Dec. 16, 1941. L. G. KURTZ ET AL 2,266,645

MOUNTING FOR ENDLESS CONVEYERS AND FOR THEIR CONVEYER FLIGHTS

Filed May 9, 1940 4 Sheets-Sheet 1

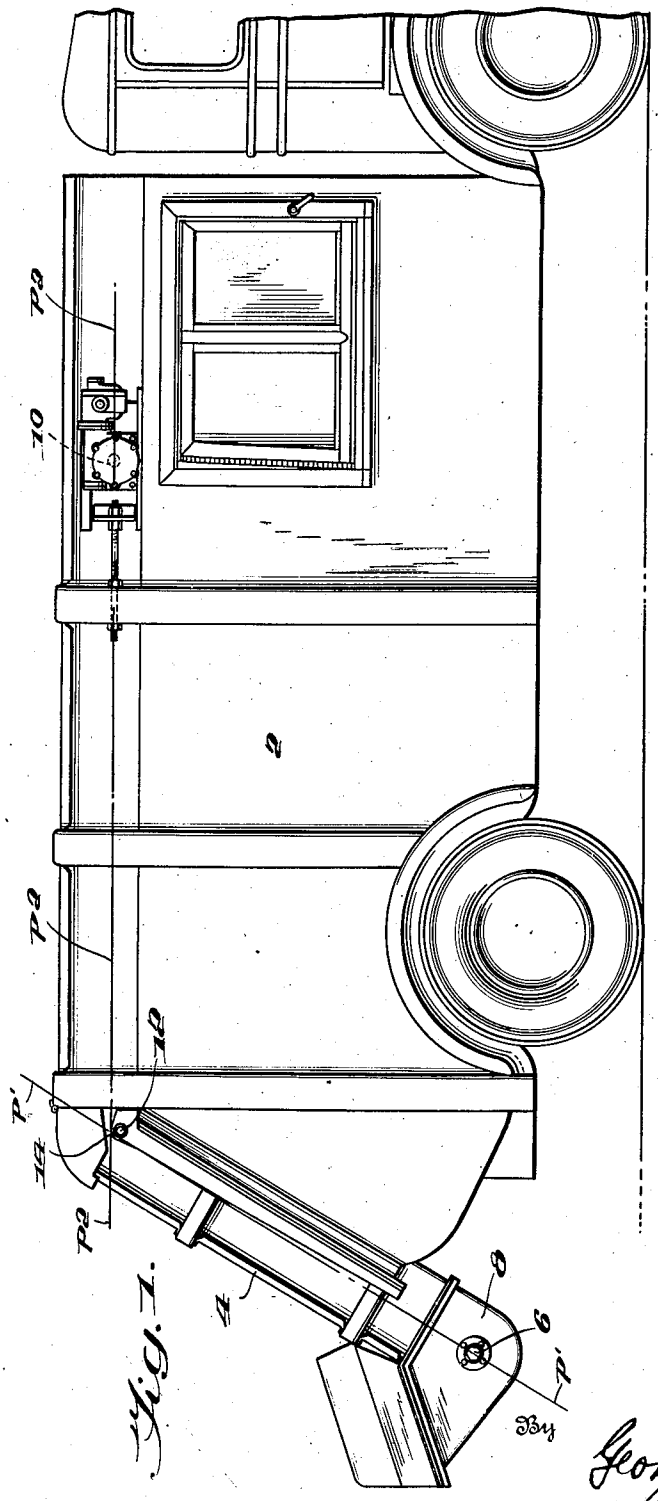


Fig. 1.

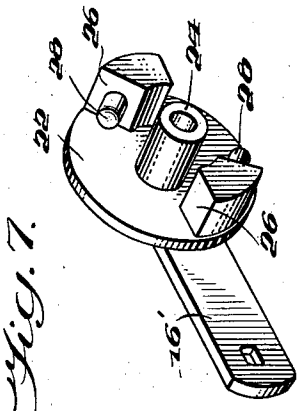


Fig. 7.

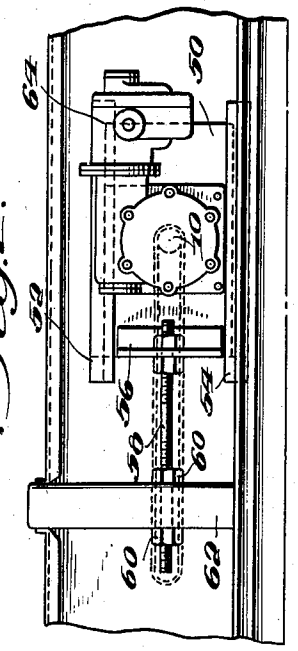


Fig. 2.

