

June 26, 1956

W. H. HAMMOND

2,752,029

BARN CLEANER

Filed June 11, 1951

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Fig. 2

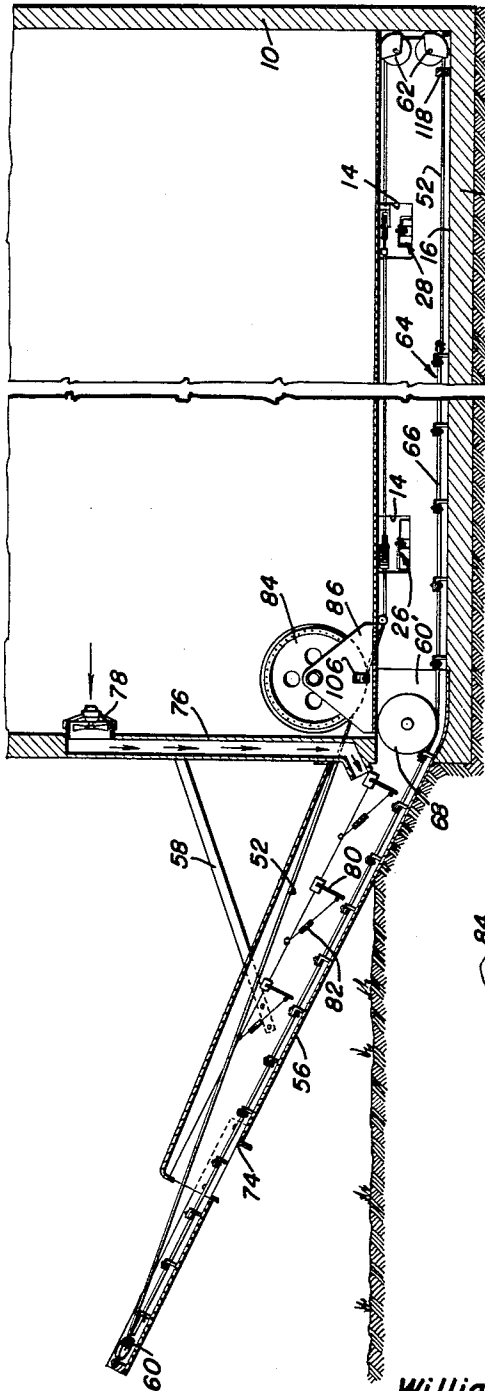
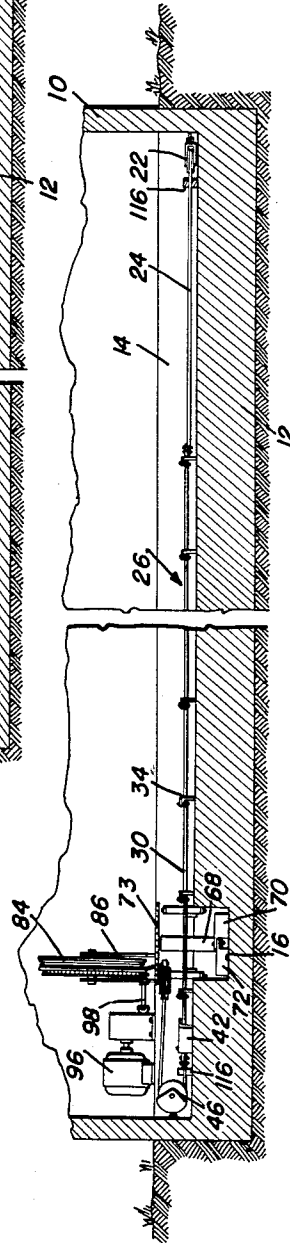


