June 1, 1965 H. PALMLEAF 3,186,278

STRAP CHOPPER

Filed Jan. 2, 1963 3 Sheets-Sheet 1

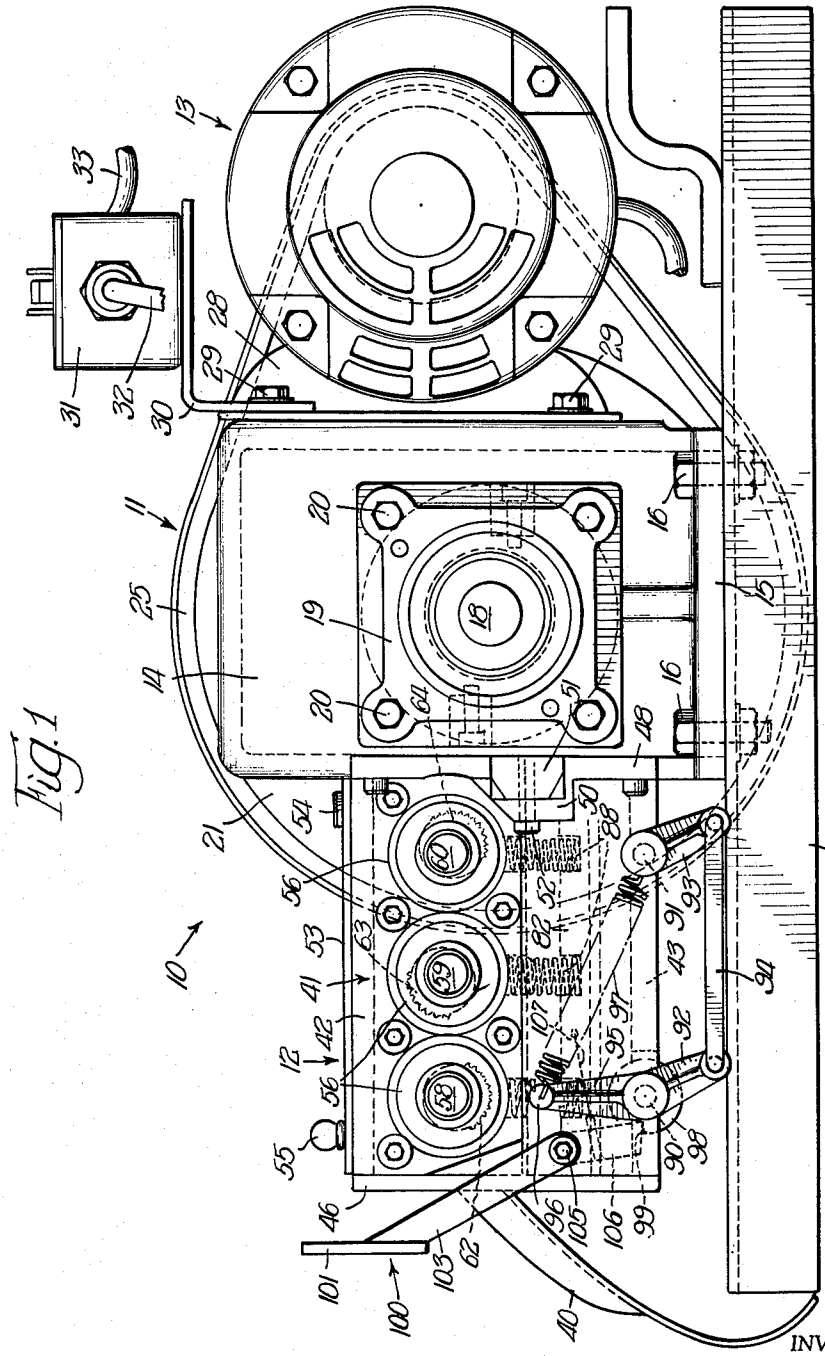


Fig. 1

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Filed Jan. 2, 1963 3 Sheets-Sheet 2