Inventors
LORON G. KURTZ,
CARL C. OTTOSON,

By George H. Mitchell Attorney

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Filed May 9, 1940 4 Sheets-Sheet 2

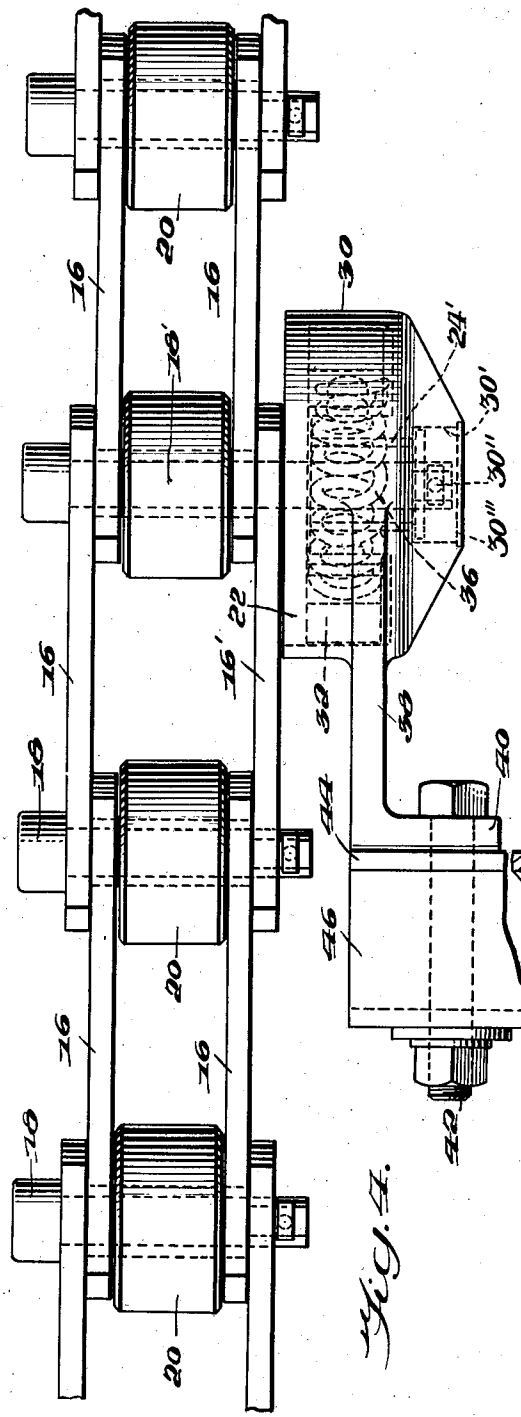


Fig. 4.

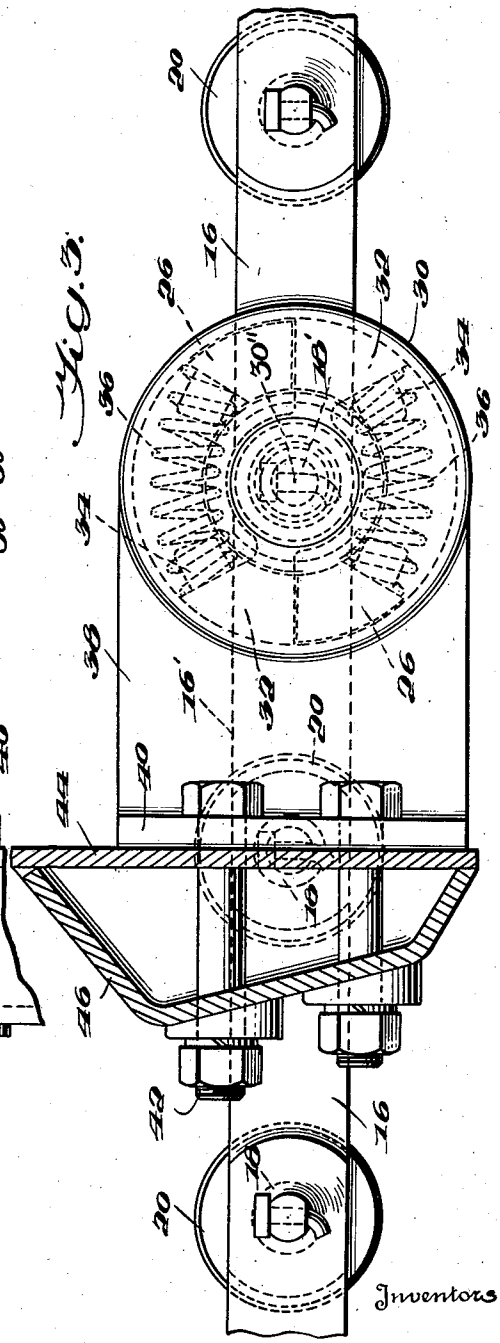


Fig. 3.

