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(54) **APPARATUS AND METHOD FOR SEALING BAGS**

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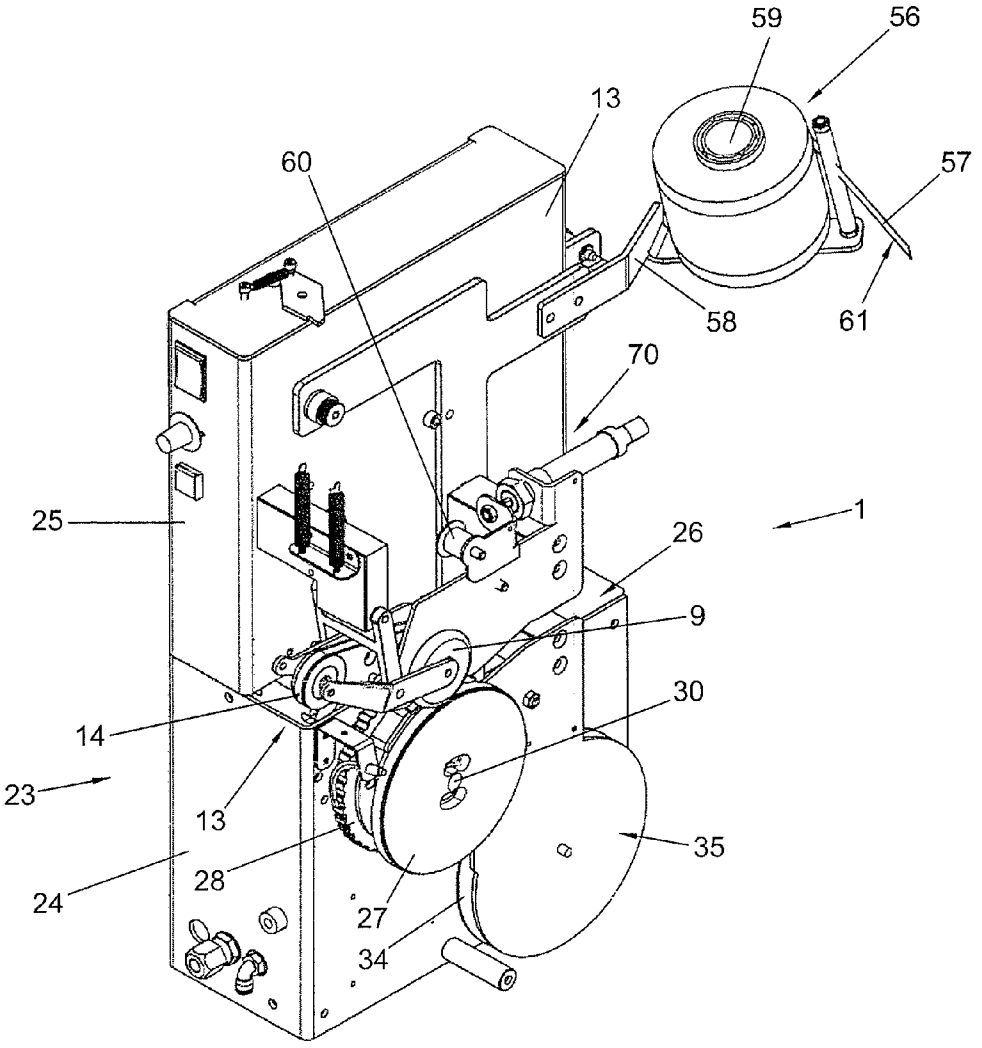
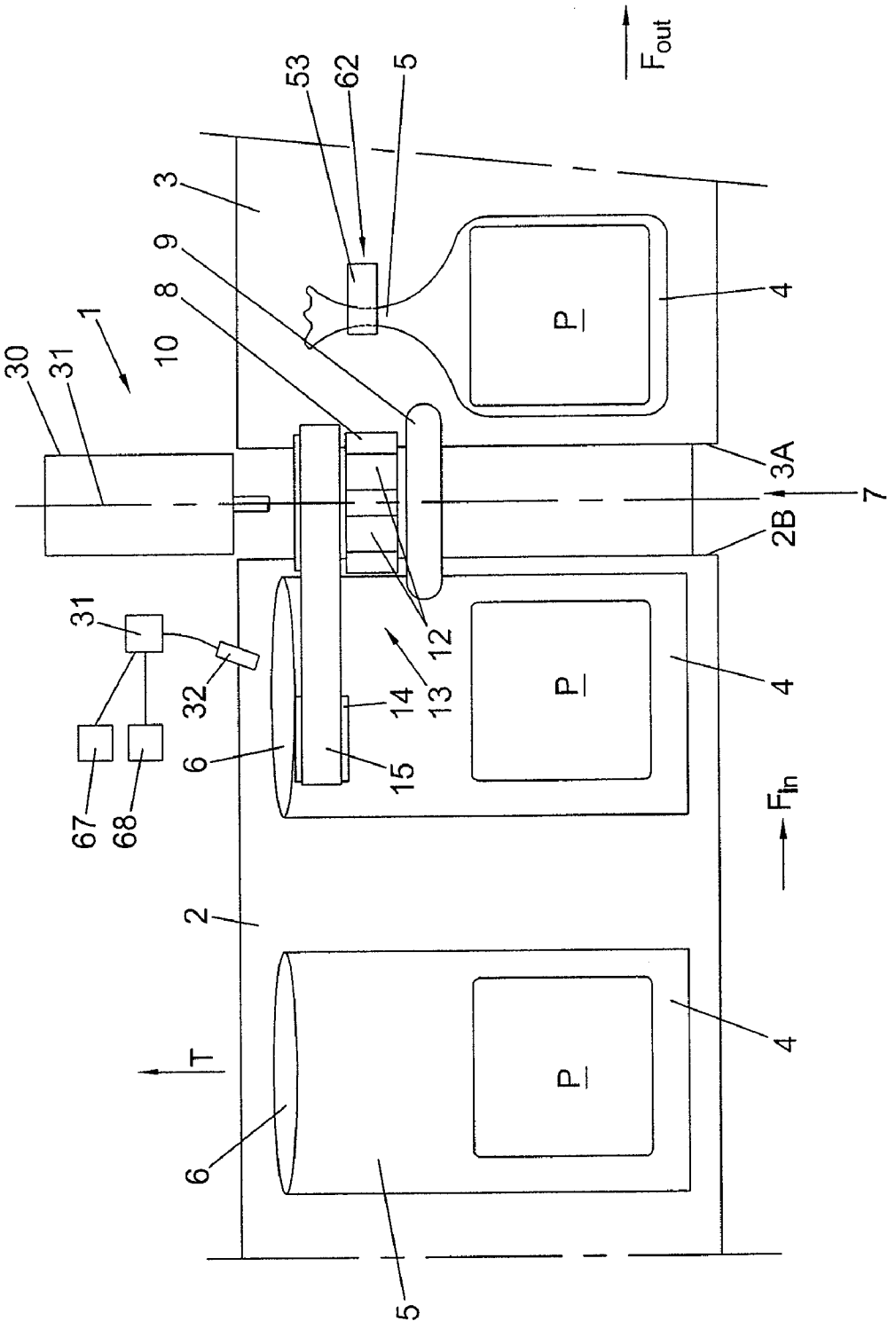
(57) **ABSTRACT**