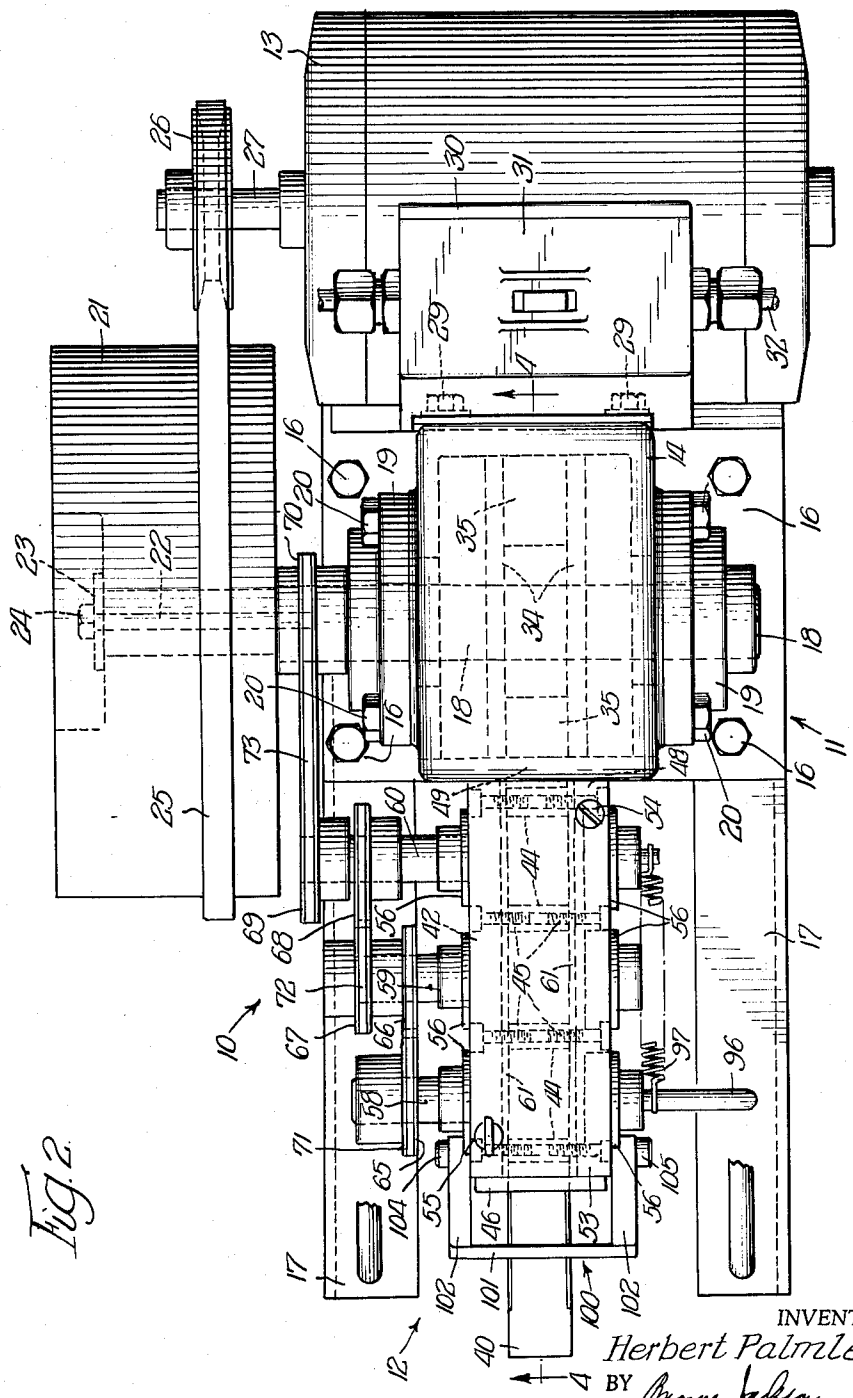


Fig. 2

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Fig. 3

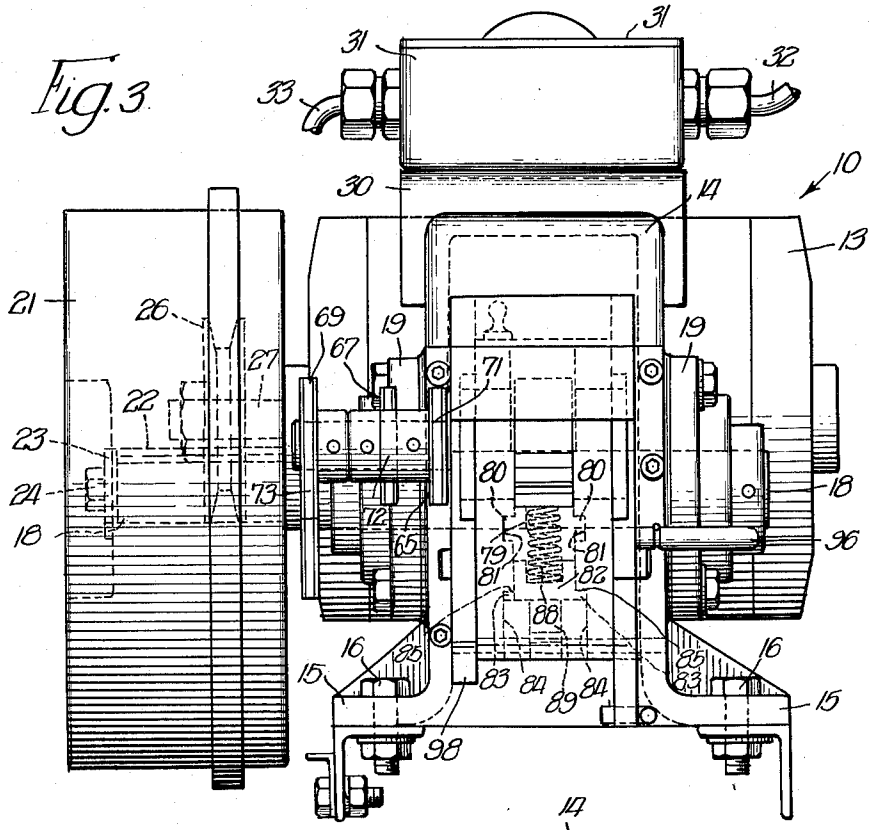
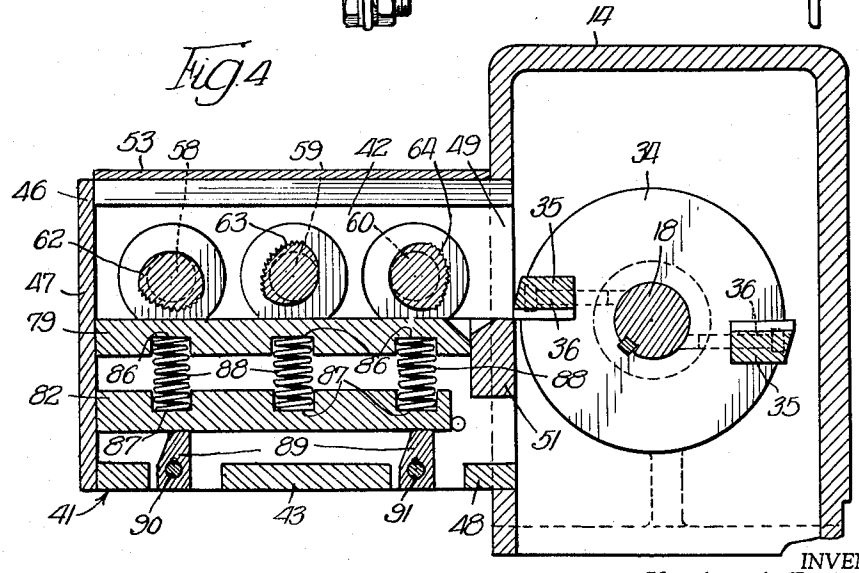


Fig. 4



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STRAP CHOPPER

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4 Claims. (Cl. 83—355)

My present invention relates generally to a strap chopper and more particularly to a strap chopper having an automatic feed therefor capable of accommodating metal strap material of irregular thickness.