Inventors

LORON G. KURTZ,
CARL C. OTTOSON,

By George H. Mitchell. Attorney

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MOUNTING FOR ENDLESS CONVEYERS AND FOR THEIR CONVEYER FLIGHTS

Filed May 9, 1940 4 Sheets-Sheet 3

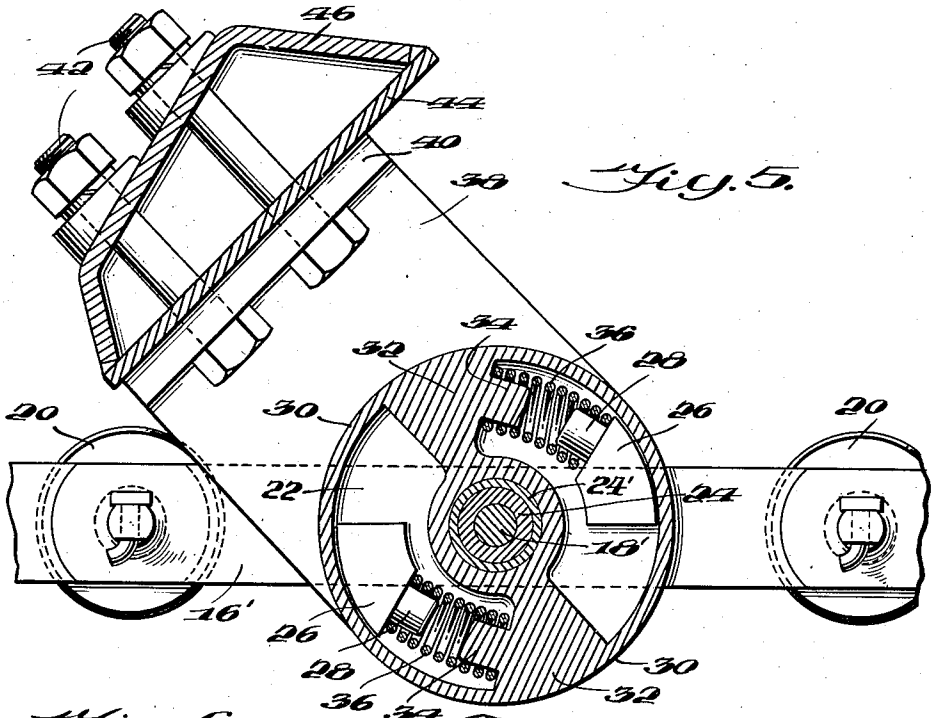
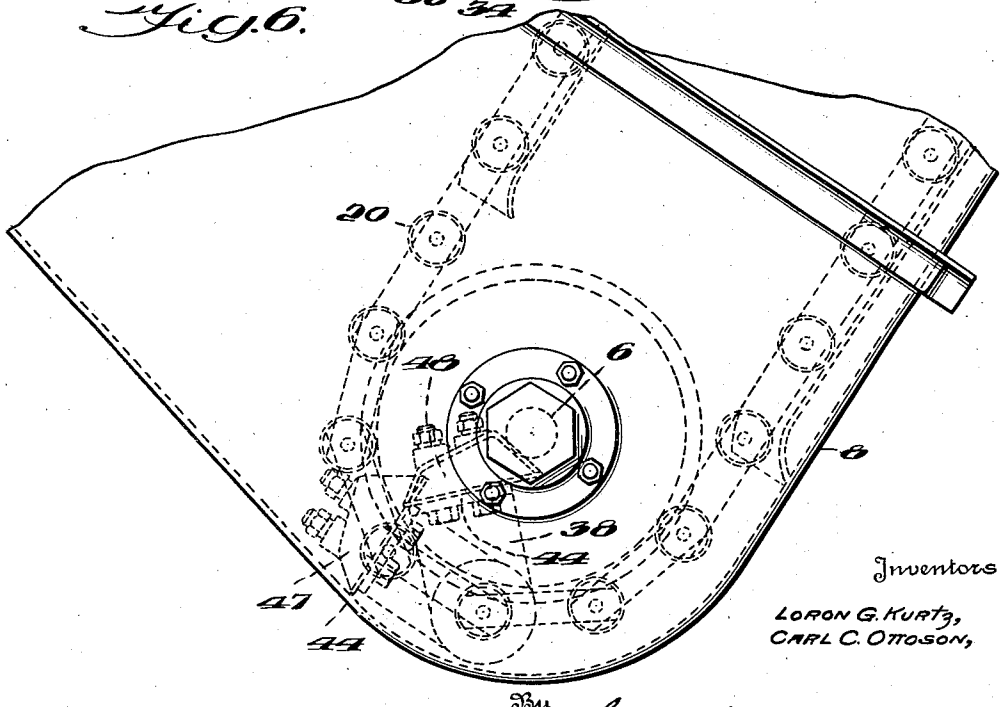


Fig. 5.

Fig. 6.



Inventors

LORON G. KURTZ,

CARL C. OTTOSON,

By George H. Mitchell Attorney

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Fig. 8.

