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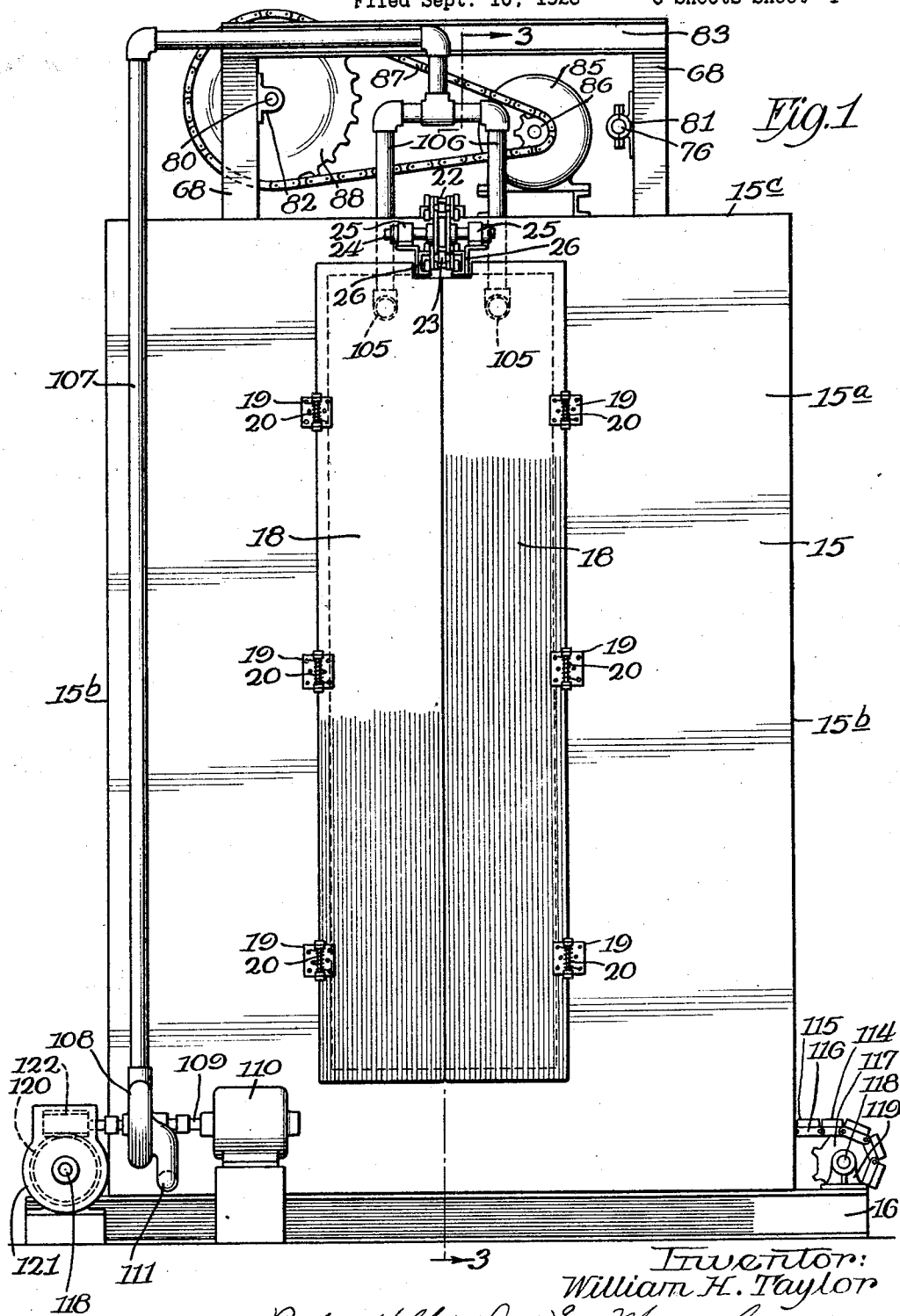
W. H. TAYLOR