Quite commonly, to facilitate handling and transportation, packed cartons, boxes, and crates, and bales of waste paper, are individually secured by means of wire or flat metal strapping. In unpacking such goods at the receiving point, the wire or flat strapping is cut free and becomes scrap. When unpacking strapped goods in volume, large quantities of scrap strapping quickly accumulate. Because of the elasticity of the strapping material and the resultant difficulty of confining it to a small volume, storage and refuse disposal costs for scrap strapping have heretofore been excessive.

It is a primary object of my present invention to provide a device that will chop or cut elongated strand, such as wire or flat strap material, into small pieces that may be conveniently and economically collected in barrels, drums or other similar containers for subsequent processing or disposal.

It is another object of my present invention to provide a strap chopper, as described, wherein an automatic feed is provided to reduce the expense that would otherwise be attendant to continuous manual feeding of strapping to the cutter device.

In the conventional application of strapping to boxes and the like, the junctions of the ends of the strapping comprise at least two, and sometimes three, thicknesses or layers of overlapping strapping, and at least two, and occasionally three, thicknesses or layers of a strap seal. Accordingly, the thickness of strapping material may vary from a single thickness of strapping between junctions up to six times the single thickness of strapping at junctions. The removal of such junctions manually prior to the feeding of the strapping material to the strap chopper would be a time consuming and expensive operation. To minimize handling expenses, it is necessary that the strapping be fed and cut into small pieces without first removing junctions. Thus, in automatically feeding scrap strapping to the cutter or chopper, provision must be made for accommodating strapping material of irregular thickness.

Accordingly, it is a further object of my present invention to provide a strap chopper, as described, wherein the automatic feed is capable of accommodating strap material of irregular thickness.

In accomplishing the foregoing objects, I propose to provide a strap chopping device comprising strap cutter means and a plurality of rotatable eccentric feed wheel members adapted to engage one side of strap material for advancing the same toward the strap cutter means. The strap chopper device further comprises pad means adapted to be biased, preferably by spring means, against the other side of the strap material for urging the same into frictional engagement with at least one of the feed wheel members. The spring biasing means associated with the pad means compensates for the varying thicknesses of strapping material passing through the feed area and minimizes jamming of the automatic feed mechanism.

As a safety feature of my present invention, the spring biasing means associated with the pad means may be quickly released through actuation of manually operable lever means to interrupt the automatic feed should conditions require. Interruption of the gripping and feed of the strap material is desirable from a safety standpoint, for example, if an operator of the device becomes entangled in the strapping being fed to the machine or if jamming occurs in the eccentric feeding area.

Now in order to acquaint those skilled in the art with the manner of constructing and using devices in accordance with the principles of my present invention, I shall describe in connection with the accompany drawings a preferred embodiment of my invention.

In the drawings:

FIGURE 1 is a side elevational view of the strap chopper of my present invention;

FIGURE 2 is a plan view of the strap chopper of FIGURE 1;

FIGURE 3 is an end elevational view of the strap chopper of FIGURE 1; and

FIGURE 4 is a median vertical sectional view of a portion of the strap chopper of FIGURE 2, taken substantially along the line 4—4 in FIGURE 2, looking in the direction indicated by the arrows.

Referring now to FIGURE 1, there is indicated generally by the reference numeral **10** a strap chopper constructed in accordance with the principles of my present invention. The strap chopper **10** comprises a main chopper assembly **11**, a strap feed assembly **12**, and a drive unit **13** which preferably is an electric motor.