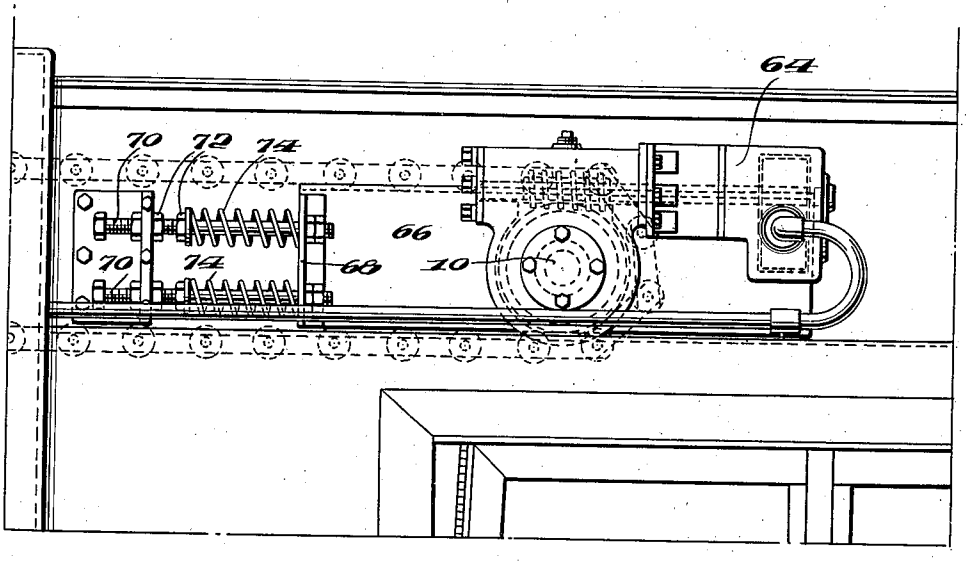
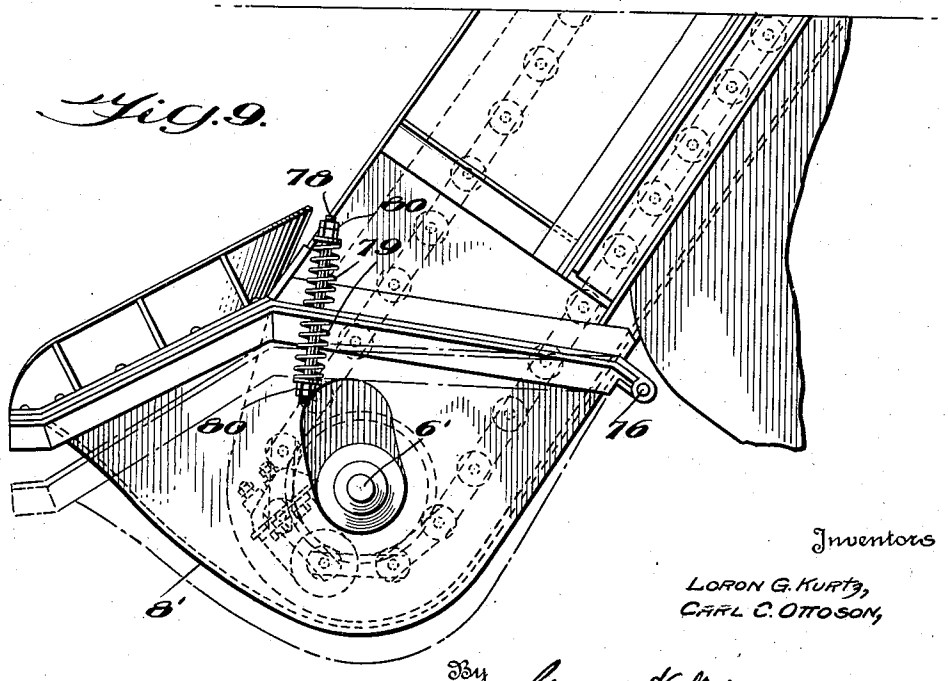


Fig. 9.



Inventors

LORON G. KURTZ,
CARL C. OTTOSON,

By George H. Mitchell Attorney

Patented Dec. 16, 1941 2,266,645

UNITED STATES PATENT OFFICE

2,266,645

MOUNTING FOR ENDLESS CONVEYERS AND FOR THEIR CONVEYER FLIGHTS

Loron G. Kurtz, Brooklyn, and Carl C. Ottoson, Port Richmond, Staten Island, N. Y.

Application May 9, 1940, Serial No. 334,288

23 Claims. (Cl. 214—67)

This invention relates to improvements in a refuse collecting truck, of the type provided with a body pivoted for dumping and provided with an endless conveyer having a downward and rearward extension. In this type of truck, there is a loading boot at the lower end of the downward and rearward extension into which refuse is loaded, and which is carried up by the conveyer and dumped in the upper part of the truck body.

In order to dump the truck body, the tail gate, which carries the downward and rearward extension referred to above, is pivoted to swing about a horizontal transverse axis.

The general type of truck here involved is shown in our application Serial No. 156,782, filed July 31, 1937 and in our application Serial No. 256,172, filed February 13, 1939, now Patent No. 2,224,789.

The truck of the present invention, although susceptible of other uses, is primarily for collecting muncipal refuse, in which refuse there are often boxes, cans, bundles and the like, of a more or less bulky nature, which would tend to jam the conveyer. Such jamming of the conveyer can be avoided to some extent by providing a resiliently mounted loading boot, or a resilient mounting for the driving shaft at the head end of the conveyer, or both, and such features are disclosed in our prior applications above referred to.

According to the present invention, jamming of the conveyer due to bulky articles of the character referred to above, is very largely eliminated by providing resiliently mounted conveyer flights, particularly of the construction referred to in more detail hereinafter.

We have found that with the resiliently mounted conveyer flights of the present invention, bulky articles are taken care of in such a way that a fixed loading boot can be used instead of a resiliently mounted loading boot, and a variably positionable, but normally fixed, driving shaft at the head end of the conveyer can be used instead of a resiliently mounted driving shaft. However, it is within the contemplation of the present invention to use, with the resiliently mounted flights, if desired, a resiliently mounted boot, or a resiliently mounted transverse drive shaft at the head end of the conveyer, or both.

More specifically, the conveyer flights of the present invention are mounted on the parallel side chains of the conveyer and are pivoted thereon on a transverse axis, which axis is by preference located a short distance ahead of the flight itself, so that if the flight meets an obstruction, it can swing inwardly, between the conveyer side chains, to accommodate said obstruction, dragging it along, the obstruction eventually being dumped into the truck body by that flight or by following flights.

The described pivotal mounting of the conveyor flights is preferably a resilient one, that is to say, there is associated with the mounting of the several conveyer flights a spring or springs so that the swinging of the conveyer flight inwardly between the conveyer chains is against said springs, serving to tension them, the reactive force of the springs returning the flights to normal position as soon as the obstruction is eliminated.

More specifically, the conveyer flights are mounted on arms, the forward ends of which are pivoted to the conveyer; these arms extend substantially parallel to the conveyer side chains, and rearwardly, the conveyer flights being secured to the rear ends of these supporting arms. Spring means are provided to cooperate with the pivotal mounting for the forward ends of said arms, for providing a resilient mounting therefor, as has been described above.