1,834,479

HOG SCRAPER

Filed Sept. 10, 1928

6 Sheets-Sheet 1



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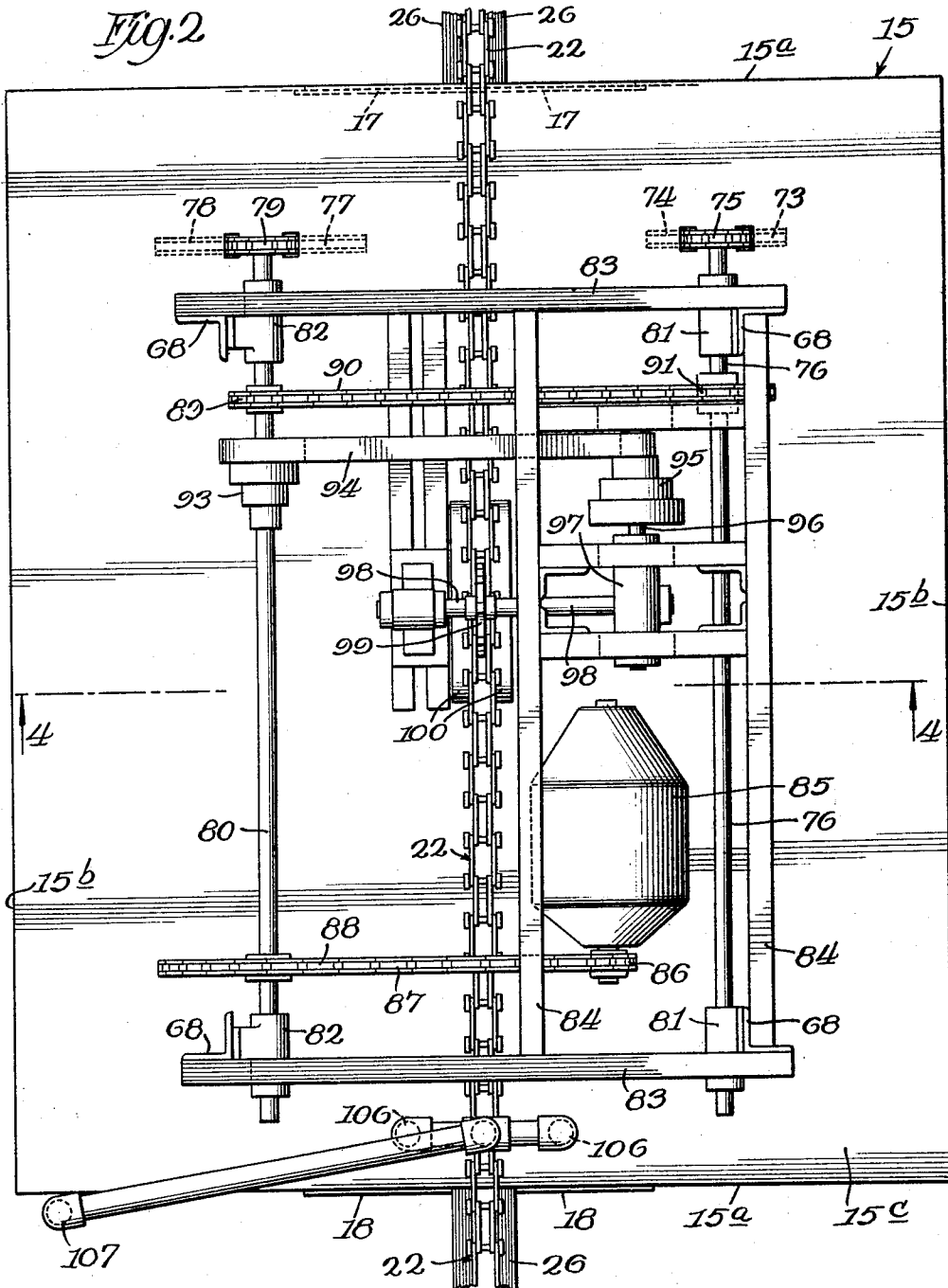
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HOG SCRAPER

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6 Sheets-Sheet 2



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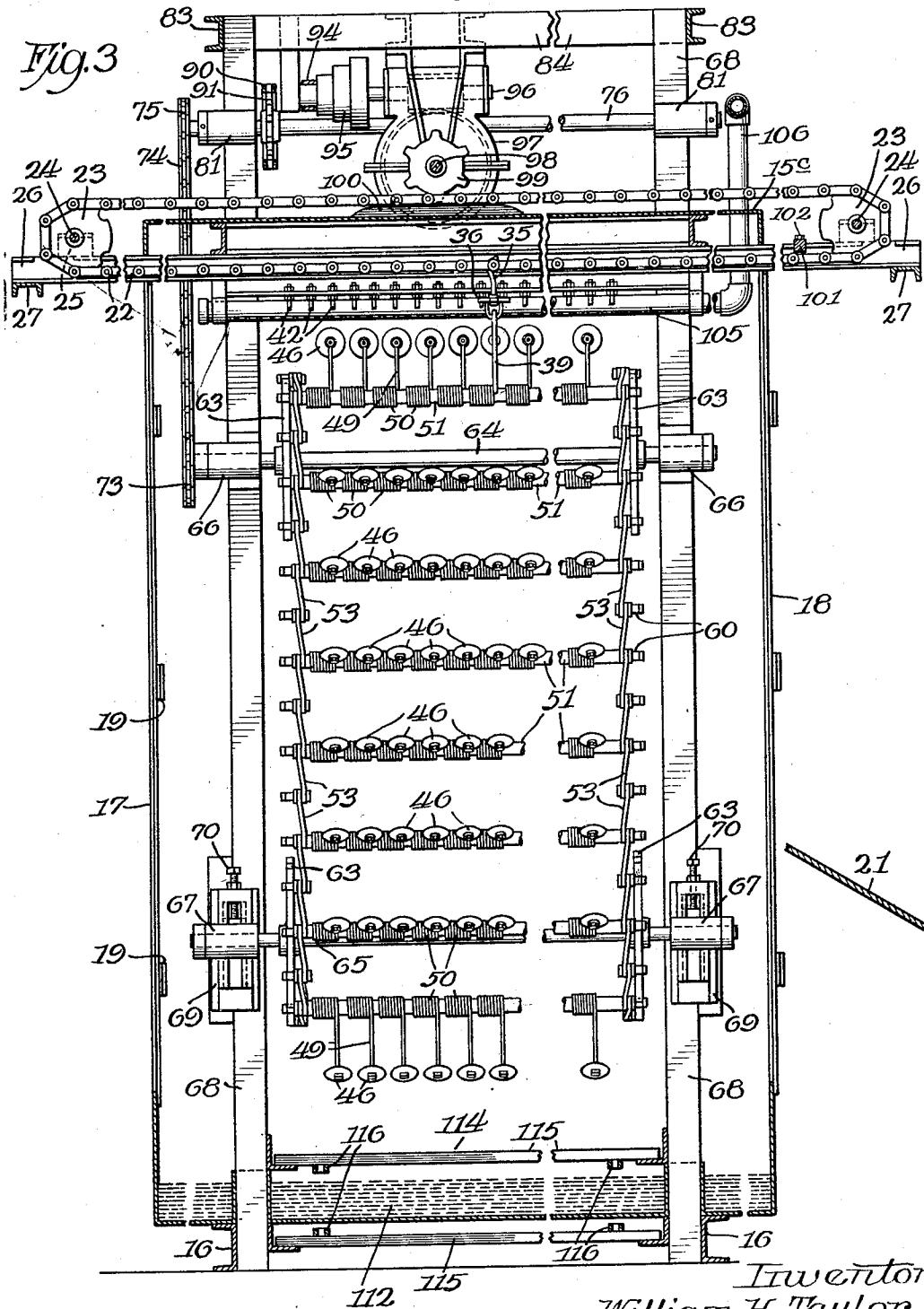
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HOG SCRAPER

