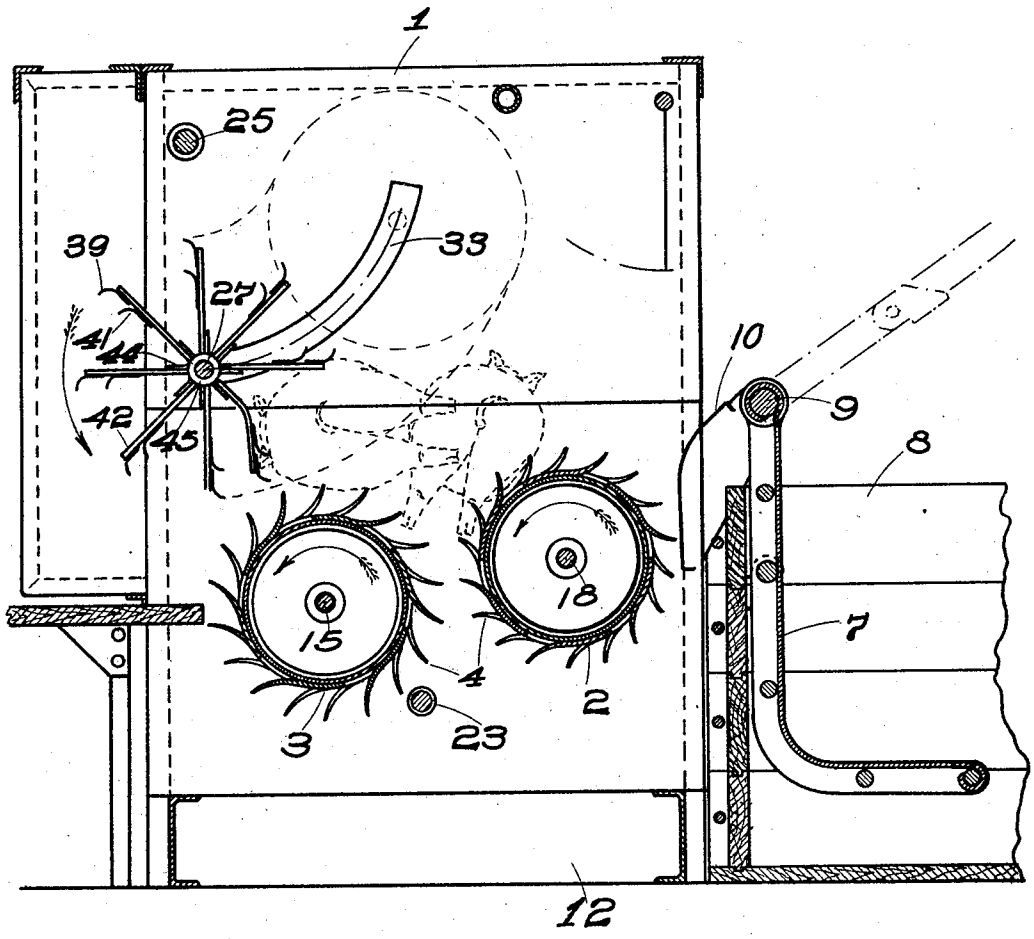


FIG. 3.

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MACHINE FOR CLEANING CARCASSES OF HOGS

Filed July 3, 1930 4 Sheets-Sheet 4

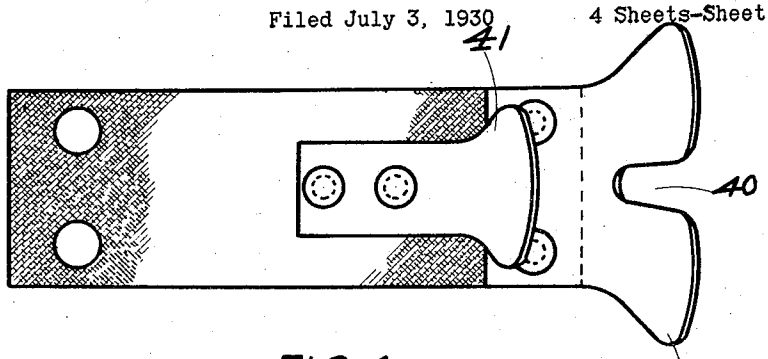


FIG. 4.