When the tail gate is lifted for dumping, together with that portion of the conveyer carried by the tail gate, there would be a tendency to stretch the conveyer chain if the tail gate were hinged on the intersection of the center lines of the two conveyer portions. However, by offsetting the tail gate hinge relatively to the center lines of the conveyer flights a certain distance (depending on the design), it is possible to maintain chain paths of substantially constant lengths.

The main features of the present invention having been thus outlined, reference is now made to the accompanying drawings for describing the invention in more detail.

Fig. 1 is a diagrammatic side view of a refuse collecting truck, made in accordance with certain features of the present invention;

Fig. 2 is an enlarged side view of the hydraulic motor and mounting at the head end of the conveyer;

Fig. 3 is an enlarged sectional side view of a resiliently mounted conveyer flight;

Fig. 4 is a plan view of the same, partly broken away;

Fig. 5 is a side view, in section, showing the conveyer flight in tilted position;

Fig. 6 is a fragmentary side view of the loading end of the conveyer;

Fig. 7 is a perspective view of a portion of the mounting for the conveyer flight;

Fig. 8 is a side view of the resilient mounting for a hydraulic motor and represents a modification; and

Fig. 9 is a side view of the loading end of a conveyer, showing a resilient boot and represents a modification.

Referring now to these drawings, in which similar reference characters indicate similar parts, 2 indicates the body of a refuse collecting truck, pivotally mounted for dumping rearwardly, the pivotal axis being behind the rear wheel, as more fully disclosed for example, in our above mentioned application Serial No. 256,172. Mounted on the tail gate is a downwardly and rearwardly extending housing 4 for an endless conveyer, this conveyer, at its lower end, passing around wheels mounted on a shaft 6 in the loading boot 8 and around sprockets on the driving shaft 10 at the head end of the conveyer, all as more fully described in said application Serial No. 256,172.

The housing 4 pivots on a transversely extending shaft 12, which is offset from the line of intersection of a plane P1, passed through the axis of shaft 6 and coincident with the center line of the housing 4, and a second plane P2 passed through the axis of shaft 10 and coincident with the structure forming the upper or forward part of the conveyer. These planes intersect on the line 14. The pivotal axis 12 is offset a short distance downwardly and inwardly from the point 14. With such an offset, variation in length of the conveyer chain paths when the housing 4 tilts up and down, is substantially eliminated. This arrangement avoids unnecessary stresses on the conveyer chains, and also prevents tightening or loosening of the chains as the rear part of the conveyer is moved up and down about its pivot.

The resilient mounting for the conveyer flights will now be described. One of the side chains of the conveyer, shown in Fig. 4, comprises the usual links 16, pivotally connected by pivot pins 18, such pivot pins carrying the usual rollers 20. At definite intervals, one of the links 16, here designated 16', is secured, as by welding, to a disc 22 (Fig. 7), which disc is provided with a transversely positioned bearing sleeve 24, through which passes an extra long conveyer pivot pin designated 18', see particularly Fig. 4. The disc 22 is provided with one or more transversely extending abutments 26. These abutments are provided with oppositely extending studs 28.

Cooperating with the parts just described is a circular, substantially cup-shaped housing, indicated generally at 30, the bottom wall of which is provided with one or more transversely extending abutments 32, these abutments being provided with studs 34, facing in opposite directions. The abutments join a hollow upstanding boss carrying a sleeve 24' journaled on the sleeve 24. Studs 34 are oppositely arranged with respect to studs 28, so that when a disc 22 is fitted into the housing 30, as shown in Fig. 5, the studs 28 and 34 face toward each other.

Positioned between and encircling each pair of facing studs 28 and 34 is a fairly heavy coiled spring 36.

The housing 30 is held in assembled relation with the chain parts by any suitable means. In the form shown the end or bottom wall of the housing 30 is recessed as shown at 30'. The long pivot pin 18' extends through the sleeve 24 and a hole in the bottom of the cup housing 30 and into the recess 30'. A washer passed over the end of the pin 18' and seating on the bottom of the recess 30' serves as an abutment for the cotter pin 30'' or other means on the pin end for holding all parts together. The recess may be closed by a disc cap 30'''.

The parts just described form a pivotal and resilient mounting for a rearwardly extending arm 38, which may be integral with the housing 30; it will be understood that at the opposite side of the conveyer a similar mounting is provided for a second arm 38. Arms 38 are provided with flanges 40 and to these flanges 40 is secured by bolts 42 a conveyer flight, here shown as a hollow structure comprising a front plate 44, to which is welded an angular plate 46. The flight may pivot about the axis of pin 18', which axis is ahead of the particular flight, considered with respect to the direction of travel of the conveyer.

It will be seen that when the flights are in normal position the abutments 26 and 32 are in engagement with each other and are so held by the springs 36. Thus the flights are held by the chains in definite positions thereon and independently of the conveyer housing 8. When the conveyer and housing are designed with proper clearance there need never be any contact between the flights and housing and noise produced by flight scraping will be entirely eliminated.

Each flight, as stated, preferably includes a front or active face plate 44. This face plate when in normal position as shown in Fig. 3 preferably extends across the chain more or less at right angles thereto and the normal center of thrust of the refuse material on the plate is about coincident with the chain. Therefore, with the center of thrust and the pivot axis about on the chain and the pivot axis in advance of the flight plate 44, there is no tendency to rock the chain links. The chain then tends to pull its load along the direction of the chain and without torsion or twisting of the links, such as would occur if the normal center of thrust were not substantially on the chain.