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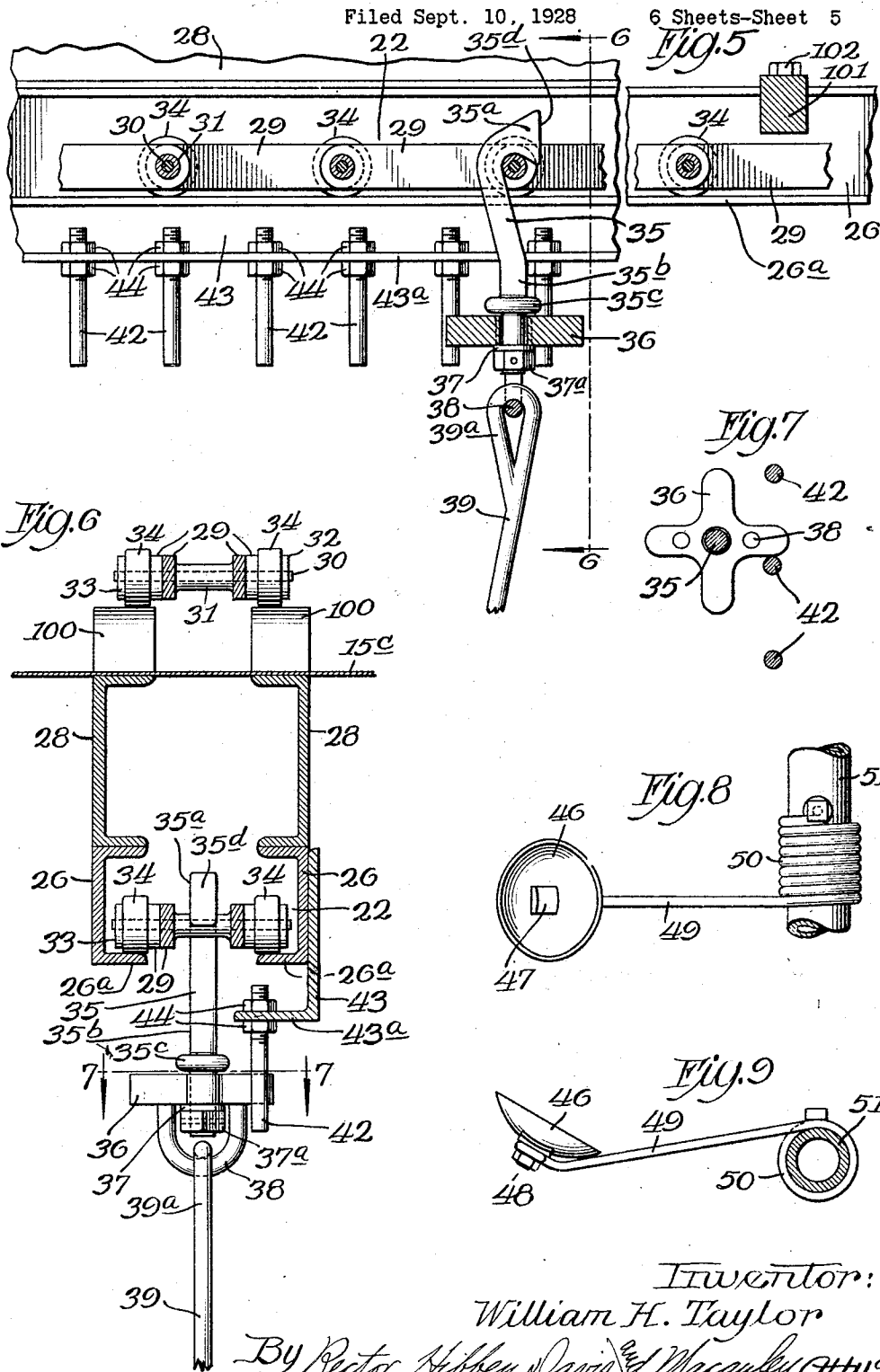
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HOG SCRAPER