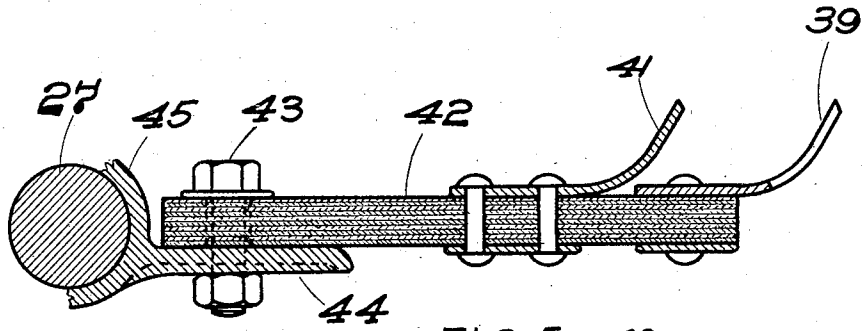


FIG. 5.

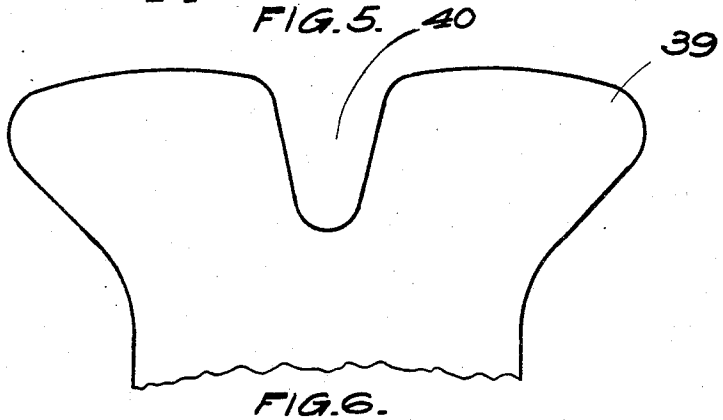


FIG. 6.

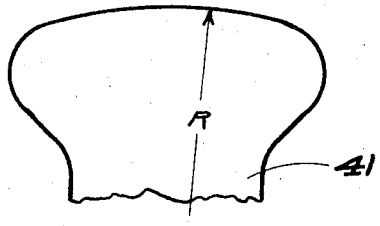


FIG. 7.

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UNITED STATES PATENT OFFICE

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MACHINE FOR CLEANING CARCASSES OF HOGS

Application filed July 3, 1930. Serial No. 465,618.

This invention relates to an improved cleaning machine for use in slaughter houses for the removal of bristles, hoofs and toenails from hog carcasses, and especially to a machine for simultaneously operating upon a plurality of carcasses.

The particular object of the invention is, to provide a machine for the purpose named that will excel in the speed and efficiency of its work and be more simple and economical in construction and operation than previous machines of this class have been; the particulars wherein and whereby said objects are attained will be duly set forth.

The construction of my improved bristle removing machine is clearly illustrated in the accompanying drawings, the various figures of which are as follows:

Fig. 1 is an elevation of the left hand end of the machine.

Fig. 2 is an elevation of the entry or receiving side of the machine.

Fig. 3 is a transverse section through the machine, said section being taken any where intermediate the ends of the scraper cylinders.

Fig. 4 is an outer face view of one of the scraper units which may be employed on any of the cylinders of my machine, but in the drawings it is shown as being attached to the member that is termed the beater or releasing cylinder.

Fig. 5 is a central, longitudinal section of the Fig. 4 form of scraper bit which is termed the fish-tail or double-point bit.

Fig. 6 is an enlarged face view of the end of said double point bit.

Fig. 7 is an enlarged face view of the point of a single point scraper bit.

The power or driving member of the machine is located at the right-hand end of Fig. 2 and nearly all of the transmissive elements are located at the left-hand end of the machine.

The construction shown in said drawings comprises a housing or casing 1 of oblong, rectangular cross section, within which are mounted two revoluble, longitudinally-extending, parallel cylinders 2 and 3 bearing metallic scraper bits 4; cylinder 2 is termed the receiving cylinder because it is mounted adjacent the carcass receiving side of the housing; cylinder 3 is termed the discharge cylinder since it is mounted adjacent the carcass discharging side of the housing. Said cylinders 2 and 3 are approximately of the same diameter and are arranged in such proximity to each other as to fully support the carcass being operated upon without the intervention of any intermediate supporting structure.

Above the discharge cylinder 3, somewhat outwardly therefrom and extending parallel therewith and longitudinally of the housing is revolubly mounted a carcass retaining and releasing cylinder 5, of open or skeleton formation which performs three functions, namely, the periodical retention of the carcass in bristle removing relation to cylinders 2 and 3, it also during said period co-acts with said cylinders in removing the bristles also the hoofs and toenails from the feet of the carcass and at the end of said cleaning period swings inwardly and upwardly over and out of contact with the carcass thus releasing it for ejection or discharge out of the housing and onto the receiving table 6.