Fig. 3



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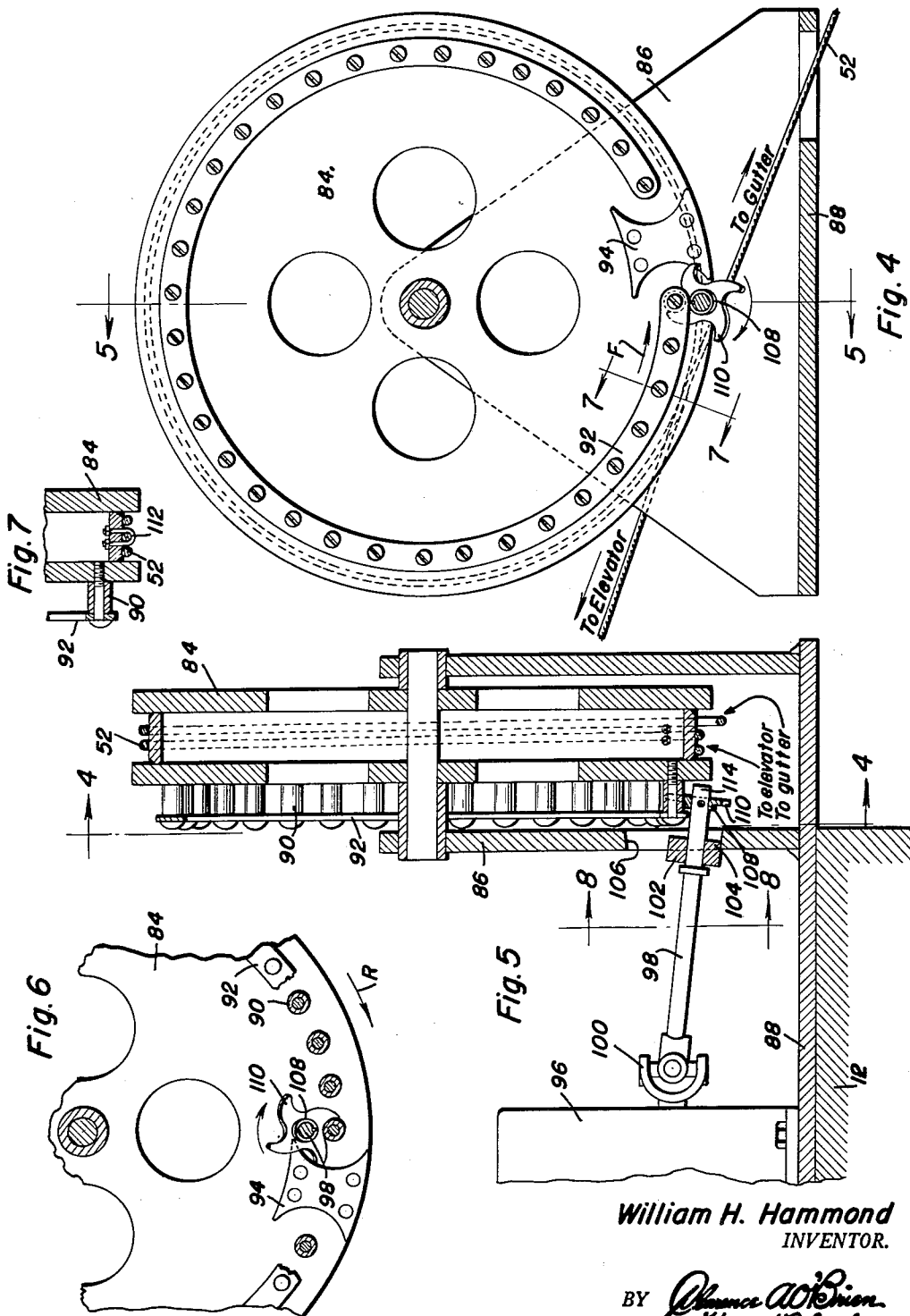
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Fig. 9