In normal operation, the conveyer chain travels to the right, as shown in Fig. 3, with the flight 44 being in substantially the position shown, the normal operating position also being shown in Fig. 6, at 47. However, if the flight 44 engages a bulky article, it is tilted inwardly, in varying degrees, depending upon the size of the article, as shown in Fig. 5 and as shown in extreme position at 48 in Fig. 6. In moving to such position the studs 28 and 34 approach each other and compress springs 36; after the bulky article constituting the obstruction is gotten rid of, the flight is returned by the springs 36 to its normal operating position with the abutments 32 in engagement with the abutments 26 as shown in Fig. 3. In swinging inwardly as just described, the flight 44 passes inwardly between the conveyer chains, as will be readily understood.

It should be noted that, when a very bulky article in the generally V-shaped trough between the oncoming chain of flights and the bottom wall of the hopper is engaged by a particular flight, that flight will be forced inwardly, that is, upwardly as viewed in Fig. 5. However, neither the chain nor the flight mounting will be unduly strained (by any bulky article of a size and character contemplated in the design of the ma-

chine). The chain, it will be observed, is adequately supported by the lower chain roller or guide and the flight itself moves into engagement with abutment means, in this case the transverse shaft 6. Thus the chain, the flight, and the abutment become, in effect, unitary and the bulky article will be crushed in the narrowing throat as the flight drags the article around. Any article which has passed the narrowest part of the throat will be carried up and into the truck body without further undue strain on the flight. During the crushing operation the chain will be solidly supported by the chain guide or wheel and the flight will be solidly supported by the chain and the shaft 6 or other equivalent abutment.

Instead of the spring mounting just described, other spring mountings may be provided, for example, a helical spring or a spiral spring, one end of which spring would be anchored to a fixed member, analogous to the disc 22, while the other end would be secured to an arm 38 that carries the flight, as will be readily understood by those skilled in the art.

In our prior applications above referred to, the loading boot has been shown as resiliently mounted and the forward or drive shaft at the head end of the conveyer was also shown as similarly, that is to say, resiliently, mounted. With the present invention, however, where the flights are resiliently mounted, it has been found that the resilient mounting for the boot can in many cases be dispensed with or the resilient mounting for the head end of the conveyer can be dispensed with, or even both can be dispensed with. In the construction shown in Fig. 1, the boot 8 is therefore shown as a boot of the fixed type and the mounting at the head end of the conveyer, while variably positionable, is also of the fixed type, that is to say, is not resilient. Such mounting (Fig. 2) for the head end of the conveyer comprises a slidable plate 50 mounted in upper and lower guides 52 and 54, the plates 50 being provided with end flanged members 56, which are securely held, and yet are variably positionable, by a threaded rod 58, which may be held in any desired fore and aft position by nuts 60 cooperating with a standard 62. The mounting plate 50 serves to carry a hydraulic motor 64 for driving the transverse driving shaft 10, all as more fully illustrated in our prior application, Serial No. 256,172.

However, it is within the contemplation of this invention to use a resilient mounting at the forward end of the conveyer and such mounting is shown in Fig. 8 and is also shown in our copending application Serial No. 256,172. Briefly described, the hydraulic motor 64 for driving the driving shaft 10, is carried by a mounting plate 66 provided with flanged end members 68 resiliently supported by threaded rods 70 and nuts 72 and springs 74 cooperating therewith. In the case of an unusual strain on the conveyer, which cannot be taken care of by the resiliently mounted flights, such strain is taken care of by the lateral movement of the head shaft 10 permitted by the springs 74.

It is also within the contemplation of the invention to use, either in combination with a fixed head shaft or with a resilient head shaft, a resiliently mounted boot, as shown in Fig. 9. In this case the boot, indicated at 8', is slotted to accommodate the lower transverse shaft 6' of the conveyer, the boot being provided to swing up and down on the pivotal axis 76. A resilient mounting is provided by rods 78 and cooperating coil springs 79 and nuts 80.

While the preferred embodiment of the invention includes springs for resiliently mounting the flights, it is within the contemplation of the invention to dispense with the springs and allow the flights to be held in or drop back to their normal position by gravity.

Furthermore, instead of having the pivotal axis for the flight located ahead of the flight, as in the preferred embodiment of the invention, it should be understood that any suitable type of pivotal mounting might be used for the flights, as will be understood by those skilled in the art. For example, a flight could be mounted directly on its pivotal axis and a spring or springs provided for returning the flight to its normal position after passing an obstruction. Such a spring could be a helical spring surrounding the pivot shaft, one end of said spring being anchored to the shaft and the other end being anchored to the flight. In another embodiment pairs of plates having slots, preferably inclined, might be provided, these plates being mounted opposite each other on the conveyer chains; such a flight would have pins slidable in these slots, springs being provided for urging or pulling these pins downwardly to their original position, or, instead of springs, gravity could be relied on to return the flights to their original positions. With such a mounting, when an obstruction is met, the pins would travel upwardly in their respective slots, against the action of such springs, or against gravity, or both, far enough to get over the obstruction, and then would be returned to their original position by said springs, or by gravity, or both.

To summarize, the resiliently mounted flights of the present invention will, in most cases, take care of obstructions and avoid jamming of the conveyer, so that a fixed loading boot and a fixed, but variably positionable, head shaft may be used. However, under extreme conditions, a resiliently mounted head shaft may be used, or a resiliently mounted boot may be used, or both.