An apparatus and method are described for sealing flexible bags, the apparatus comprising a gathering assembly for a neck of the bag including at least a transport means and at least one tape dispenser, wherein the gathering assembly comprises a star wheel and the tape dispenser comprises a guide for guiding tape from the tape dispenser over part of the star wheel, the transport means extending into or along at least a cell of the star wheel, wherein the star wheel is coupled to the transport means, such that when the transport means is driven, to feed the neck of the bag into a cell of the star wheel, the star wheel is driven intermittently.




F_{out}
53
62
5
3
9
8
1
10
30
31
4
P
3A
7
2B
31
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12
13
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67
68
F_{in}
2
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5

FIG. 1

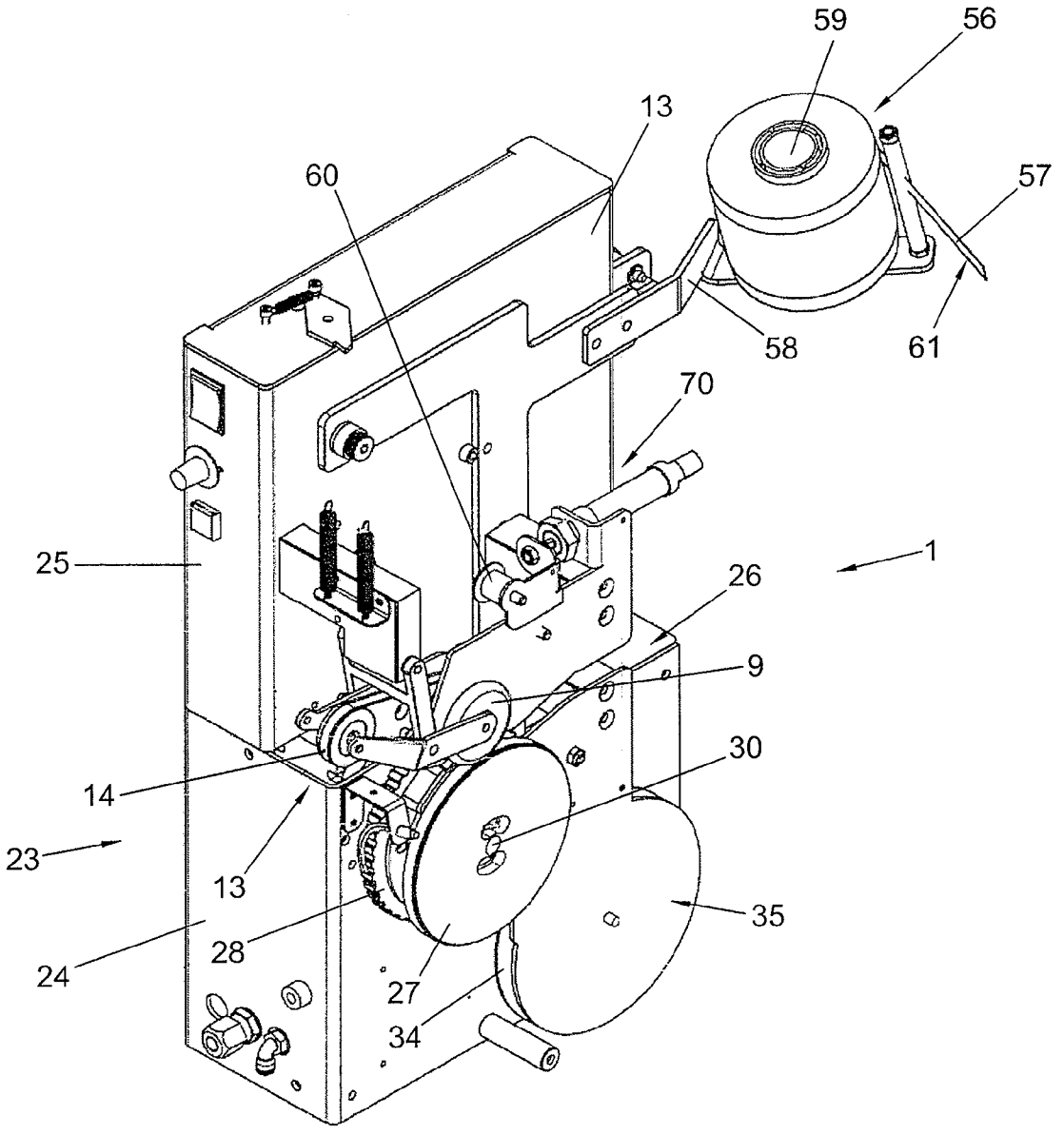

FIG. 2

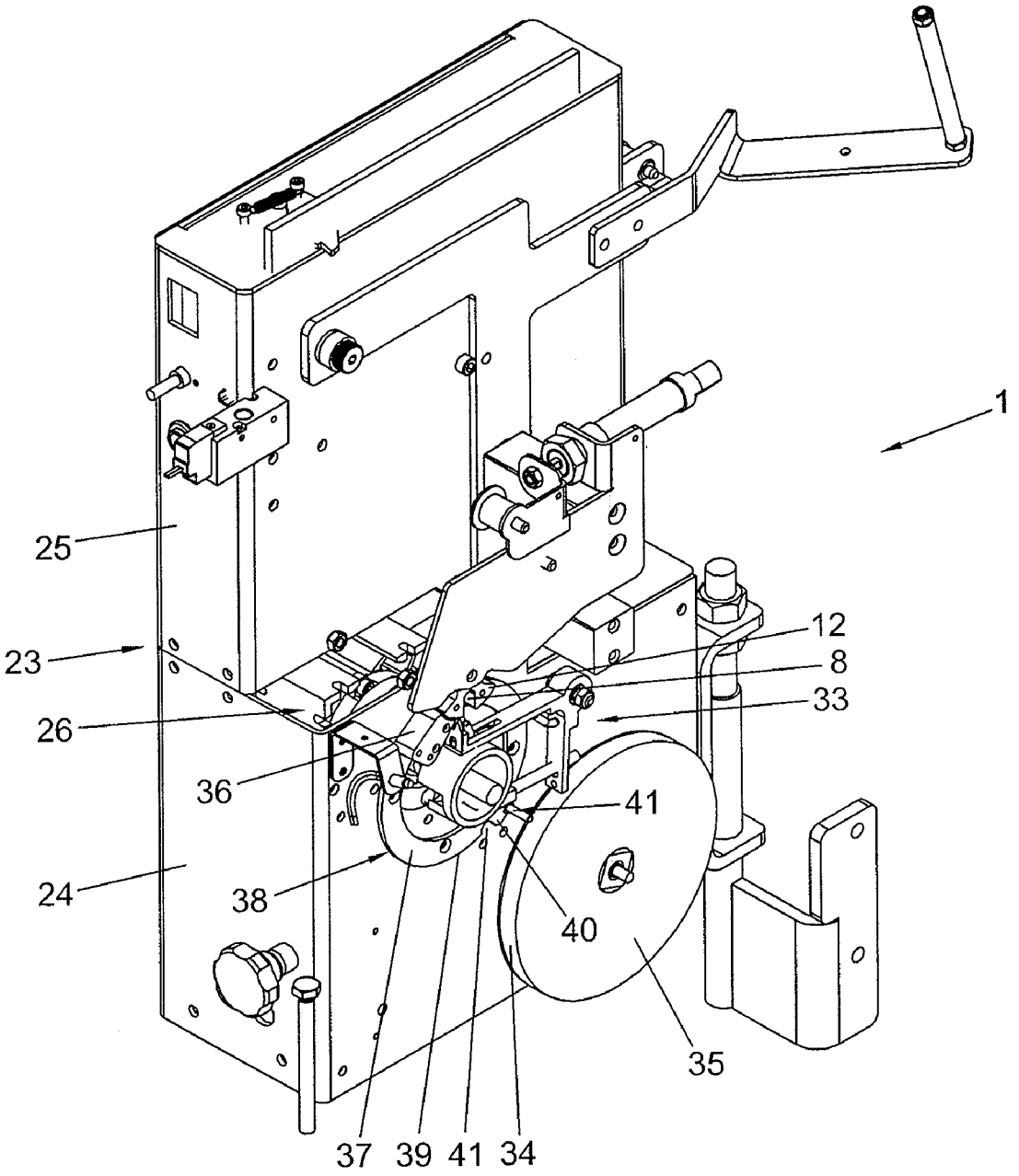

FIG. 3

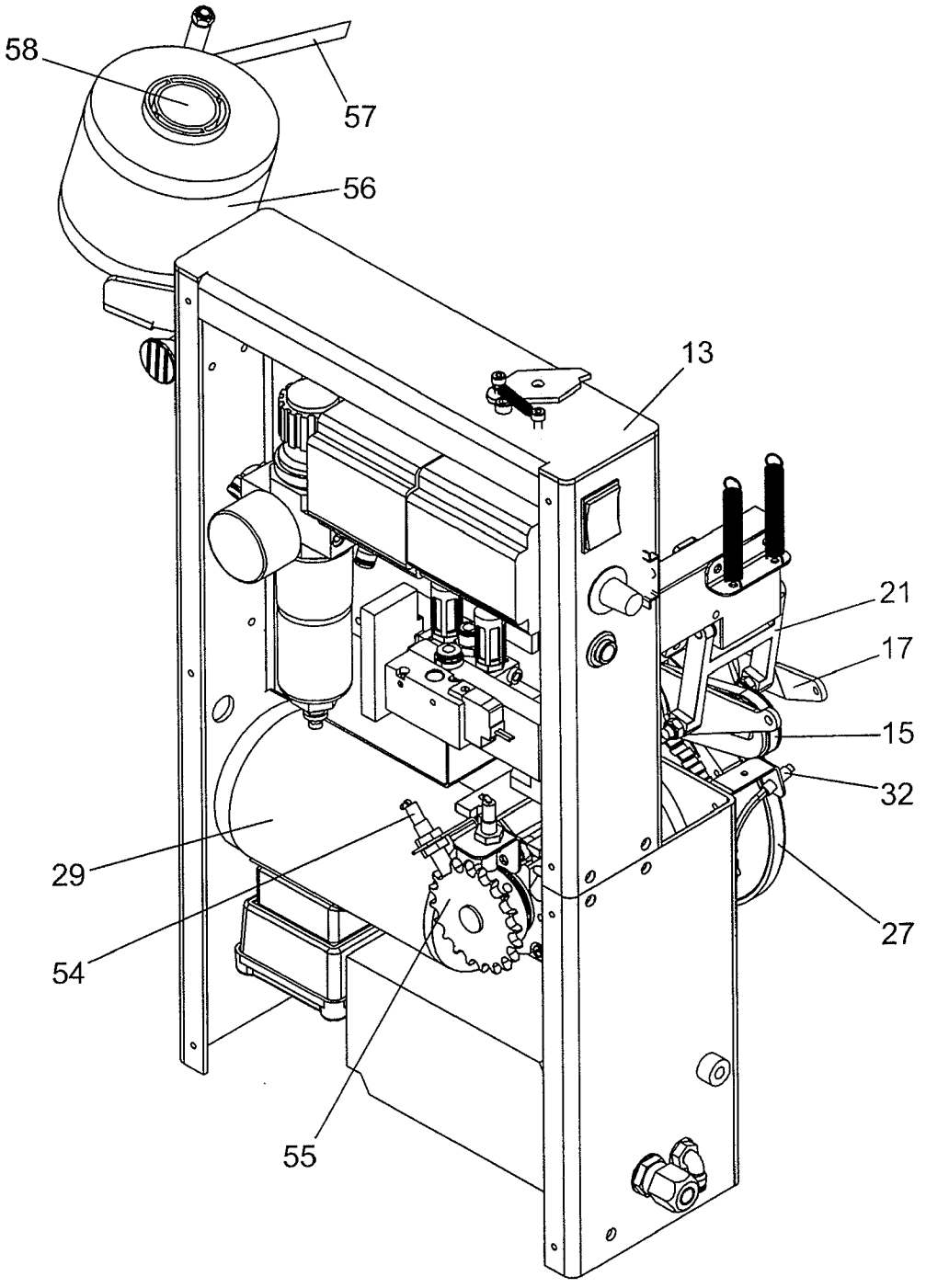

FIG. 4

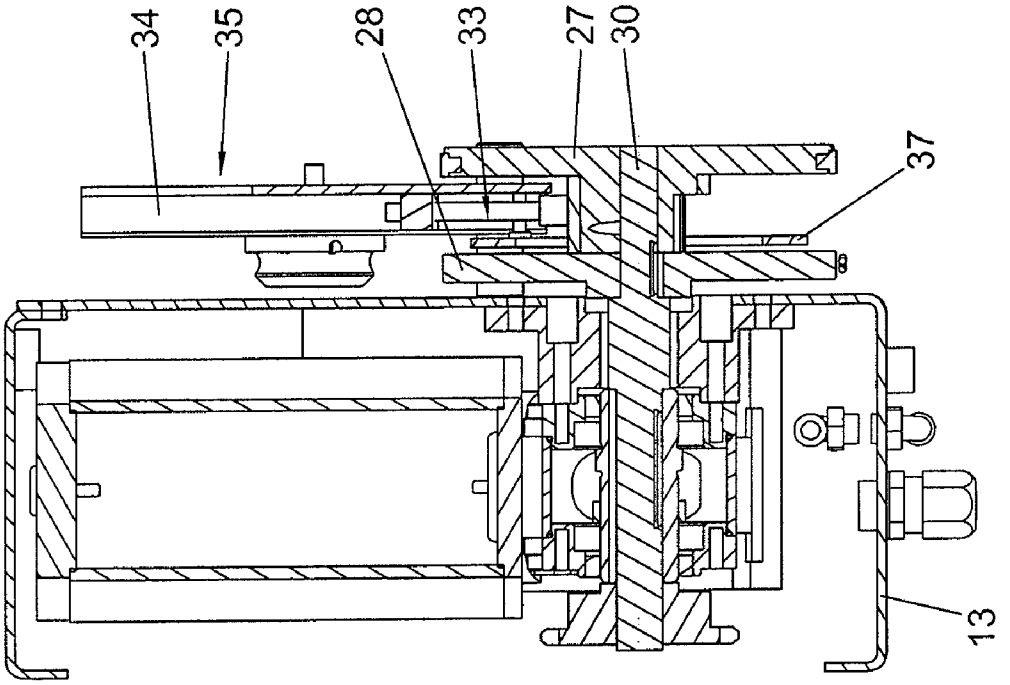

FIG. 6

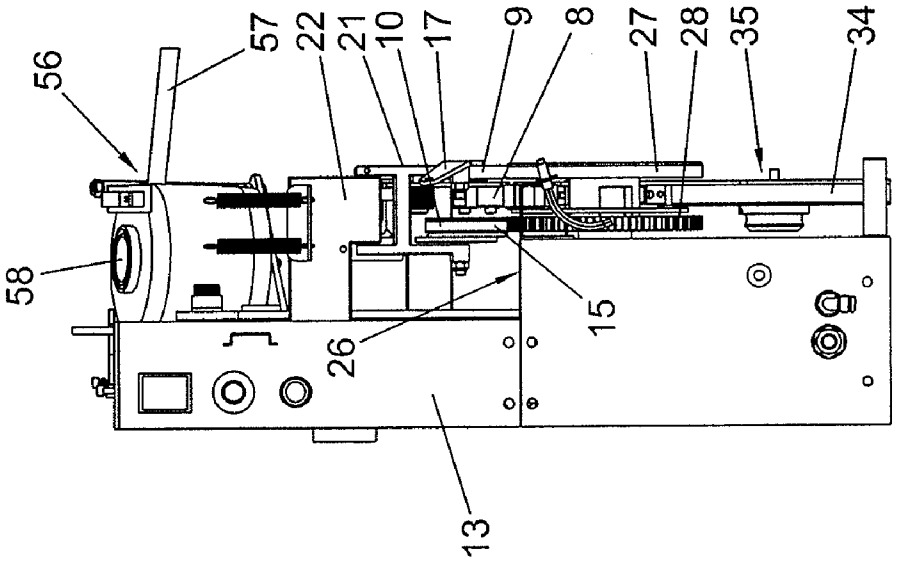

FIG. 5

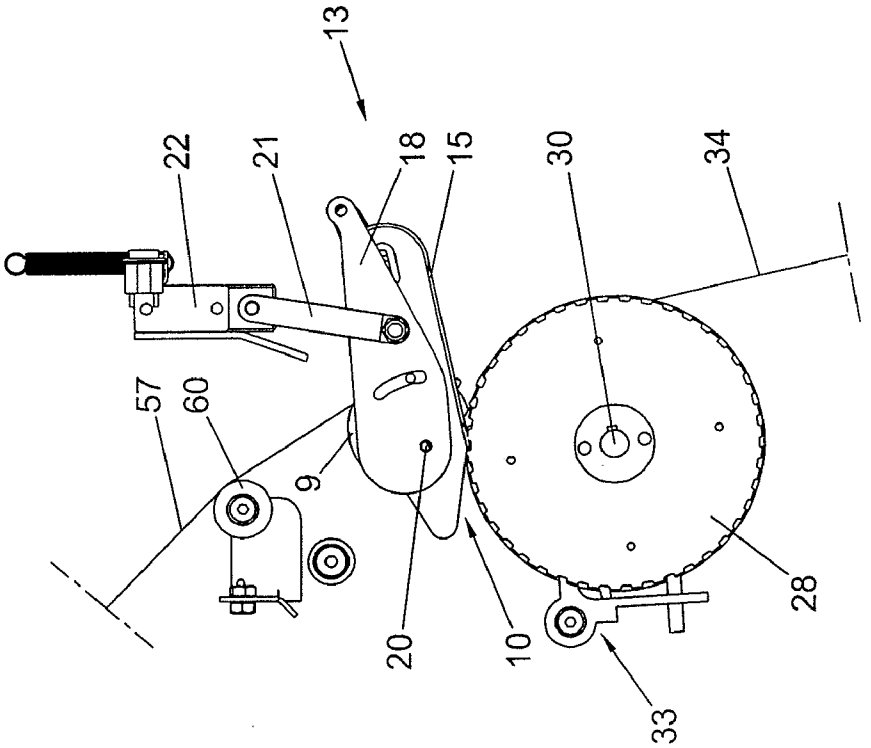
13
22
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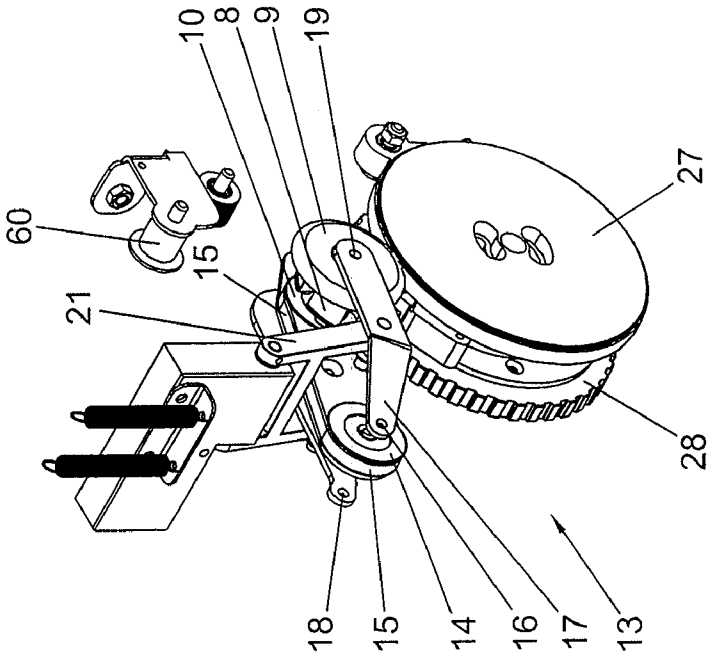
FIG. 8