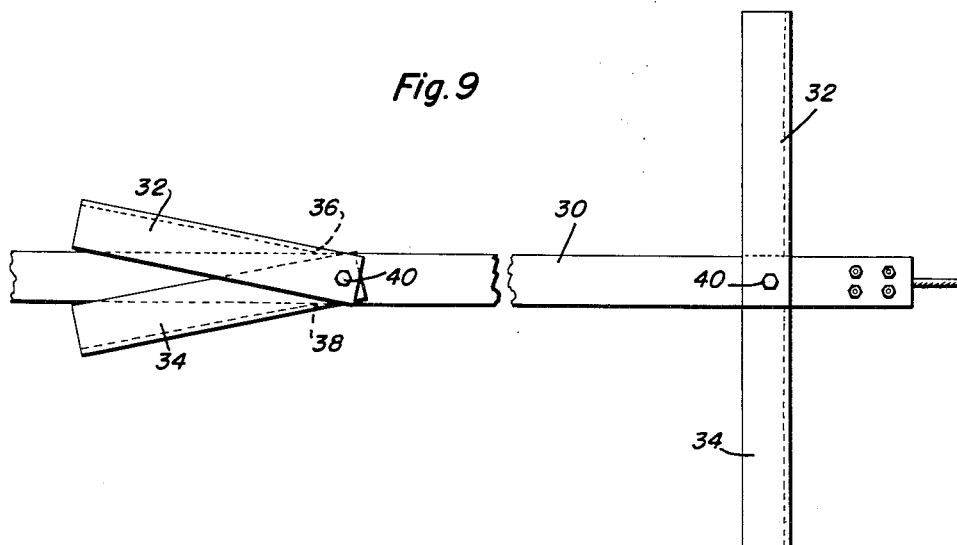


Fig. 10

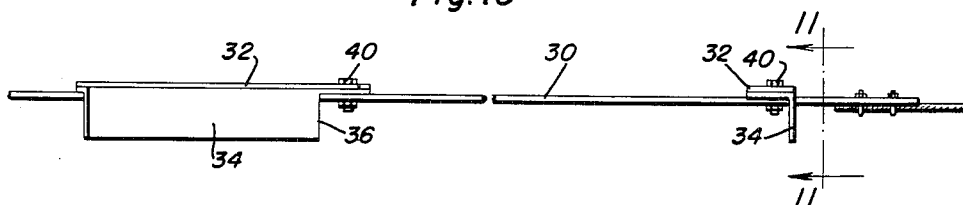


Fig. 11

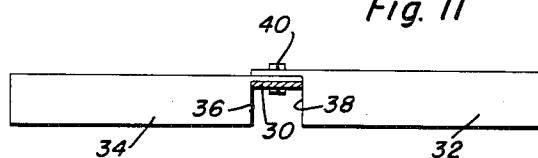
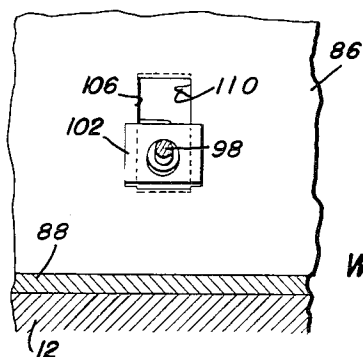


Fig. 8



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BARN CLEANER

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Application June 11, 1951, Serial No. 230,992

6 Claims. (Cl. 198—79)

This invention relates to new and useful improvements in dairy barn cleaners and the primary object of the present invention is to provide an apparatus for conducting feces from contributory gutters to a main gutter and then delivering the feces from the main gutter to a disposal point.

Another important object of the present invention is to provide a barn cleaner including contributor gutter cleaners that are operatively connected to a power operated main gutter cleaner whereby all cleaners will operate simultaneously for moving material to a dump area.

Yet another object of the present invention is to provide a barn cleaner of the aforementioned character involving a novel and improved means for reciprocating the main gutter cleaner and the contributory gutter cleaners as a unit.

A further object of the present invention is to provide a barn cleaner involving gutter cleaning means composed of pairs of swingable arms that swing to a coaxial position in order to move material and which arms swing together upon retraction of the cleaning means to prevent the material being removed from passing back into the gutters.

A still further aim of the present invention is to provide a barn cleaning apparatus that is operated by a single motor, one that is adaptable for various types of barns, and which is extremely simple and practical in construction, service and operation.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a fragmentary plan view of the present invention mounted in a barn and illustrating but two contributory gutter cleaners;

Figure 2 is a vertical sectional view taken substantially on the plane of section line 2—2 of Figure 1;

Figure 3 is a vertical sectional view taken substantially on the plane of section line 3—3 of Figure 1;

Figure 4 is a vertical sectional view taken substantially on the plane of section line 4—4 of Figure 5;

Figure 5 is a vertical sectional view taken on the plane of section line 5—5 of Figure 4.