The main chopper assembly **11** includes a generally rectangular hollow housing **14** which is open at its bottom end and which is formed with lower lateral flanges **15**. The flanges **15** are suitably secured, as by bolt and nut assemblies **16**, to a pair of laterally spaced horizontal supporting angle irons **17**, intermediate of the ends thereof. Extending transversely of the housing **14**, centrally thereof, is a main shaft **18** which is journalled in a pair of bearing blocks **19** suitably secured, as by cap screws **20**, to the outer faces of the side walls of the housing **14**. As shown in FIGURES 2 and 3, one end of the main shaft **18** extends beyond the adjacent bearing block **19** and serves to support a flywheel **21**. The flywheel **21** is connected to the main shaft **18** for rotation therewith by means of a key **22**, and is maintained on the main shaft **18** by means of a washer **23** and a screw **24** threaded axially into the end of the main shaft **18**. The flywheel **21** is drivingly connected through a V-belt **25** to a pulley **26** secured to the drive shaft **27** of the electric drive unit **13**.

Referring to FIGURES 1 and 2, it will be seen that the supporting flange **28** of the electric motor **13** is secured, as by bolts **29**, to the one side of the housing **14**. Also supported from the side of the housing **14** adjacent the motor **13**, by means of a bracket **30** held in place by the upper bolts **29**, is a conventional switch box **31**. The switch box **31** has connection with the motor **13** through an electrical cord **32** and is adapted to be connected to a power source through an electrical cord **33**. Upon energization of the electric motor **13**, the flywheel **21** and

the main shaft 18 are driven in a counter-clockwise direction as viewed in FIGURE 1.

As best shown in FIGURES 2 and 4, a pair of axially spaced radial disc or rotor members 34 are suitably keyed to the main shaft 18 within the confines of the housing 14. Mounted within the rotor members 34 are a pair of rotor blades or cutters 35 which are removably held in position by means of cap screws 36. The rotor blades 35 face in opposite radial directions and are disposed on the opposite sides of a plane passing through the axis of the main shaft 18 with their cutting edges lying substantially in this common plane. The rotor blades 35 are arranged to cooperate with a fixed cutter blade, which will be described more fully hereinafter, to define strap cutter means.

Having completed a description of the main chopper assembly 11, I shall now describe in connection with FIGURES 1, 2 and 4 the strap feed assembly 12 of my present invention. The assembly 12 includes a generally rectangular hollow housing 41 which may, for example, be comprised of a pair of spaced vertical side walls 42 interconnected along their lower edges by means of a bottom wall 43. The bottom wall 43 may be of one or two piece construction and may be integral with or separate from the vertical side walls 42. The side walls 42 are maintained in spaced parallel relationship along their upper edges by means of cylindrical spacers 44 held in place by cap screws 45 extending through the adjacent portions of the side walls 42.

The housing 41 is further comprised of an end wall 46 having a strap receiving opening 47 formed therein and a partially open opposite end wall 48 that is suitably received and secured in an opening 49 formed in the front wall of the housing 14. The end wall 46 adjacent the opening 47 is provided with a downwardly inclined strap receiving guide member 40. The end wall 48 is provided with an offset portion 50 which serves to receive and seat a fixed or stationary cutter blade 51 held in position by cap screws 52. By the cooperation of the rotary cutters 35 with the fixed cutter blade 51 metal strap is adapted to be chopped or cut into small pieces. The top of the housing 41 is enclosed by a cover plate 53 pivotal in a horizontal axis about pivot pin 54 and removably held in position by a thumb screw 55 normally received in a lateral slot in the cover plate 53.