While we have illustrated the invention in some detail, it should be understood that the invention is not limited to these exact details, but may be carried out in other ways, within the scope of the appended claims.

We claim as our invention:

1. In a refuse collecting truck, a truck body provided with an endless conveyer for carrying refuse to the upper part of the truck body, said conveyer having a downward extension, a housing for said extension, flights on said conveyer, and means for pivotally and resiliently mounting said conveyer flights, the pivotal axis of each conveyer flight being located a substantial distance in advance of the flight.

2. In a refuse collecting truck, a truck body provided with an endless conveyer, comprising spaced apart parallel side chains, and conveyer flights carried by said side chains, said flights being respectively pivoted to swing on axes in advance thereof, so that they can swing between the side chains of the conveyer for preventing jamming thereof, and means for normally holding said flights in position rearwardly of said axes.

3. In a refuse collecting truck, a truck body provided with an endless conveyer, comprising spaced apart parallel side chains, conveyer flights carried by said side chains, said flights being respectively pivoted to swing on axes in advance

thereof, so that they can swing between the side chains of the conveyer for preventing jamming thereof, and means including resilient means cooperating with the pivotal mounting of the conveyer flights for providing a resilient mounting therefor and for normally holding said flights rearwardly of said axes.

4. In a refuse collecting truck, a truck body provided with an endless conveyer and having a downward extension, a fixed loading boot cooperating with the lower end of said extension, said conveyer being provided with flights which are respectively pivoted to swing on axes in advance thereof for avoiding jamming of the conveyer due to obstructions.

5. In a refuse collecting truck, a truck body provided with an endless conveyer and having a downward extension, a fixed loading boot cooperating with the lower end of said extension, said conveyer being provided with flights which are respectively pivoted to swing on axes in advance thereof for avoiding jamming of the conveyer due to obstructions and resilient means cooperating with the pivotal mountings of the conveyer flights for providing resilient mountings therefor.

6. In a refuse collecting truck, a truck body provided with an endless conveyer having a downward extension, a normally fixedly mounted head shaft at the upper or head end of the conveyer, said conveyer being provided with flights which are respectively pivoted to swing on axes in advance thereof for avoiding jamming of the conveyer due to obstructions.

7. In a refuse collecting truck, a truck body provided with an endless conveyer having a downward extension, a normally fixedly mounted head shaft at the upper or head end of the conveyer, said conveyer being provided with flights which are respectively pivoted to swing on axes in advance thereof for avoiding jamming of the conveyer due to obstructions and resilient means cooperating with the pivotal mountings of the conveyer flights for providing resilient mountings therefor.

8. In a refuse collecting truck, a truck body provided with an endless conveyer, having a downward extension, a fixed loading boot cooperating with the lower end of said conveyer, a normally fixed and variably positionable head shaft at the upper or head end of the conveyer, said conveyer being provided with flights which are respectively pivoted to swing on axes in advance thereof for avoiding jamming of the conveyer due to obstructions.

9. In a refuse collecting truck, a truck body provided with an endless conveyer, having a downward extension, a fixed loading boot cooperating with the lower end of said conveyer, a normally fixed and variably positionable head shaft at the upper or head end of the conveyer, said conveyer being provided with flights which are respectively pivoted to swing on axes in advance thereof for avoiding jamming of the conveyer due to obstructions and resilient means cooperating with the pivotal mountings of the conveyer flights for providing resilient mountings therefor.

10. In a refuse collecting truck, a truck body provided with an endless conveyer, having a downward extension, a fixed loading boot cooperating with the lower end of said conveyer, a normally fixed and variably positionable head shaft at the upper or head end of the conveyer, said conveyer being provided with flights which are respectively pivoted to swing on transverse axes in advance thereof to positions between the side chains of the conveyer for avoiding jamming of the conveyer due to obstructions, and resilient means cooperating with the pivotal mountings of the conveyer flights for providing resilient mountings therefor.

11. In a refuse collecting truck, a truck body provided with an endless conveyer, a resiliently mounted boot cooperating with the lower end of the conveyer, said conveyer being provided with pivotally and resiliently mounted flights, that cooperate with the resiliently mounted boot in avoiding jamming of the conveyer due to obstructions.

12. In a refuse collecting truck, a truck body provided with an endless conveyer having parallel side chains, a resiliently mounted boot cooperating with the lower end of the conveyer, said conveyer being provided with pivotally and resiliently mounted flights, the respective conveyer flights being mounted on transverse axes in advance thereof, so that they can swing between the conveyer chains, said flights cooperating with the resiliently mounted boot in avoiding jamming of the conveyer due to obstructions.

13. In a refuse collecting truck, a truck body provided with an endless conveyer having a downward extension, a drive shaft at the head end of the conveyer, means for resiliently mounting said head shaft, said conveyer being provided with flights pivoted to swing on transverse axes in advance thereof for avoiding jamming of the conveyer due to obstructions.

14. In a refuse collecting truck, a truck body provided with an endless conveyer having a downward extension, a drive shaft at the head end of the conveyer, means for resiliently mounting said head shaft, said conveyer being provided with flights pivoted to swing on transverse axes in advance thereof for avoiding jamming of the conveyer due to obstructions and resilient means cooperating with the pivoted mounting of the conveyer flights, for providing resilient mountings therefor.

15. In a conveyer having parallel side chains, transversely extending conveyer flights, pivotal mounting means for the respective conveyer flights, comprising supporting arms therefor, means for pivoting the forward ends of said arms to the conveyer chains, whereby the flights may swing between the conveyer chains for avoiding obstructions.