Figure 6 is a fragmentary view of Figure 4 but showing how the rotating drum is reversed;

Figure 7 is a detail sectional view taken substantially on the plane of section line 7—7 of Figure 4;

Figure 8 is a vertical sectional view taken substantially on the plane of section line 8—8 of Figure 5;

Figure 9 is an enlarged fragmentary view of Figure 1 to illustrate a portion of one of the gutter cleaners;

Figure 10 is a side view of Figure 9; and

Figure 11 is a vertical sectional view taken substantially on the plane of section line 11—11 of Figure 10.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents a barn whose concrete flooring 12 is formed

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with a plurality of spaced parallel contributory gutters 14 and a main gutter 16 that extends transversely across the contributory gutters at a lower level than the gutters 14.

The gutters 14 are arranged in pairs, as shown in Figure 1, with their ends, remote from the gutter 16, joined by a passage 18 that is covered by a grill or screen 20. The ends of the gutters 14 joined by the passage 18 have pulleys 22 mounted therein over which there is trained a cable 24. The ends of the cable 24 are attached to relatively oppositely moving gutter cleaners 26 and 28 slidably received in the pair of gutters 14.

The cleaners for the contributory gutters are similarly constructed and each includes an elongated bar 30 to which pairs of horizontally swinging scraper arms 32 and 34 are pivoted. An inspection of Figures 9, 10 and 11 reveals the detail construction of the cleaners 26 and 28 and illustrates the arms 32 and 34 as being of angle iron construction with their vertical flanges removed at their inner ends to form vertical edges 36 and 38.

The horizontal flanges of the angle iron arms 32 and 34 at their inner ends overhang the edges 36 and 38, and are secured one above the other and to the bar 30 by vertical pivots 40. The arms 32 and 34 are arranged to face the main gutter 16 and the edges 36 and 38 of the arms 32 and 34 will abut the side edges of the bars 30 to limit swinging movement of the arms toward and away from each other.

When the arms 32 and 34 engage debris in the gutters 14, the arms 32 and 34 will swing outwardly from the bars 30 and away from each other until the arms 32 and 34 are coaxial and perpendicular to the bars 30, as shown in Figures 9, 10 and 11, whereupon the edges 36 and 38 will abut the side edges of the bars 30. As the bars 30 are moved toward the pulleys 22, the arms will engage debris in the gutters 14 and will swing inwardly toward each other and toward the bars 30 so that the arms may pass through the debris.

The cleaners 26 and 28 are so arranged and connected to the ends of cable 24 that the cleaner 26 will move toward and across the gutter 16 as the cleaner 28 moves away from the gutter 16, and when the cleaner 28 is moved toward and across the gutter 16 then the cleaner 26 will move away from the gutter 16.

The arms 40' and 42 pivotally attached to the ends of the bars 30 closest the gutter 16 are arranged to swing oppositely from the arms 32 and 34, although the arms 40' and 42 are of angle iron construction. These arms 40' and 42 face the first pair of arms 32 and 34 and they will be disposed toward each other and toward the bars 30 when the other arms 32 and 34 are disposed perpendicular to the bars 30. However, the arms 40' and 42 will be disposed perpendicular to the bars 30 when the arms 32 and 34 are disposed toward each other and toward the bars 30. This particular arrangement is necessary in order to clean the ends 44 of the gutters 14 remote from the ends in which the pulleys 22 are mounted since the bars 30 will extend completely across the gutter 16 when they are moved to position for forcing material from gutters 14 into gutter 16.

Vertical and horizontal pulleys 46 and 48 are mounted in the ends 44 of gutters 14 and a cable 50 is trained over these pulleys with its ends attached to the ends of bars 30 closest gutter 16. A portion of the cable 50 between the horizontal pulleys 48 of each pair of gutters 14 is secured to an intermediate portion of another cable 52 by a clamp 54.