The side walls 42 serves to support transversely aligned spaced pairs of bushing members 56 in which are journalled transversely extending parallel shafts 58, 59 and 60. Provided at the inner faces of the side walls 42 are wear plates 61 which are held in place by the several spacers 44. The transverse shafts 58, 59 and 60, intermediate of the pair of wear plates 61, are respectively formed with eccentric feed wheel members 62, 63 and 64, each of which has a serrated outer peripheral portion to facilitate engagement with the top side of strapping material for advancing the latter toward the cooperating cutters 35 and 51.

As shown in FIGURE 2, the one ends of the transverse shafts 58, 59 and 60, which extend outwardly of the strap feed assembly housing 41, have a positive driving connection with the main shaft 18 through an arrangement of chains and sprockets. More specifically, a sprocket 65 is secured on the shaft 58, a pair of sprockets 66 and 67 are secured on the shaft 59, a pair of sprockets 68 and 69 are secured on the shaft 60, and a sprocket 70 is secured on the main shaft 18 intermediate of the flywheel 21 and the adjacent bearing block 19. To complete a driving connection among the four noted shafts, a chain 71 is trained over the sprockets 65 and 66, a chain 72 is trained over the sprockets 67 and 68, and a chain 73 is trained over the sprockets 69 and 70. Thus, when the main shaft 18 is driven in a counter-clockwise direction as viewed in FIGURE 4, the shafts 58, 59 and 60, together with their integral eccentric feed wheels 62, 63 and 64, are driven in a counter-clockwise direction.

Arranged immediately below the eccentric feed wheel members 62, 63 and 64, as shown in FIGURES 3 and 4, is a pad member 79 having lateral flanges 80 that are received in horizontal notches 81 formed in the inner faces of the side walls 42. The vertical dimension of the notches 81 serves to define the extent of the permissive vertical movement of the pad member 79. Spaced below the pad member 79 is biasing means comprising a lower spring pad 82 which has lateral flanges 83 slidably guided in horizontal notches 84 formed in the lower inner faces of the side walls 42. The shoulders 85 defined by the upper edges of the notches 84 serve to limit upward vertical movement of the lower spring pad 82. The underside of the upper pad 79 is formed with a plurality of recesses 86 and the upper side of the lower spring pad 82 is formed with a plurality of recesses 87 aligned with the recesses 86. Interposed between the pad members 79 and 82 with their ends received in the recesses 86 and 87 are a plurality of coil springs 88. The lower spring pad 82 and springs 88 normally urge the pad member 79 against the underside of strap material for pressing the same into frictional engagement with the eccentric feed wheels 62, 63 and 64.

To maintain the pad member 79 in an operative position, the lower spring pad 82 is normally biased to its uppermost position shown in FIGURES 3 and 4 by means of cam means in the form of a pair of lift cams 89. The lift cams 89 are received in openings formed in the bottom wall 43 and are suitably keyed one each to transverse shafts 90 and 91 journalled in the bottom wall 43. The shafts 90 and 91, at their one ends project outwardly of the housing 41 and, as shown in FIGURE 1, have secured thereon a pair of normally angularly downwardly depending crank arms 92 and 93. The lower ends of the crank arms 92 and 93 are interconnected by a tie bar 94. Additionally, a normally upwardly projecting crank arm 95 is secured to the shaft 90 and a lateral reset arm 96 extends from the free end of the crank arm 95. A coil spring 97 is arranged between the reset arm 96 and the transverse shaft 91 for normally imposing a clockwise force upon the crank arms 92, 93 and 95 and the tie bar 94.