A suitable, vertically-swinging cradle 7 whereby carcasses are lifted from a scalding tank 8 and delivered onto the receiving cylinder 2, is provided, and has its upper end rigidly mounted upon a horizontally extending, rotating shaft 9, the ends of which are rotatively mounted in bearings 10, which are secured to and carried by the end walls of the housing 1.

Power and transmission gearing are provided whereby said cylinders and cradle are operated as follows:

Referring especially to Fig. 2, a motor 11 is mounted upon the base 12 of the housing, and the shaft 13 of said motor is supplied with a suitable speed-reducing gearing contained in a casing 14, the driving shaft of which is shown at 15; this shaft 15 extends longitudinally through the housing 1 and the cylinder 3 is mounted upon and driven thereby. As shown in Fig. 1, upon the left end of said shaft 15, is rigidly mounted and secured a sprocket 16, from which power is

transmitted to a larger sprocket 17 which is secured to and drives shaft 18 of the cylinder 2; shaft 18 is also supplied with a pinion 19 which meshes with and drives a gear 20; upon the shaft 20′ is mounted a pinion 21 which meshes with and drives a gear 22, the shaft of which is shown at 23; upon said shaft 23 is keyed a cam 24, the function of which will presently appear.

Adjacent the top of the delivery side of the housing is mounted a longitudinally-extending shaft 25 which projects from said housing at each side thereof, and upon each of said projecting ends is rotatively mounted the upper eye or hub of a double-ended link 26; the lower eye or hub of each of said links carries the respective ends of the shaft 27 of the releasing cylinder 5.

Two sprockets 28 and 29 are mounted upon the projecting left hand end of said shaft 25; said sprockets 28 and 29 are preferably a unitary structure and are revolubly mounted upon said shaft 25; sprockets 28 and 29 are driven by a chain indicated by the broken line 30 which passes around sprocket 31 that is keyed to said main driving shaft 15.

The left-hand end of the releasing cylinder shaft 27 is provided with a rigidly affixed sprocket 32 to which motion is transmitted from sprocket 29. It can now be readily seen that, by means of the links 26, the beater cylinder is adapted to swing to its inward, upper, carcass-releasing position along the arc 33; this swinging and releasing movement is positively imparted to said beater cylinder by the following means. Shaft 23, which is driven by gear 22, extends longitudinally of and each end thereof projects through its respective end of the housing 1; upon each of said projecting ends is mounted a cam 24; a transmission lever 35 is provided which is adapted to employ and is mounted upon shaft 15 as a fulcrum, and its lower end is provided with a roller 36 which contacts with and constantly bears upon the actuating face of said cam; the upwardly-extending end of said lever terminates in proximity to said link 26 and is connected thereto by means of a reach rod 34. The weight of the beater cylinder carried by said shaft 27 causes it to occupy its lowermost, carcass-retaining position, as shown in the drawings, and at the same time to keep the roller 36 in contact with the face of cam 24, which contact imparts to said lever 35 a swinging movement which, in turn, is imparted through said reach rod 34 to said beater cylinder to periodically impart to it co-operative function of assisting in cleaning the carcass or carcasses, as the case may be, and thereafter to permit their release from the machine. For the purpose of imparting the swinging movement to said cradle, one end of a crank lever 37 is rigidly secured to the left-hand end of the cradle shaft 9; to the other end of said crank is attached one end of a connecting rod 38; the other end of said connecting rod is attached to a crank-pin 38′ that is carried by the gear 22.

In Fig. 3 of the drawings cylinder 5 is shown in the extreme outward and lower limit of its arcuate line of travel and the dotted adjacent circle indicates the extreme inward and upward limit of said arcuate line of travel. The shape of cam 24 clearly indicates that cylinder 5 will dwell at the lowermost point of its travel.

In the use of this machine it has been found that two or more comparatively small carcasses may be placed in the machine and cleaned at the same time, and that the rubbing of such plurality of carcasses together, as they are turned by the bristle removing cylinders, materially assists in the cleaning of the carcasses, and greatly increases the output of the machine. When the machine is used for the cleaning of a plurality of carcasses, such plurality, whether two or more, are picked up by the cradle and deposited into the machine at the same time.

The respective movements of the cradle and the discharge cylinder are such that the carcasses are deposited into the housing and onto the receiving cylinder at the instant when said beater cylinder is moving rearwardly and downwardly, and because of this its bristle-removing action begins while the carcass is entering the machine and early in the return movement of said cylinder; this action materially shortens the bristle-removing interval especially because the transmission gearing of said beater cylinder is geared to revolve said cylinder very rapidly as will be noted from an inspection of Fig. 1 where the relative diameters of sprockets 31 and 32 appear.