A vertically inclined delivery chute 56 extends upwardly from one end of the gutter 16 and is braced to the barn 10 exteriorly of the barn by braces 58. The lower end 60' of the chute 56 is formed with a bottom wall flush with the bottom wall of the gutter 16 and the

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upper end of the chute supports a pulley 60 over which the cable 52 is trained. Other pulleys 62 are mounted in the end of gutter 16 remote from chute 56 and the cable 52 is also trained over these latest pulleys 62.

A main gutter cleaner 64 is disposed in gutter 16 for reciprocation and this cleaner comprises an elongated flexible bar 66 whose intermediate portion is disposed under a roller 68 carried by end 60' that will urge the bar toward the bottom of the chute 56 and gutter 16. The ends of the cable are attached to the ends of bar 66 and a means, later to be described, is attached to the cable 52 for reciprocating the cleaner.

Pairs of angle iron scraper arms 70 and 72 are pivoted to the bar 66 by common pivots similar to pivots 40. The arms 70 and 72 are mounted on bar 66 in the same manner as the arms 32 and 34 are mounted on the bars 30. The arms 70 and 72 face the upper end of the chute and will fan outwardly as the bar 66 is moved toward the chute to conduct material in gutter 16, covered by a grill or screen 73, toward an opening 74 in the bottom wall of the chute 56.

A vertical air duct 76 is mounted in a wall of the barn above the end 60 of the chute and includes a lower end that faces and overlies the chute. An air impeller is supported at the upper end of the duct 76 to force warm air from in the building over the main gutter cleaner, before operation of the latter, in order to loosen the scraper arms in the event of cold weather.

Baffle plates 80 are swingably mounted in the chute 56 above the portion of cleaner 64 that is disposed in the chute. The baffle plates 80 are connected to the side walls of the chute by springs 82 so that they may swing upwardly, but the springs will restrict movement of the plates 80 toward end 60 and thereby prevent backward descent of the material being lifted in the chute.

The means for imparting reciprocation to the cleaner 64 and hence to the cleaners 26 and 28 is shown best in Figures 4, 5, 6, 7 and 8, and comprises a cable drum 84 that is rotatably supported in a bracket 86 mounted on a base 88 adjacent the roller 68.

One side wall or flange of the drum 84 supports a plurality of circumferentially spaced horizontal rollers 90 that are joined by an arcuate plate 92. A cam 94 is mounted on the roller supporting wall of the drum between two of the rollers and between the ends of the plate 92.

A motor 96 is mounted on base 88 and its drive shaft is connected to a shaft 98 by a reduction gearing and a universal joint 100. The outer end portion of the shaft 98 carries a sliding plate 102 having a reduced end 104 that is slidably received in a vertical slot 106 in the bracket 86. The outer end of shaft 98 also supports, fixedly, a sprocket or a member 108 having curved radial arms 110.

An intermediate portion of the cable 52 is wrapped about the drum 84 and secured to the cylindrical wall of the drum by a cable clamp 112 so that one end of the cable 52 may move away from the drum as the other end of the cable is pulled toward the drum.

In practical use of the present invention, as the motor operates, the shaft 98 will be driven and the arms 110 will extend upwardly from shaft 98 to engage the rollers 90 sequentially and rotate the drum 84 in the direction shown by arrow F in Figure 4.

After the member 108 has engaged the last of the rollers 90, the end 114 will be engaged by cam 94 and will ride upwardly carrying with it the member 108 whereupon the arms 110 will extend downwardly into engagement with the last roller which now becomes the first roller and the drum 84 will be rotated in an opposite direction, as shown in Figure 6 by arrow R.

During the above operation, the cleaning devices 26 and 28 reciprocate back and forth in their respective gutters and move material in the gutters 14, in a step by step manner, into the gutter 16. Also, the cleaning

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device 64 moves back and forth in gutter 16 and chute 56 in order to move material in gutter 16 into the chute and through opening 74 in a step by step manner due to the spreading and contracting of the arms 70 and 72.