Also secured to the transverse shaft 90 at the outboard end thereof opposite the crank arm 95 (FIGURES 1 and 3) is a disk member 98 having a peripheral notched-out shoulder portion 99. Operatively associated with the disk member 98 is safety release lever means 100 comprising a transverse touch plate 101 and a pair of depending arm members 102 and 103 pivotally mounted respectively on the shoulders of socket screws 104 and 105 threaded into the side walls 42. The arm member 102 has a lower depending crank arm portion 106 that normally engages the shoulder 99 of the disk 98. A spring 107 shown diagrammatically in FIGURE 1 is connected between the crank arm 106 and the adjacent side wall 42 for imposing a counterclockwise force on the crank arm 106 of the release lever means 100 to thereby normally maintain the lower end of the crank arm 106 against the shoulder 99. The crank arm 106 normally serves to render the spring biased crank arms 92, 93 and 95 inoperative so that the lift cams 89 remain upright. However, when the safety lever means 100 is suitably actuated, the crank arm 106 is disengaged from the shoulder 99, the lift cams 89 are spring biased clockwise from the position shown in FIGURE 4, and the pad member 79 is thereby separated from the feed wheels 62, 63 and 64 for interrupting the automatic feed.

In using my above-described strap chopper, the unit 10, which is portable, is first placed over an open-top barrel or similar container with the angle irons 17 resting on the rim of the container. After the unit has been properly located, the motor 13 is energized for driving the main shaft 18 and the several feed shafts 58, 59 and 60. Then the leading edge of metal strap material is po-

sitioned in the guide member **40** and inserted through the opening **47** in the end wall **46** whereupon the spring biased pad **79** bears against the underside of the strap material for pressing the same into frictional engagement with the feed wheel members **62**, **63** and **64**. The eccentric feed wheels serve to alternately engage the upper side of the strap material for automatically advancing the same toward the stationary cutter blade **51** where the rotating cutters **35** continuously cut or chop small pieces off of the advancing end of the strap material. The resultant pieces drop through the opening in the bottom of the chopper housing **14** and are conveniently and economically collected in the container therebelow.

In the event the operator of the device should become entangled in the strapping being fed to the machine, or if jamming should occur in the eccentric feeding area, the operator need only push or hit the touch plate **101** for pivoting the arm members **102** and **103** clockwise as viewed in FIGURE 1 to release the crank arm portion **106** from engagement with the shoulder **99** of the disk **98**. As the lower end of the crank arm **106** is disengaged from the shoulder **99**, the spring **97** causes the crank arms **92**, **93** and **95** and lift cams **89** to pivot clockwise as viewed in FIGURES 1 and 3. Clockwise movement of the lift cams **89** permits the spring pad **82**, springs **88** and pad member **79** to move downwardly thereby separating the pad member **79** from the feed wheel members **62**, **63** and **64** so as to interrupt the engagement of strap material between the pad **79** and feed wheels **62**, **63** and **64**. The motor **13** may then be de-energized and the operator may, without harm to himself, either disentangle himself from the strapping or correct any jamming in the eccentric feeding area, as the case may be. To return the pad member **79** to an operative position relative to the feed wheels **62**, **63** and **64**, the operator may pull the reset arm **96** counterclockwise, as viewed in FIGURE 1, until the shoulder **99** of the disk **98** clears the lower end of the crank arm **106** and the spring **107** effects re-engagement of the arm **106** with the shoulder **99**.

From the foregoing description it will be seen that I have provided a device that will chop or cut wire or flat metal strap material into small pieces that may be conveniently and economically collected in barrels or the like for subsequent disposal. In addition, my strap chopper has an automatic feed that is capable of accommodating strap material of irregular thickness. The spring biasing means associated with the pad member **79** compensates for the varying thickness of strapping material passing through the feed area. Thus, my device can accommodate strapping of single thickness and also strapping junctions that may vary up to six times the single thickness of strapping. By way of example, I have found that a standard 1725 r.p.m. one-half horsepower motor **13** and a 50 pound flywheel **21** will serve to cut or chop ¾ inch metal strapping material of irregular thickness varying from .028 inch to .192 inch. Strapping material of differing width and thickness may be cut by altering the size and capacity of the flywheel **21** and drive unit **13**. In the case of larger size strap choppers, a floor stand or frame may be substituted for the pair of supporting angle irons **17**. With this arrangement the barrel or drum for collecting chopped pieces would be placed beneath the strap chopper **10** within the confines of the floor stand. Finally, as a safety feature, the spring biasing means associated with the pad member **79** may be quickly released through actuation of manually operable lever means to interrupt the automatic feed whenever conditions require.