The length and consequently greater flexibility of the beater arms of said cylinder 5, together with their centrifugal action due to said rapidity of revolution of their drum gives to said arms a superior efficiency of bristle removing action.

For the purpose of indicating a speed for the respective drums which has been found to be generally satisfactory, it is noted that a speed of the discharge cylinder 3 may be 110 revolutions per minute, that of the receiving cylinder 50 revolutions and that of the beater or releasing cylinder 175 revolutions per minute.

Attention is called to the fact that when the releasing movement of the cylinder 5 takes place the shaft 27 thereof moves upwardly through an arc of approximately 65 degrees in extent, which arc it retraverses in moving back to its position of cooperative action with the other two cylinders; this trend of movement is important in three respects, namely, that in its upward movement it exerts its bristle removing action upon the outgoing

carcass from a constantly changing position until it reaches the uppermost carcass releasing point; throughout its return travel to its lowermost point, its scraper bits are also acting upon the entering carcass from a changing point of attack; this causes a more universal prolonged and complete action upon the carcass than would be obtained if the shaft of said cylinder 5 did not swing and act in the precise manner stated; it also insures a more certain and efficient action of the double-point and single-point scraper bits in removing the toenails from the feet of the carcass. The shape of the cam 24 is such that the beater cylinder dwells somewhat at its lowermost position as previously stated; also the shape of the point of said cam and the approaches thereto are such as to cause said cylinder to quickly reverse its direction of travel at its highest point of travel.

The form of scraper bits shown on sheet 4 of the drawings, and especially the combination and arrangement of same shown in Figs. 4 and 5 constitute a novel and valuable detail of my invention especially for the following reasons:

The double-pointed, bifurcate, or fish-tail form of bit 39 is sufficiently wide at its point that when the proper number of them are secured to a cylinder, a continuous line of scraping edges extend entirely across and longitudinally of the cylinder, and furthermore, the central notch 40 in said fish-tail bit is especially effective in removing the hoofs and toenails from the carcass; the single point bit, 41—Fig. 7, being located back of and in circumferential alignment with said notch, is complementary in action to said double points 39, and neutralizes or erases what would or might be an uncleaned streak upon the carcass which might possibly be caused by said notch.

The single point form of bit,—a face view of which is shown in Fig. 7 and an edge view is shown in Fig. 3, upon the cylinders 2 and 3,—is fully described in a co-pending application for a patent for improvements in machines for removing bristles from hog carcasses, filed at even date herewith.

These two forms of bits as employed on cylinder 5 are combined into a scraper unit which is clearly illustrated in Figs. 4 and 5 wherein they are shown as being rigidly secured at and adjacent to the outer free end of a flexible tongue 42, which is composed of a closely woven rubber-impregnated, or otherwise waterproofed fabric; the inner end of said tongue 42 is firmly secured, as by means of bolts 43 to the radially disposed flanges 44 of the collar 45 which is rigidly affixed to and driven by said shaft 27. The ends of both of said bits adjacent their scraping edges are curved outwardly away from the carrying tongue 42.

As clearly indicated in Fig. 3 of the drawings, the flexible tongues 42 of the beater elements with which cylinder 5 is equipped are attached at their inner ends very close to the shaft 27, which carries this organization, and extend radially outwardly therefrom, are of sufficient length so that, in their unflexed normal, radial reach and limit of operation, a circle circumscribed about them at said limit would be of somewhat greater diameter than a circle circumscribed about either of the drums 2 or 3 at the maximum limit of travel of their respective scraper bits 4; but, owing to the length and degree of flexibility of said tongues 42, such a considerable degree of flexure thereof may take place as would cause the limit of operation of their bits 39 and 41 to take place at a much shorter radial distance from the center of cylinder 5 than the length of the radius of said circumscribed circle of the drums 2 or 3.

This feature adds materially to the adaptability of the machine not only in respect to efficiency of operation upon carcasses of different sizes, but also upon a plurality of small carcasses.