It should be noted that the amount of the cable 52 wrapped about the drum is determined by the diameter of the drum 84 and the stroke desired for the cleaning member 64. Also, the roller 68 bends the flexible bar 66 in order that the scraper arms thereon will engage the bottom walls of the gutter 16 and chute 56. Suitable guides, such as 116 and 118, are mounted in the gutters 14 and 16 respectively, and slidably receive the cables 24 and 52 respectively.

Having described the invention, what is claimed as new is:

1. In a barn including a plurality of parallel contributory gutters and a main gutter extending transversely across the contributory gutters, gutter cleaners slidably mounted in said contributory gutters, a main gutter cleaner slidably positioned in the main gutter, means operatively connected to the main gutter cleaner for reciprocating the same in said main gutter, and means operatively connecting said main gutter cleaner to the contributory gutter cleaners for reciprocating the latter in the contributory gutters in one direction during deciprocation of said main gutter cleaner, and means operatively connecting the contributory gutter cleaners for reciprocation of each by the other in the opposite direction.

2. In a barn including a plurality of parallel contributory gutters and a main gutter extending transversely across the contributory gutters, a pair of relatively oppositely sliding cleaners in two of the contributory gutters operatively connected together for reciprocation of each by the other in one direction, and a reciprocating gutter cleaner in the main gutter and connected to said pair of cleaners for reciprocating said pair in the opposite direction.

3. In a barn including a plurality of parallel contributory gutters and a main gutter extending transversely across the contributory gutters, a pair of bars slidably received in two of said contributory gutters, pairs of horizontally swinging scraper arms pivoted to each bar, pulleys in the ends of said contributory gutters remote from said main gutter, a main bar slidable in the main gutter, pairs of scraper arms swingably mounted on said main bar, means connected to the main bar for reciprocating the same, means connecting the main bar to the pair of bars for reciprocating the pair of bars in one direction during reciprocation of the main bar, and a flexible element trained over said pulleys and operatively connecting said pair of bars for reciprocation of each by the other in the opposite direction.

4. In a barn including a plurality of parallel contributory gutters having rear ends and a main gutter extending transversely across the contributory gutters, a pair of bars slidably received in two of said contributory gutters and having front and rear ends, pairs of horizontally swinging scraper arms pivoted to each bar, pulleys in the rear ends of said contributory gutters remote from said main gutter, a flexible element attached to the rear ends of said pair of bars and trained over the pulleys and operatively connecting said pair of bars for reciprocation of each by the other in one direction, a main bar slidable in the main gutter, pairs of scraper arms swingably mounted on said main bar, means connected to the main bar for reciprocating the same, means connecting the main bar to the front ends of the pair of bars for reciprocating the pair of bars in the opposite direction during reciprocation of said main bar, said main gutter having a discharge end, and a vertically inclined delivery chute extending upwardly from the discharge end of said main gutter and slidably receiving a portion of the main bar and certain of the arms pivoted thereto.

5. The combination of claim 1 wherein said first named

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means includes a cable drum, a plurality of circumferentially spaced rollers projecting outwardly from the drum, a double faced cam mounted on the drum between a pair of said rollers, a shaft, a universal joint connecting the shaft to the motor and a sprocket on said shaft including arms extending upwardly toward the rollers until the cam engages the shaft to raise the shaft above the rollers whereby said sprocket arms will extend downwardly to engage the rollers in order to change the direction the drum is rotating.

6. In a barn including a main gutter and a pair of spaced parallel contributory gutters extending transversely across the main gutter and having forward ends disposed at one side of the main gutter and rear ends at the other side of the main gutter, a pair of bars disposed in the contributory gutters for reciprocation and having forward and rear ends offset longitudinally relative to each other, a pulley mounted within the rear end of each contributory gutter, a table trained over the pulleys and terminally secured to the rear ends of said pair of bars and operatively connecting said pair of bars for reciprocation of each by the other in one direction, a main gutter cleaner reciprocably disposed in the main gutter, additional pulleys disposed in the forward ends of said contributory gutters, cables trained over the ad-

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ditional pulleys and terminally attached to the forward ends of said bars and said main gutter cleaner whereby the pair of bars will be reciprocated in the opposite direction by reciprocation of said main gutter cleaner, and scraper arms pivotally attached to said bars for scraping the contributory gutters.

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