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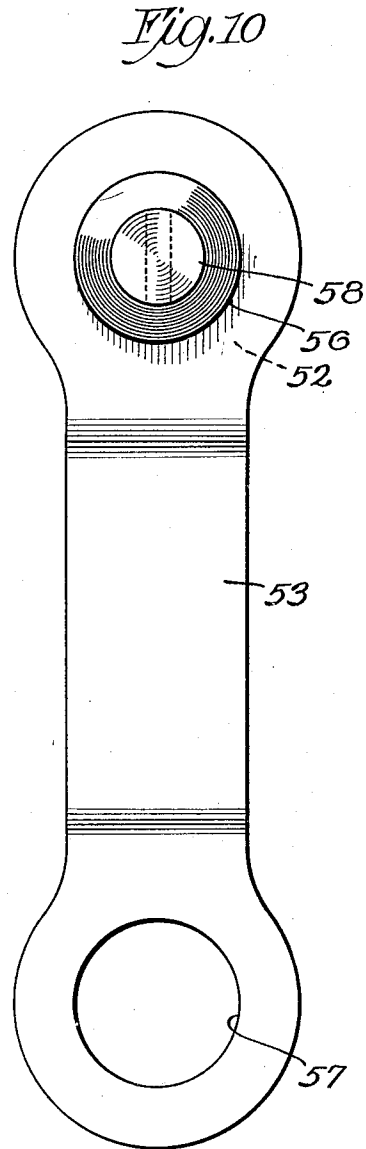
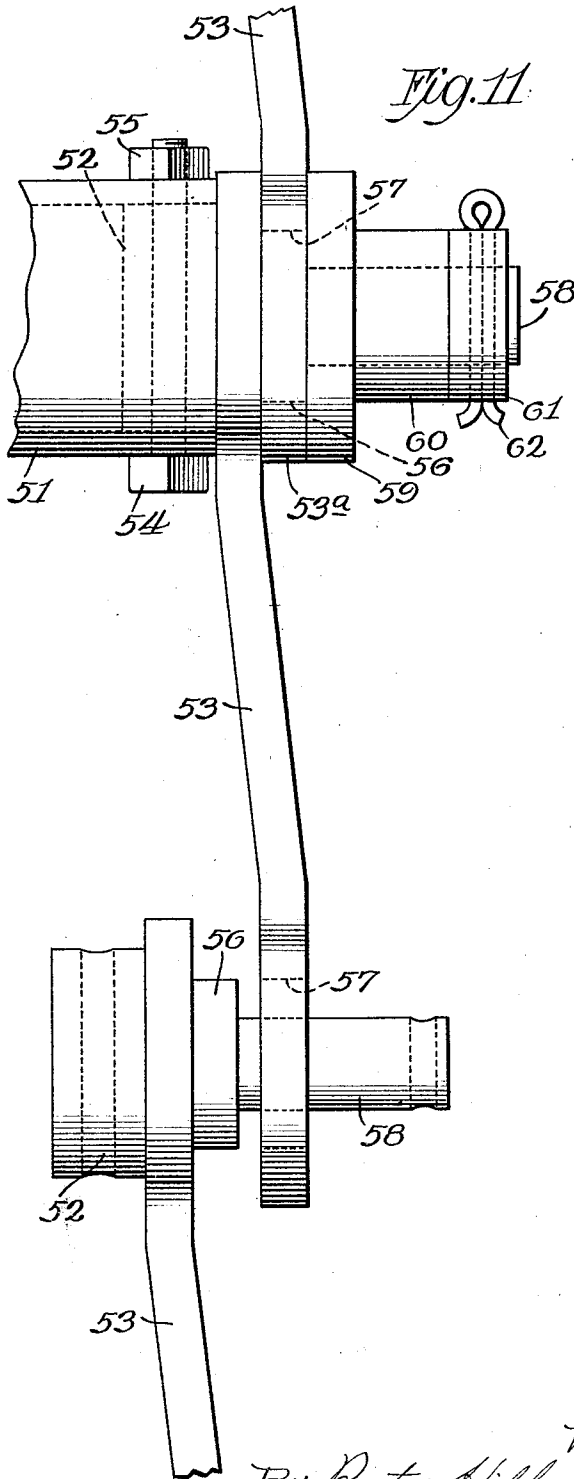
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HOG SCRAPER

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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

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HOG SCRAPER

Application filed September 10, 1928. Serial No. 304,949.

This invention relates to a hog scraper and its purpose is to provide an improved machine adapted for use in dehairing hogs and the like more efficiently, more quickly and at less cost, as compared with the operation of machines heretofore in use.

The machines which have thus far been used for dehairing hogs have belonged to two principal types known as the beater type and the scraper type. In machines of the beater type, the dehairing elements operate at relatively high speed and have a tendency to injure the carcass of the hog, while also failing to remove the hair thoroughly from all parts of the carcass. Machines of the scraper type, while tending to effect a more thorough dehairing operation, have heretofore been unsatisfactory for the reason that to obtain a close contact of the scraping elements with all parts of the hog body, it has been necessary to mount the scraping elements on resilient supports and the constant flexure of these supports has caused them to break off adjacent their points of attachment, with the result that various parts of such machines have required frequent replacement. Machines of both types, as heretofore constructed, have occupied a very large amount of space in proportion to the work accomplished by them and have necessitated a very large original investment in the machines and their auxiliary equipment.