10
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13

FIG. 7

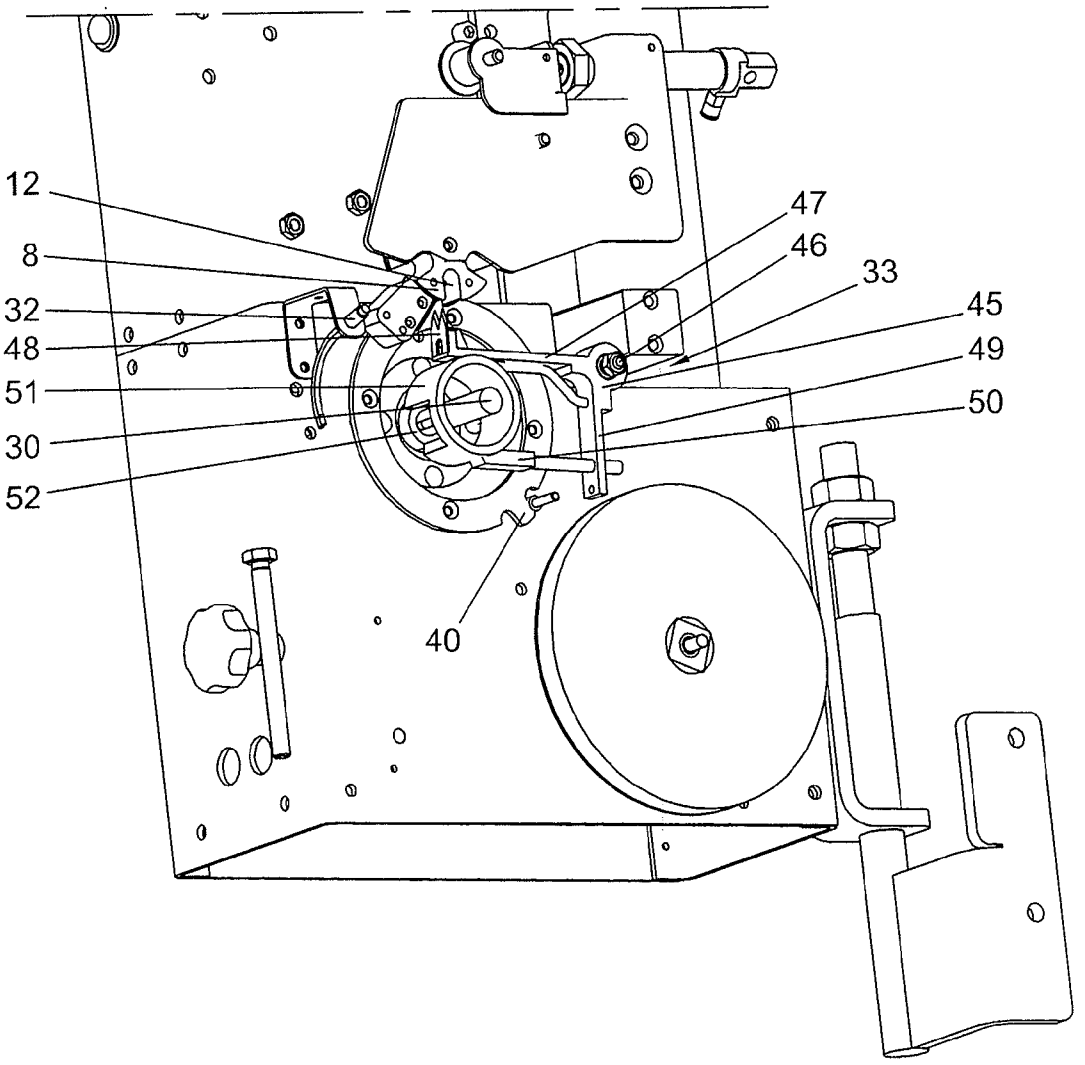

FIG. 9

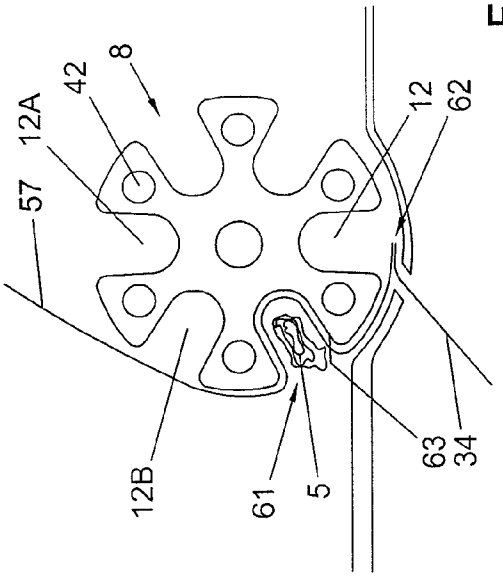

FIG. 10B

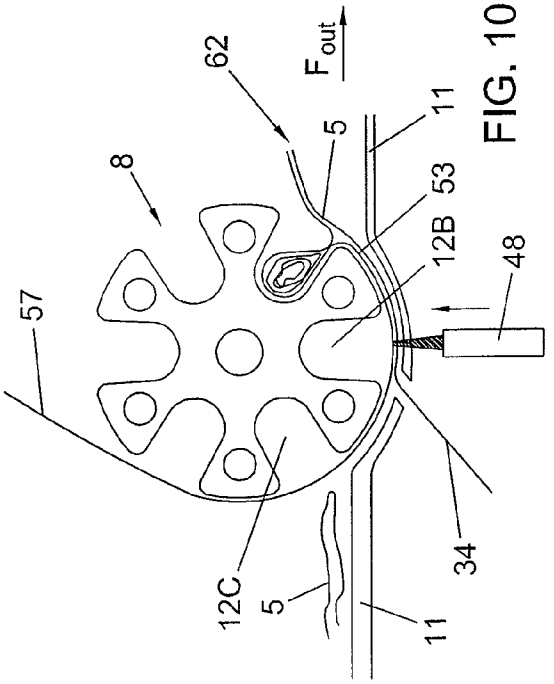

FIG. 10D

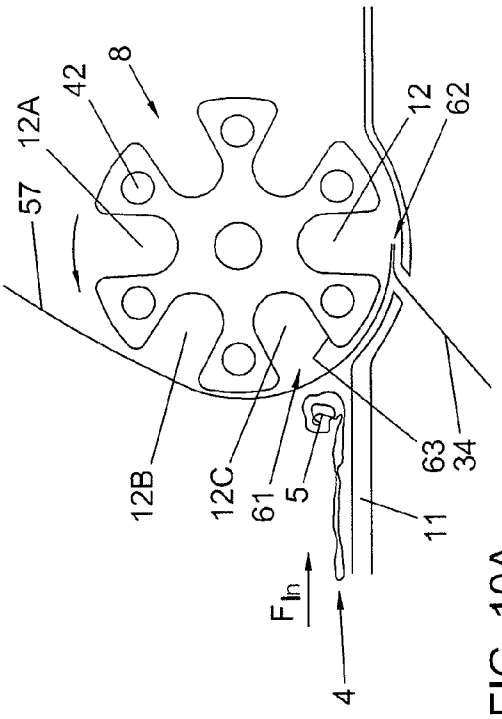

FIG. 10A

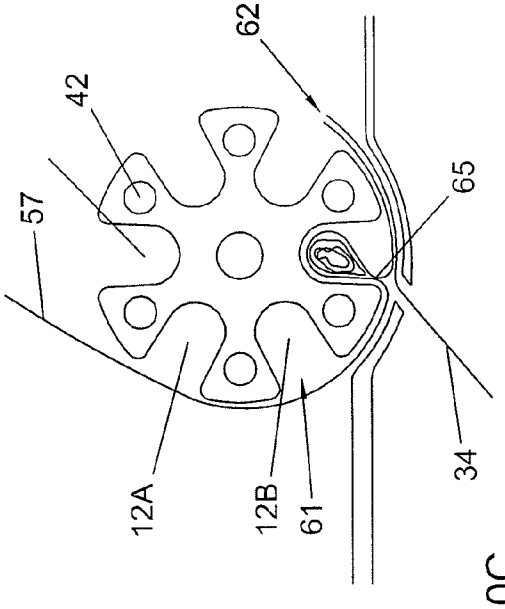

FIG. 10C

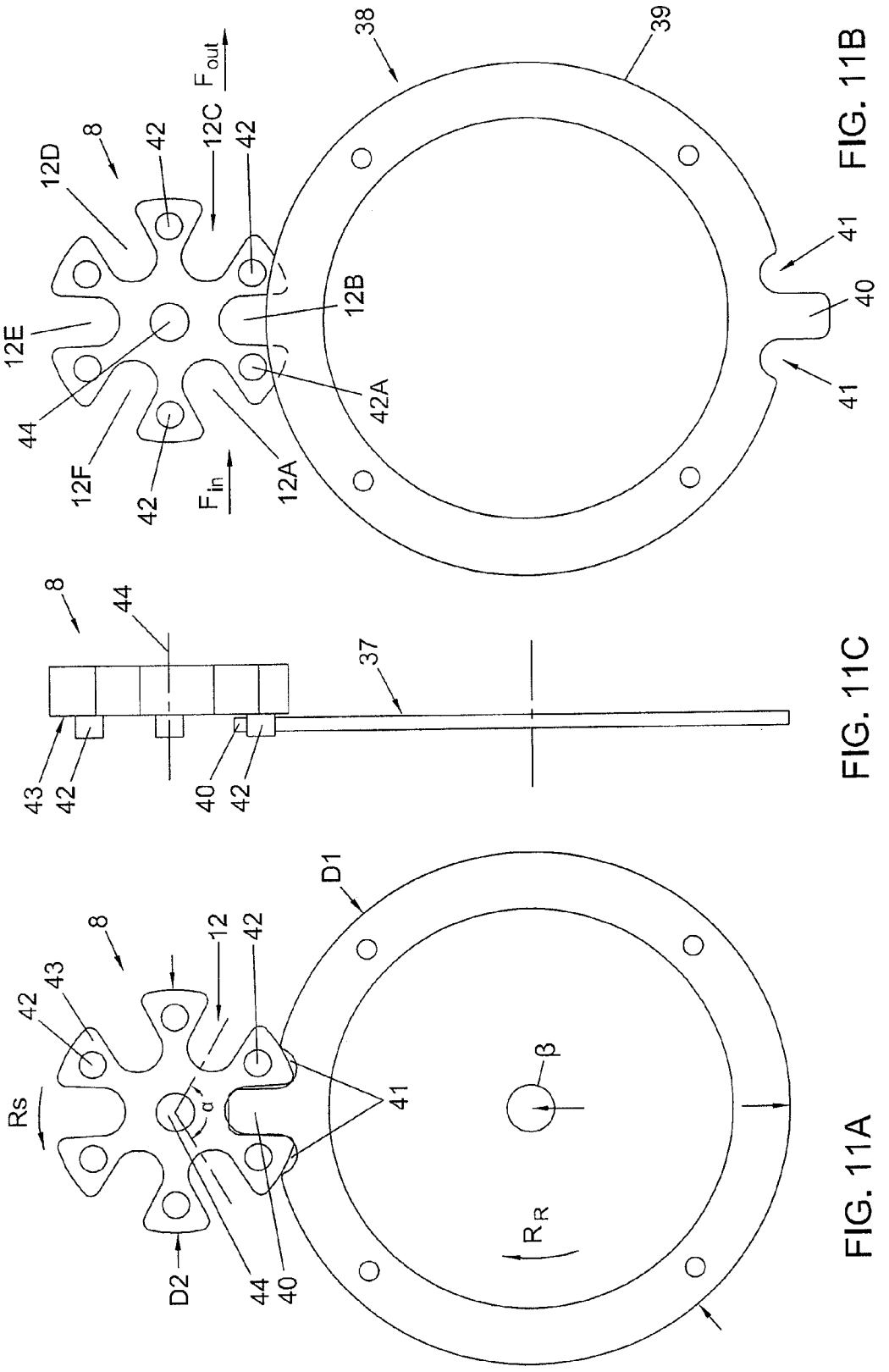

FIG. 11B

FIG. 11C

FIG. 11A

APPARATUS AND METHOD FOR SEALING BAGS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority benefit of Aarts, Netherlands Patent Application Serial No. 2002595, filed on Mar. 5, 2009, entitled "Apparatus And Method For Sealing Bags," the contents of which are expressly incorporated herein by reference in their entirety, including any references therein.

FIELD OF THE INVENTION

[0002] The invention relates to an apparatus and method for sealing bags. The invention more specifically relates to an apparatus and method for wrapping at least an adhesive strip of tape around at least part of the neck of a bag, especially for industrial and semi industrial packaging of products in bags.

BACKGROUND

[0003] It is known to gather the neck of a bag in an industrial closure device and provide a clip around the neck, closing the bag. The clip can for example be a plastic or metal strip, folded around the neck, or a plastic plate shaped clip with a slit forced over the neck.

SUMMARY OF THE INVENTION

[0004] An aim of the present invention is to provide an alternative to these known apparatus and methods. Another aim of the present invention is to provide a method and apparatus for sealing a bag without the necessity of adding metal or relatively stiff plastic plate shaped elements.

[0005] There is furthermore a desire to provide a closure device or method which can process containers substantially at a continuous pace. Moreover it would be desirable to have an apparatus or method for closing containers using tape, especially adhering tape, which closure can easily be opened again, preferably without the necessity to use cutlery, tools or a users teeth.