I claim the following:

1. A machine for cleaning hog carcasses comprising in combination a suitable housing through which the carcass is passed for cleaning, means for delivering carcasses into the carcass-receiving side of said housing, a first carcass scraping drum revolubly mounted adjacent said receiving side of said housing and in receiving relation to the delivery point of said delivery means, a second carcass-scraping and ejecting drum having a diameter substantially the same as the diameter of said first drum mounted in said housing adjacent the delivery side thereof lower down than and in co-operative bristle-removing relation to said first drum, said two drums being adapted to fully support the carcass thereon, a third swingingly-mounted drum normally positioned above and outwardly toward the delivery side of said housing from said second drum also in co-operative coincident, bristle-removing relation to said first and second drums and furthermore, in retaining relation to the carcass being cleaned, means for mounting said third drum consisting of a link at each end of said drum in which the projecting ends of its shaft are respectively carried, said links being positioned exteriorly of said housing; whereby it is adapted to have an arcuate, inward, upward swing whereby it assumes a carcass releasing position and continues its cleaning action upon the outgoing carcass during its travel to said releasing position, also exerts its cleaning action upon the incoming carcass while traveling back to its normal position, and power generating and transmission means whereby said carcass delivery means and said drums are caused to respectively operate and to swing in the manner stated.

2. A machine for cleaning carcasses of hogs comprising in combination, a suitable housing through which the carcasses are passed to be cleaned, means for delivering a carcass into the carcass-receiving side of said housing, a first carcass-receiving bristle-removing drum revolubly mounted in carcass-receiving proximity to the delivery point of said delivery means, a second bristle-removing drum of substantially the same diameter as said first drum revolubly mounted adjacent to the carcass ejecting or delivery side of said housing in co-operative bristle removing proximity to and lower down than said first drum, a carcass-cleaning, retaining and releasing open work cylinder of substantially the same diameter as that of said drums and having substantially long, flexible beater arms with metallic bits on the outer ends thereof revolubly and swingingly mounted in said housing so as to swing inwardly therein in an upwardly extending arcuate line of travel throughout the greater portion of which said releasing drum continues its cleaning action upon the outgoing carcass, said cylinder being positioned normally above and outwardly from said second drum, also in such proximity to said other two drums as to co-operatively and co-extensively exert therewith a cleaning action upon the carcasses being cleaned and furthermore, for a predetermined period of time to retain said carcass in its bristle removing relation to said drums and at the expiration of said period, by execution of said upward swinging movement, to travel over and release said carcass whereby said carcass becomes free so as to be ejected from the delivery side of said housing by the action of said second drum whereafter and during its return travel said cylinder begins its cleaning action upon the incoming carcass, and power generating and transmission means whereby said delivery means and said drums and cylinder are caused to operate as stated.

3. A machine for cleaning carcasses of hogs comprising in combination, a suitable housing, means for delivering a carcass into said housing at the receiving side thereof, three carcass-cleaning drums revolubly mounted in said housing with their axes in parallel relation; the first of said drums mounted adjacent to the carcass-receiving side of said housing in carcass-receiving proximity to the delivery point of said delivery means, a second drum of substantially the same diameter as said first drum positioned lower than and toward the delivery side of said housing from said second drum, said first and second drums being adapted to jointly and fully support a carcass in the dehairing position, the third unit of said drums being swingingly mounted and normally positioned above and outwardly toward the delivery side of said housing from said second drum elongated, flexible tongues for said third drum having their inner ends attached adjacent the shaft thereof and provided upon their outer free ends with terminal metallic scraper bits which are adapted through said flexibility to have a radial reach of effectual, bristle-removing operation that is substantially the same as or less than the radial reach of said first and second drums, all of said drums being normally in respect to position and direction of revolution to co-operate throughout the interval of removal of bristles from the carcass being operated upon, the travel of said third drum during its swinging movement being in an upwardly-curving, arcuate path toward the receiving side of the housing out of contact with the carcass being cleaned whereby said carcass becomes free to be and is ejected from the housing by the action of said second drum, and power and transmission means whereby said delivery and cleaning means are caused to operate as set forth.

4. A machine for cleaning hog carcasses comprising in combination a suitable housing through which the carcass is passed for cleaning, means for delivering carcasses into the carcass-receiving side of said housing, a first carcass scraping drum revolubly mounted adjacent said receiving side of said housing and in receiving relation to the delivery point of said delivery means, a second carcass-scraping and ejecting drum of substantially the same diameter as that of the first drum mounted in said housing adjacent the delivery side thereof lower down than and in co-operative bristle-removing relation to said first drum, said two drums being arranged to fully support the carcass therebetween, a swingingly-mounted rotary scraping member having an effective radial reach substantially the same as that of said drums and normally positioned above and outwardly toward the delivery side of said housing from said second drum and also in co-operative, bristle-removing relation to said first and second drums and furthermore in retaining relation to the carcass being cleaned, means for mounting said rotary scraping member for movement in an arcuate, inward, upward swing whereby it assumes a carcass releasing position, power generating and transmission means whereby said carcass delivery means and said drums are caused and co-ordinated to operate in the manner and sequence stated.

In testimony whereof I affix my signature.

NIELS ERIK WERNBERG.