The principal object of the present invention is to provide a dehairing machine of the scraper type comprising improved means for effecting a thorough and efficient cleaning of all parts of the hog's body without injury to the skin. A further object of the invention is to provide a hog scraper which may be constructed in units of relatively small dimensions and which will be more speedy and durable in operation than machines heretofore used for dehairing purposes. A further object of the invention is to provide a dehairing machine of the scraper type in

which the scraping elements are resiliently mounted in an improved manner so that a firm contact of the scraping elements with the hog's body is maintained without injury to the skin and without deterioration of the resilient supports. Still another object of the invention is to provide a machine in which the hog is operated upon by two opposing sets of oppositely moving scrapers adapted to effect a thorough dehairing of all parts of the hog's skin. Another object of the invention is to provide a hog scraper in which the hog is suspended vertically and arranged to travel along a pathway during the dehairing operation while the hog is at the same time turned about a vertical axis and engaged on opposite sides by oppositely moving sets of scraper blades. A further object of the invention is to provide means for neutralizing the effect of the scraping action on the hog's body to prevent danger of lifting the hog from its support or from tearing the tendon of its leg by which it is suspended. A further important object of the invention is to provide a dehairing machine comprising scraping elements mounted on a resilient arm carried by a resilient coil which is adapted to be partially wound up when the arm is deflected by the engagement of the scraping elements with the body of the hog. Still another object is to provide improved means for automatically feeding the hogs into the dehairing chamber and for automatically dropping the hogs from the suspending apparatus after they have been dehaired. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawings in which one embodiment of the invention is illustrated. In the drawings,

Figure 1 shows an elevation of the discharge end of the improved hog scraper of

the present invention with the doors of the dehairing chamber in closed position so that the principal parts of the operating mechanism are concealed from view;

5 Fig. 2 shows a top plan view of the improved hog scraper illustrated in Fig. 1;

Fig. 3 shows a longitudinal vertical section taken on the line 3—3 of Fig. 1;

Fig. 4 shows a transverse vertical section taken on the line 4—4 of Fig. 2;

Fig. 5 shows an enlarged longitudinal section, similar to that of Fig. 3, through the upper portion of the apparatus, on the line 5—5 of Fig. 4, showing the means for sus-
10 pending the hogs and for effecting rotation thereof during their travel;

Fig. 6 shows an enlarged transverse vertical section taken on the line 6—6 of Fig. 5;

Fig. 7 is a detailed section taken on the
20 line 7—7 of Fig. 6;

Fig. 8 shows a partial plan view of one of the scraping elements and its resilient supporting arm with a portion of the bar or shaft on which the arm is mounted;

Fig. 9 shows a side elevation of the parts illustrated in Fig. 8;

Fig. 10 shows a side elevation of a link of one of the scraper conveyors; and

Fig. 11 shows an enlarged front elevation
30 of a portion of one end of a scraper conveyor.

As illustrated in the accompanying drawings, the invention comprises a housing or chamber 15 adapted to be located within a room of a packing house or other place where
35 hogs are slaughtered and adapted to contain the principal parts of the dehairing mechanism so that the steam, hot water and detached hair or bristles, which necessarily accompany the dehairing operation, are con-
40 fined within closed walls. The housing 15 comprises end walls 15^a, side walls 15^b, and a top wall or ceiling 15^c, the lower portions of the vertical walls being mounted on support-
45 ing beams 16 which in turn rest on the floor of the room in which the apparatus is located. The end wall 15^a of the entrance end of the housing is provided with inwardly opening doors 17 and the end wall 15^a at the discharge end of the housing is provided
50 with outwardly opening doors 18. These doors are similar in construction and mounting except that the inwardly opening doors are located on the inside of the end wall whereas the outwardly opening doors 18 are
55 located on the outer side of the end wall as shown in Fig. 1. Each door is attached to its end wall by a plurality of hinges 19 each of which embodies a coil spring 20 adapted to exert a normal tendency to close
60 the door to which it is attached so that the discharge doors 18 normally move to the closed position shown in Fig. 1 and the inwardly opening doors 17 normally assume the closed position shown particularly in Fig. 2.
65 The upright openings in the end walls 15^a

which are normally closed by these doors 17 and 18 extend substantially throughout the height of the end walls and are of sufficient width to accommodate any size of hog which may be moved to or from the interior chamber of the housing. The hogs are scald-
70 ed to loosen the hair and bristles before they pass into the chamber 15 and upon emerging therefrom through the doors 18, with the hair and bristles removed, each hog carcass is dropped onto an inclined chute 21 which di-
75 rects it onto a table in readiness for further operations such as are carried on in the packing of meat.

During this movement of the hogs
80 through the dehairing chamber 15, they are suspended from an endless conveyor chain 22, shown particularly in Fig. 3, which extends longitudinally of the housing im-
85 mediately above the central parts of the door openings and which is mounted on sprocket wheels 23 carried by shafts 24 which are journaled in bearings 25. These bearings are carried by the longitudinal beams 26
90 which extend through the upper part of the housing with their ends supported outside the housing by transverse channel beams 27. The beams 26 are in the form of channels having their flanges directed inwardly to-
95 ward each other as shown in Fig. 6 and the upper flanges thereof are attached to longitudinal supporting beams 28 mounted beneath the top wall 15^c of the housing. As shown in Figs. 5 and 6, the conveyor chain 22 comprises a series of pairs of links 29
100 which are pivotally connected by transverse pins 30. The links 29 of each pair are spaced apart by cylindrical collars 31 through which the pins 30 pass and the outer ends of the pins are engaged by washers 32 and 33
105 between which are mounted the rotatable rollers 34 adapted to travel on the lower flanges 26^a of the supporting and guiding beams 26. The sprocket wheels 23 engage the sleeves or rollers 31 between the track
110 beams 26 and the sleeves or rollers 31 also serve as the parts which are directly engaged by supporting hooks from which the hogs are suspended.