[0006] One or more of these and/or other aims can be obtained with an apparatus and/or method according to invention.

[0007] In a first aspect an apparatus for sealing flexible bags can comprise a gathering assembly for a neck of a flexible container such as a bag. Such gathering means and/or the apparatus can include at least a transport means and at least one tape dispenser. The gathering assembly comprises, by way of example, a star wheel and the tape dispenser comprises a guide for guiding tape from the tape dispenser over part of the star wheel. The transport means can extend into or along at least a cell of the star wheel, wherein the star wheel is coupled to the transport means, such that when the transport means is driven, feeding the neck of the bag into a cell of the star wheel, the star wheel is driven intermittently.

[0008] In a second aspect a method for sealing flexible containers can comprise each of the steps or combination of the steps of:

[0009] leading a strip of adhesive tape along part of a star wheel, such that the tape extends over an opening of at least one cell of said star wheel;

[0010] gathering neck material of a container by feeding the neck material into the cell of the star wheel in a first direction, keeping the star wheel substantially stationary during said gathering, such that the tape is forced against an inside wall of said cell and around the gathered neck material;

[0011] rotating the star wheel over an angle, such that the gathered neck material, tied into a closed state by at least the tape, can be moved out of the cell in a second direction;

[0012] adhering a foil strip to part of the tape; and

[0013] during or following said rotation of the star wheel feeding and/or holding tape over an opening of a next cell of the star wheel.

[0014] The star wheel is driven, for example, over said angle by a drive means, separate from the container itself.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] By way of example an apparatus and method shall be described hereafter, schematically and in relative detail, with reference to the drawings, in which:

[0016] FIG. **1** schematically shows a top view of an apparatus, interposed between feeding means and discharge means for containers, such as bags;

[0017] FIG. **2** is a perspective view of an apparatus for sealing containers, from a first side;

[0018] FIG. **3** is a perspective view of an apparatus according to FIG. **2**, with at least part of the gathering means removed;

[0019] FIG. **4** is a perspective view of an apparatus according to FIGS. **2** and **3**, from a second (opposite) side;

[0020] FIG. **5** is a side view of the apparatus depicted, by way of illustrative example, in FIGS. **2-4**;

[0021] FIG. **6** a cross section view of a lower portion of the apparatus of FIG. **5**, taken along the line A-A in FIG. **5** cutting though a common axis **30** upon which wheels **27** and **28** are mounted;

[0022] FIG. **7** is a perspective view of part of the exemplary gathering means;

[0023] FIG. **8** is a frontal view of the illustrative gathering means of FIG. **7**;

[0024] FIG. **9** is a perspective view of part of an illustrative embodiment, showing a roll of foil strip and a knife assembly;

[0025] FIGS. **10**A-D depict, in simplified form, four steps of sealing a bag during transport through the star wheel; and

[0026] FIGS. **11**A, B and C depict in illustrative frontal views the star wheel engaged by a rotary element (**11**A), for rotating the star wheel over a predetermined angle, prevented from rotating by the rotating element (**11**B), and a side view of the rotating element and part of the star wheel (**11**C).

DETAILED DESCRIPTION OF THE DRAWINGS

[0027] In this description the same, similar or corresponding parts can have the same or corresponding reference signs. The embodiments shown and described are exemplary embodiments only and should by no means be understood as limiting the scope of protection sought as defined by the claims. The apparatus and methods according to the invention are described in relation to flexible containers such as bags. These can for example be plastic or paper bags. This should not be considered limiting.