16. In a conveyer having parallel side chains, transversely extending conveyer flights, pivotal mounting means for the respective conveyer flights, comprising supporting arms therefor, alongside and substantially parallel to the side chains, the rear ends of said arms being secured to the respective flights, while the forward ends of said arms are pivoted to the side chains, and resilient means cooperating with said arms for providing resilient mountings for the conveyer flights.

17. In a refuse collecting truck, a truck body provided with an endless conveyer including spaced apart parallel side chains, conveyer flights carried by and between said chains, each of said flights including a front wall member, longitudinally extending arm members at opposite ends of said flights, said arms being pivotally mounted on said spaced apart chains substantially in advance of said active front wall members, and means for normally holding said flights with the normal center of thrust of said front wall mem-

bers substantially in line with said spaced side chains.

18. In a refuse collecting truck, a truck body provided with an endless conveyer, said conveyer including spaced apart parallel side chains, flights for said conveyer, each of said flights including a front active wall member extending longitudinally between said parallel chains and transversely both inwardly and outwardly of the plane of said chains, whereby the center of thrust on said active wall member will be generally in the plane of said side chains, means substantially forwardly of said active front wall for pivotally mounting said flight on said side chains, and means for normally holding said active front wall with its normal center of thrust generally in the plane of said side chains.

19. In a refuse collecting truck, a truck body provided with an endless conveyer, said conveyer including spaced apart parallel side chains, conveyer flights carried by said side chains and positioned between the latter, each of said flights having an active front wall extending both inwardly and outwardly of the plane of said chains, means forwardly of said active front wall for pivotally mounting said flights on said chain, means for limiting pivotal swinging of said flights in one direction on said chains, and resilient means for resisting pivotal swinging of said flights in the opposite direction.

20. In a refuse collecting truck, a truck body provided with an endless conveyer including parallel side chains, conveyer flights pivotally carried by said side chains, means cooperating with at least one of said side chains and each said flight and defining a hollow chamber, and means including resilient means within said hollow chamber and enclosed therein for resiliently maintaining said flights in generally predetermined position relatively to said chains.

21. In a refuse collecting truck, a truck body provided with an endless conveyer, said conveyer including parallel side chains, conveyer flights carried by said chains, means for pivotally mounting said conveyer flights on said side chains, and means defining a hollow chamber enclosing at least a part of said pivotal mounting, resilient means within said chamber for resisting pivotal swinging of said flights on said chains in one direction, and abutment means for limiting pivotal swinging of said flights on said chain in the opposite direction.

22. In a conveyer having parallel side chains, conveyer flights carried by said side chains, said side chains having opposed disk members secured thereto, said flights having opposed cup members cooperating with said disks and providing a closed chamber between said cups and disks, and resilient means within said closed chambers for urging said conveyer flights toward predetermined positions relatively to said side chains.

23. In a refuse collecting truck, a truck body provided with an endless conveyer having parallel side chains, guide means for said side chains, conveyer flights pivotally carried by said side chains and movable inwardly between said chains, and abutment means engageable by said conveyer flights when moved inwardly between said side chains, said abutment means being positioned to be engaged by said flights on said chains when supported by said guide means, whereby said flights may be carried about said guide means by said chains and be supported by said chains and by said abutment means, for the purpose described.

24. In a refuse collecting truck, a truck body provided with an endless conveyer, said conveyer including parallel side chains, a transverse shaft, guide means for said side chains and carried by said shaft, conveyer flights pivotally carried by said chains, said conveyer flights having active front surfaces rearwardly of the points of pivotal connection to said chains, said flights having parts engageable with said transverse shaft when pivotally swung inwardly, whereby said flights may be supported by said shaft and by said chain when the latter is guided on said chain guide means.

25. In a refuse collecting truck, a truck body provided with an endless conveyer having parallel side chains, guide means for said side chains, conveyer flights having active front wall members, means for pivotally securing said flights to said chains at points in advance of said active front walls, said flights being pivotally movable in a direction transversely of the plane of said side chains, abutment means engageable by said conveyer flights when moved to a position transversely of the plane of said side chains, said abutment means being positioned to be engaged by said flights on said chains when the latter are supported by said guide means, whereby said flights may be carried along by said chains and supported by said chains while engaged with said guide means and simultaneously supported by said abutment means, for the purpose described.

26. In a refuse collecting truck, a truck body provided with an endless conveyer including chain means, guide means for said chain means, conveyer flights having active front wall members, means for movably securing said conveyer flights to said chain means for movement in a direction generally across said chain means, whereby said flights may move in a direction generally across said chain means when meeting an obstruction.

27. In a refuse collecting truck, a truck body provided with an endless conveyer including chain means, conveyer flights movably secured to said chain means for moving relatively to said chain means in a direction generally across the latter, whereby said conveyer flights may move generally across said chain means when meeting an obstruction, and abutment means for limiting said movement of said conveyer flights generally across said chain means.

28. In a refuse collecting truck, a truck body provided with an endless conveyer including chain means, conveyer flights movably secured to said chain means for movement relatively to said chain means in a direction generally across the latter, whereby said conveyer flights may move generally across said chain means when meeting an obstruction, and abutment means positioned for engagement by said conveyer flights to limit said movement of said conveyer flights in a direction generally across said chain means in one direction.

LORON G. KURTZ.
CARL C. OTTOSON.