Each hog is suspended from a hanger 35
115 which has an upper hooked extremity 35^a adapted to engage one of the spacing sleeves 31, as shown in Fig. 5 and the lower portion of the hanger is offset so that it lies directly beneath the axis of the supporting sleeve. This depending stem 35^b of each hanger is
120 provided with an annular rib 35^c beneath which there is rotatably mounted a pinion 36 held in place by a washer 37 and nut 37^a which are mounted on the lower end of the
125 hook stem. The pinion 36 carries a U-shaped member 38 which is secured therein to straddle the nut 37^a, as shown in Fig. 6 and which is engaged by the upper looped end 39^a of a hook 39 on which the hog 40 is suspended as
130

shown in Fig. 4. For this purpose, one of the hind legs of the hog is slit on the inside of the usual tendon so that the hook can be inserted therethrough to permit the hog to be suspended by one leg with its head directed downwardly. Then, as the conveyor chain 22 is actuated by the driving mechanism hereinafter described, the lower stretch of the chain travels along on the track beams 26 and carries with it the series of hogs which are suspended by individual hooks from the chain. During this movement through the housing 15, each hog 40 is rotated about a vertical axis by reason of the engagement of the pinion 36 mounted on its suspending hanger 35 with a row of pins 42 which are mounted in the lower horizontal flange 43^a of an angle plate 43 which is secured to one of the track beams 26. The pins 42 are secured in adjusted position by lock nuts 44 and they form rack teeth which cooperate with the pinion 36 to effect the rotation of this pinion during its travel, with the result that the suspended hook 39 carried by the pinion is rotated with the hog mounted thereon. Thus, each hog is rotated about a vertical axis as it travels through the housing from the entrance doors 17 to the discharge doors 18.

During this travel of the hog through the housing, it is engaged on opposite sides by two series of scrapers 45 which are similar to each other except that they move in opposite directions. Each scraping device 45 comprises a plurality of saucer shaped scraping elements 46 which are circular in form and which have rounded scraping edges so that they will not injure the hog by their scraping engagement therewith. Each scraping element 46 is secured by a bolt 47 and nut 48 on a resilient arm 49 having the form shown particularly in Figs. 4, 8 and 9. The resilient arm 49 is formed as an integral part of a helical coil 50 which is resilient like the arm 49 and which is mounted on a tubular supporting bar 51. A series of parallel supporting bars 51 are provided and a plurality of arms 49 and scraping elements 46 are mounted on each bar, as shown particularly in Figs. 3 and 4. Each bar 51 is engaged at each end by a cylindrical boss 52 which is formed on one end of a link 53. A bolt 54 passes through each boss 52 and through apertures in the adjacent walls of the bar 51, with a nut 55 engaging the threaded end of the bolts, so that each bar 51 has a link 53 rigidly attached to each end thereof. Each link 53 is provided on its outer side, opposite the boss 52 thereon, with a smaller cylindrical boss 56 adapted to be rotatably engaged by the end of the link 53 attached to the next adjacent bar 51, the free end of each link 53 being provided with an aperture 57 for engagement with the boss 56 carried by the link attached to the next adjacent bar. In this manner, the links

attached to adjacent bars overlap each other and have a pivotal relation so that a plurality of the bars 51 with their connecting links 53 make up the endless members 45. A spindle 58 extends outwardly from the boss 56 and is engaged by a washer or collar 59 which seats against the adjacent overlapping end 53^a of one of the links and a roller 60 is mounted on the trunnion 58 adjacent the washer 59. A small collar 61 is secured on the outer end of each trunnion 58 by means of a cotter pin 62. These rollers 60 are adapted to coact with the sprocket wheels 63 by which the endless members 45 are supported as shown in Fig. 4. The sprocket wheels 63 are secured on shafts 64 and 65 which are journaled, respectively, in bearing members 66 and 67. The bearing members 66 are secured rigidly to the upright frame members 68, but the bearing blocks 67 are adjustable in guide members 69 carried by the frame members 68, this adjustment being effected by the adjusting screws 70, so that the tightness of the endless conveyors which carry the scraping elements may be varied to cause the scraping elements 46 to engage the hog with suitable firmness to effect the scraping of the hair and bristles therefrom.