As used in the specification and claims, the term "strap" or "strapping" shall include all form of materials, such as wire, strips or strands. Additionally, those skilled in the art will recognize that the device of my present invention may be used to chop or cut material of either metal or non-metal. Also, by varying the relative speed and spacing among the eccentric feed wheel members and the strap cutter means, the device can be adapted to cut material into small pieces for processing, as well as for disposal, purposes.

Now while I have shown and described what I believe to be a preferred embodiment of my present invention, it will be understood by those skilled in the art that various modifications and rearrangements may be made therein without departing from the spirit and scope of my invention.

I claim:

1. A device for chopping strap material of irregular thickness longitudinally thereof, comprising strap cutter means, a plurality of rotatable eccentric feed wheel members adapted to engage one side of strap material for advancing the same toward said strap cutter means, said eccentric feed wheel members having their respective points of maximum radius arranged at non-corresponding circumferential positions, and pad means adapted to be floatingly biased against the other side of strap material whereby to accommodate strap material of irregular thickness longitudinally thereof so that the latter may be continuously fed by said plurality of rotatable eccentric feed wheel members to said strap cutter means without jamming.

2. A device for chopping strap material comprising strap cutter means, means for normally continuously advancing strap material toward said strap cutter means, spring biased pad means, means for normally urging said spring baised pad means toward said advancing means for pressing strap material into frictional engagement with said advancing means, and means for releasing said last-named means whereby to interrupt instantaneously the engagement of strap material between said advancing means and said pad means thus rendering said advancing means ineffective for advancing strap material.

3. A device for chopping strap material of irregular thickness longitudinally thereof, comprising strap cutter means, at least one rotatable eccentric feed wheel member adapted to engage one side of strap material for normally continuously advancing the same toward said strap cutter means, spring biased floating pad means, cam means for normally positioning said spring biased pad means against the other side of strap material, said floating pad member serving to accommodate strap material of irregular thickness longitudinally thereof so that the latter may be continuously fed by said feed wheel member to said strap cutter means without jamming, spring biased means for releasing said cam means whereby to separate said pad means from said feed wheel member so as to interrupt instantaneously the engagement of strap material between said feed wheel member and said pad means thus rendering said feed wheel member ineffective for advancing strap material, and lever means normally serving to render said spring biased means inoperative.

4. A device for chopping strap material of irregular thickness longitudinally thereof, comprising strap cutter means, a plurality of rotatable eccentric feed wheel members adapted to engage one side of strap material for normally continuously advancing the same toward said strap cutter means, said feed wheel members having axes of rotation lying in a common plane, spring biased floating pad means, means for normally positioning said spring biased pad means against the other side of strap material, said floating pad member serving to accommodate strap material of irregular thickness longitudinally thereof so that the latter may be continuously fed by said plurality of rotatable eccentric feed wheel members to said strap cutter means without jamming, spring biased means for releasing said last-named means whereby to separate said pad means from said feed wheel members so as to interrupt instantaneously the engagement of strap material therebetween thus rendering said rotatable eccentric feed wheel members ineffective for advancing strap material, and lever means normally serving to render said spring biased means inoperative.

(References on following page)

References Cited by the Examiner

UNITED STATES PATENTS

998,736	7/11	Armstrong	83—260
1,727,683	9/29	Wilbur	83—422 XR
1,656,755	1/28	Palmer	83—401
1,951,844	3/34	Rose	83—236
2,051,491	8/36	Lockett et al.	33—350

2,320,659	6/43	Sahlin	83—422
2,339,962	1/44	St. Louis	226—155
2,601,200	6/52	Amos et al.	83—906 XR

FOREIGN PATENTS

112,842	1/18	Great Britain.

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