It will be observed that the scraping elements 46 and their supporting arms 49 are oppositely disposed on the bars 51 forming parts of the oppositely disposed endless members 45 so that one series of concave scraping elements is directed upwardly adjacent the hog 40, while the other series of scraping elements 46 is directed downwardly adjacent the hog 40. The endless scraper carriers 45 are actuated to move in opposite directions adjacent the hog as illustrated by the arrows 71 and 72 in Fig. 4 so that the hog is scraped on opposite sides by scraping elements traveling in opposite directions while at the same time it is rotated about a vertical axis and advanced longitudinally between the moving parallel bars 51. The shaft 64 of the right hand endless scraper conveyor 45, as viewed in Fig. 4, has a sprocket gear 73 fixed thereon to mesh with a sprocket chain 74 having its upper portion passed around a sprocket gear 75 which is fixed on a shaft 76. At the left hand side of the apparatus, as viewed in Fig. 4, the shaft 64, having stationary bearings, is provided with a relatively fixed sprocket gear 77 meshing with a sprocket chain 78 which is driven by another sprocket gear 79 fixed on a horizontal shaft 80. Referring to Figs. 1, 2 and 4, it will be seen that the shafts 76 and 80 are located above the housing 15 and are journaled in bearings 81 and 82, respectively, which are secured to the upright frame members 68. These frame members 68 are connected at their upper ends by the transverse frame members 83 and these transverse frame members are in turn connected by the longitudinal frame members 84. An

electric motor 85 is mounted above the housing 15 and its shaft has a sprocket gear 86 fixed thereon which is connected by a sprocket chain 87 with a sprocket gear 88 fixed on the shaft 80. The shaft 80 is further provided with a relatively fixed sprocket gear 89 which is connected by a sprocket chain 90 with another sprocket gear 91 fixed on the shaft 76 so that the two shafts 80 and 76 are driven in the same direction and thus cause the two endless scraper conveyors 45 to travel in the same direction with the result that their adjacent portions move in opposite directions. In order that the driving means for each endless scraper conveyor 45 may exert a pull thereon, rather than a pushing action, the driven shaft 64 of the right hand scraper conveyor, as viewed in Fig. 4, is located at the upper end of the conveyor, while the driven shaft 64 of the other scraper conveyor is located at the lower end thereof.

The shaft 80, which is driven by the motor 85, also serves to actuate the mechanism by which the hogs are conveyed longitudinally through the dehairing chamber 15. For this purpose, the shaft 80 has a fixed cone pulley 93 upon which is mounted a belt 94 arranged to drive another oppositely directed cone pulley 95 fixed on a shaft 96 which is journaled in a worm housing 97. A worm fixed on the shaft 96 meshes with a worm wheel fixed on the shaft 98 and the latter shaft has fixed thereon a driving pinion 99, the teeth of which are adapted to pass between the sleeve 31 of the endless conveyor 22 as the upper stretch thereof passes over the blocks 100 which are mounted above the top 15^c of the housing and above the frame members 28, as shown in Fig. 6. By varying the position of the belt 94 on the various steps of the cone pulleys 93 and 94, the speed of travel of the hogs through the dehairing chamber 15 may be varied as desired. In order to cause the hogs to be automatically dropped from the endless conveyor 22 after the hair has been removed therefrom and as the hogs are emerging through the exit doors of the housing, the head 35^a of each hanger 35 is provided with a flat face 35^d which is adapted to engage a stop member 101 clamped in adjusted position on the track members 26 by means of studs 102. Upon engagement of the head 35^a with the stop member 101, the travel of the hanger 35 and its suspended hog is arrested so that the supporting sleeve 31 moves out from its position beneath the hooked extremity 35^a of the hanger and allows the hanger to drop with its hog onto the inclined chute 21.

It will be understood that each hog is scalded in a bath of hot water before being suspended on the endless conveyor 22 by means of one of the hangers 35 and then upon mounting the hog on the hanger, it moves through the entrance doors of the housing into the inner chamber thereof where it is en-

gaged by the oppositely moving sets of scraping elements. During the time that the hog is being scraped, it is maintained in a wet condition by sprays of water which are discharged from a pair of perforated pipes 105 located in the upper part of the housing 15 as shown in Fig. 4. These spray pipes 105, which are perforated on their under sides in order to direct the sprays onto the moving hogs, are supplied with water through branch pipes 106 leading from a supply pipe 107. This supply pipe is connected with the discharge port of a centrifugal pump 108, the shaft 109 of which is driven by an electric motor 110. The pump 108 has an inlet 111 leading from a comparatively shallow vessel 112 which is located in the lower part of the housing 15 and which is adapted to catch the spray water after it has fallen downwardly around and about the hogs being scraped. In this way a recirculation of the same spray water is maintained. The inlet of the centrifugal pump is provided with a suitable screen to collect any hair or sediment which may be present in the water and for the purpose of preventing the contamination of the water in the tank 112 by the falling hair or bristles, an endless platform 114 is provided to extend completely around the tank 112. This endless platform is made up of a plurality of spaced slats 115 which are mounted on the links of endless chains 116 mounted to travel about the sprocket wheels 117 located on shafts 118. These shafts 118 are journaled in bearings 119 secured to the frame members 16 and one of these shafts is driven by a worm wheel 120 mounted in a housing 121 and arranged to be driven by a worm 122 fixed on an extension of the shaft 109 of the pump 108 and the motor 110. In this way, the hair and bristles falling from the hogs which are being scraped during their traveling through the housing, is carried away by the endless platform 114 and discharged over one edge of the tank 112.

The operation of the apparatus will be apparent from the foregoing description without further summary. It will be observed that each hog being scraped is engaged simultaneously on opposite sides by oppositely moving scraping elements so that force exerted on one side of the hog is to a large extent counterbalanced by the force exerted on the other side so that there is no force exerted on the tendon of the hog's leg by which it is suspended other than the weight of the hog itself. Thus, there is little danger of the hogs being torn loose from their supporting hooks during their travel through the housing. A plurality of hogs may be mounted on the endless conveyor 22 for treatment in the housing 15 at the same time and upon emerging from this housing, each hog will be substantially free of all hair or bristles. By shifting the belt 94 on the driving pulleys, the speed of travel of the hogs through the hous-

ing may be varied so that the duration of the scraping operations on a particular series of hogs may be adjusted to suit the difficulty with which the hair or bristles are removed therefrom.

Although one form of the invention has been shown and described by way of illustration, it will be understood that it may be constructed in various other forms within the scope of the appended claims.

I claim:

1. A hog scraper comprising a scraping element, an arm attached to said element, a resilient helical member carrying said arm and having its longitudinal axis extending transversely thereto, and means for holding against rotation a portion of said helical member spaced from said arm.

2. A hog scraper comprising a scraping element, and a resilient helical supporting member adapted to be wound about its axis upon engagement of said scraping element with the hog.

3. A hog scraper comprising a supporting bar, a helical member mounted on said bar, means for holding said helical member against rotation bodily on said bar, an arm extending from said helical member, and a scraping element carried by said arm.

4. A hog scraper comprising a supporting bar, a plurality of helical members wound about and secured to said bar, and a scraping element carried by each of said helical members.

5. A hog scraper comprising a supporting bar, a plurality of helical members wound about said bar, a scraping element carried by each of said helical members, and means for securing one end of each of said helical members to said bar.

6. A hog scraper comprising a supporting bar, a plurality of helical members wound about said bar, a scraping element carried by each of said helical members, means for securing said helical members against rotation bodily on said bar, and means for moving said bar.

7. A hog scraper comprising a supporting bar, a resilient helical member mounted on said bar with one end secured to said bar and the other end projecting outwardly therefrom, and a scraping element secured to said upwardly extending end of said helical member.

8. A hog scraper comprising means for supporting a hog, a plurality of scraping elements having linear movements in opposite directions on opposite sides of said hog, and means for moving said supporting means transversely to the direction of movement of said scraping elements.

9. A hog scraper comprising means for supporting a hog, a plurality of oppositely moving scraping elements adapted to travel along parallel linear paths and engage oppo-

site sides of said hog, and means for turning said hog about an axis extending substantially parallel to the directions of movement of said scraping elements.

10. A hog scraper comprising means for supporting and conveying the hog, means for turning the hog about a vertical axis during its movement, and scraping elements movable vertically in opposite directions along linear paths on opposite sides of said hog.

11. A hog scraper comprising means for supporting a hog in suspended position, means for moving said hog, a plurality of rows of scraping elements mounted on opposite sides of the path of movement of said hog, and means for moving the scraping elements on opposite sides of said hog in opposite directions along helical paths.

12. A hog scraper comprising means for supporting a hog in suspended position, means for moving said hog, a plurality of bars movably mounted on opposite sides of the path of movement of said hog, a resilient helical member mounted around each of said bars and secured thereto, and a scraping element secured to each of said helical members.

13. A hog scraper comprising means for supporting a hog in suspended position, means for moving said hog, a plurality of bars movably mounted on opposite sides of the path of movement of said hog, a resilient helical member mounted around each of said bars and secured thereto, a scraping element secured to each of said helical members, and means for moving the bars on opposite sides of the path of movement of the hog in opposite directions vertically.

14. A hog scraper comprising an endless conveyor, means for suspending hogs on said conveyor, a pair of endless chains mounted for vertical movement on opposite sides of the path of travel of said hogs on said conveyor, scraping elements carried by said endless chains for engagement by said hogs during their movement, and means for actuating said endless chains to cause the scraping elements carried thereby to move over said hogs in opposite directions on opposite sides thereof.

15. A hog scraper comprising an endless conveyor, means for suspending hogs on said conveyor, a pair of endless chains mounted for vertical movement on opposite sides of the path of travel of said hogs on said conveyor, scraping elements carried by said endless chains for engagement by said hogs during their movement, means for actuating said endless chains to cause the scraping elements carried thereby to move over said hogs in opposite directions on opposite sides thereof, and means for rotating said hogs about vertical axes during their travel on said conveyor.

16. A hog scraper comprising an endless conveyor, means for suspending hogs on said conveyor, a pair of endless chains mounted for vertical movement on opposite sides of the path of travel of said hogs on said conveyor, scraping elements carried by said endless chains for engagement by said hogs during their movement, means for actuating said endless chains to cause the scraping elements carried thereby to move over said hogs in opposite directions on opposite sides thereof, and means for automatically releasing said hogs from said conveyor after they have passed between said scraping elements.

17. A hog scraper comprising a housing having entrance and exit doors, a conveyor extending through said housing and projecting therefrom above said doors, means for suspending hogs from said conveyor for movement through said entrance doors and said housing and thence outwardly through said exit doors, means for maintaining a spray of water on said hogs during their movement through said housing, and movable scraping elements within said housing for dehairing said hogs during their movement.

18. A hog scraper comprising a housing having entrance and exit doors, a conveyor extending through said housing and projecting therefrom about said doors, means for suspending hogs from said conveyor for movement through said entrance doors and said housing and thence outwardly through said exit doors, means for maintaining a spray of water on said hogs during their movement through said housing, movable scraping elements within said housing for dehairing said hogs during their movement, a tank for collecting the water sprayed over said hogs, and an endless movable platform having a part movable above said tank for conveying the removed hair over the edge of said tank.

In testimony whereof, I have subscribed my name.

WILLIAM H. TAYLOR.