[0028] In FIG. **1** a top view is depicted of part of an apparatus **1** for sealing containers, such as bags **4**, between feeding means **2** and discharge means **3**. The feeding means **2** can, for example, comprise an endless belt, chain, mat or other transporting devices for transporting bags **4** in a feeding direction

F. In FIG. **1** the bags **4** are shown lying on a side, with a neck **5** and an open side **6** thereof facing in one direction T, substantially perpendicular to the feeding direction F_{in}. The discharge means **3** can, for example, comprise an endless belt, chain, mat or other transporting devices for transporting bags **4** in a discharge direction F_{out}. A product P or several products can be provided for enclosure in the bags **4**. In this respect sealing should be understood as comprising at least providing a seal around a gathered neck of the bag, closing off the open side **6** thereof substantially, preferably entirely, by tape and/or foil.

[0029] Substantially between, and extending partly above and partly below facing ends **2**A, **3**A of the feeding means **2** and discharge means **3** respectively, a gathering assembly **7** is provided. The gathering assembly comprises a star wheel **8**, as will be discussed hereafter. The star wheel **8** is, in the illustrative, embodiment largely positioned between a first wheel **9** and a second wheel **10** substantially above a guide surface **11** over which the bags **4** can be guided from the feeding means **2** to the discharge means **3**. The wheels **9**, **10** can be part of transport means **13**. The aim of the gathering assembly **7** is at least to grab a neck **5** of a bag **4** and gather the neck into a bundle within a cell **12** of the star wheel **8** as schematically shown, in FIG. **10**, in cross sectional view. Providing the wheels **9**, **10** at opposite sides of the star wheel **8** allows the bag **4** to be grabbed at both sides of the wheel **8**, such that gathering is improved. In the embodiment shown in, for example, FIGS. **2**, **7** and **8**, a third wheel **14** is provided in the transport means **13**, upstream from, and in front of, the second wheel **10**. A snare or band **15** is guided over the second wheel **10** and the third wheel **14**. The third wheel **14** is mounted on an axis **16** between a first bracket **17** and a second bracket **18**. The second bracket **18** can extend along the band **15** and be connected to or carry the axis **20** of the second wheel **10**. The first bracket **17** can extend on the opposite side of the star wheel **8** and be connected to an axis **19** of the first wheel **9**. The brackets **17**, **18** can be pivotally mounted on an arm **21** connected to the housing by a spring loaded mount **22**, such that the wheels **9**, **10** and/or the band **15** are pushed in the direction of the guide surface **11**. The band **15** and third wheel **14** can extend above the feeding means **2**, such that at least the band **15** can grab the necks **5** of the bags **4** first, especially when the bags **4** are slightly open or upstanding.

[0030] FIG. **2** shows in perspective view the apparatus **1**. The apparatus **1** comprises a housing **23** with a wider lower part **24** and a narrower upper part **25**, such that a platform **26** is formed at the top of the lower part **24**, next to the upper part **25**. The guide surface **11** has been partly removed, as well as some protective plating. The platform **26** can be used as, or support, a guide surface **11**. As can be seen in FIG. **1**, the wheels **9**, **10**, **14** are at levels to one side of the platform **26**, here above the platform **26**, whereas at levels to the opposite side of the platform **26**, here below, there are two drive wheels **27**, **28**, driven by a motor **29** (shown in FIG. **4**). A first drive wheel **27** can be, when no bag **4** is provided, close to or in engagement with the first wheel **9**, whereas a second wheel **28** of the drive wheels can be, when no bag **4** is provided, close to or in engagement with the second wheel **10**. The drive wheels **27**, **28** are positioned on a common axis **30** and driven at a constant speed for periods of time defined by a control **31**. The control is connected to, for example, a sensor **32** sensing presence of a bag **4** and activates the motor **29** for a period of time necessary for feeding the bag **4** past the star wheel, as will be discussed hereafter. The drive wheels **27**, **28** are spaced apart, when seen in the length direction of the axis **30**, such that space is created between the drive wheels for the star wheel **8** and a knife construction **33** to be discussed. The drive wheels **27**, **28** and/or the snare or band **15**, the first and/or the second wheel **9**, **10** can have a friction surface for engagement with the bags **4**.

[0031] In FIG. **3** an apparatus according to FIG. **2** is shown in which the drive wheels **27**, **28** have been removed. The view in FIG. **3** shows part of the star wheel **8**, part of the knife construction **33**, and a guide block **36** for a foil strip **34** to be dispensed during use from a foil dispense roll **35**. Also visible in FIG. **3** is a rotating element **37** that is normally connected to the second drive wheel **28** such that the rotating element **37** rotates with the second drive wheel **28** around the same axis **30**. The rotating element **37** is, in the illustrative embodiment, a ring comprising a profile **38**, such as a circular outer surface **39** with a lip **40** extending radially outward between two notches **41** extending radially inward.

[0032] As shown in more detail in FIGS. **11**A and B, the star wheel **8** includes a number of elements **42** extending from a side surface **43** of the star wheel **8**, each element **42** being positioned between two adjacent cells **12**. The lip **40** of the rotating element extends, during rotation of the ring **37** around the axis **30**, in a path extending along the star wheel **8** such that, when the ring **37** is rotated, at least one of the elements **42** of the star wheel **8** is, as a coupling element, engaged by the extending lip **40** for rotating the star wheel **8** around an axis **44**. Assuming a rotation direction R_r of the ring **37** in a clockwise direction, in FIG. **11**A a position is shown in which the lip **40** has engaged the element **42**A in front of a first cell **12**A and is halfway a rotation angle α imposed by the ring **37** on the star wheel **8**. Other numbers of cells can be provided, as well as other numbers of coupling elements **42** and/or other numbers of lips **40**. In each of these variations the construction can be designed such that upon rotation of the rotating element **37** over a first angle β, the star wheel can be rotated over a second angle α, in an opposite direction, to be chosen as desired. The ring **37** is part of the transport means or can at least be coupled to the transport means discussed herein above.

[0033] In the exemplary embodiment shown in FIG. **11** the star wheel **8** has six cells **12** and six coupling elements **42**, which can for example be pins, bolts, integrally formed protrusions or other means for engagement. The diameters D_1 and D_2 of the ring **37** and the star wheel **8** and the position of the elements **42** and the length of the lip **40** extending from the ring **37** are designed such that upon rotation of the rotating element **37** such that the lip is brought from one side of the star wheel to the opposite side, the star wheel is rotated over an angle α of 120 degrees. During use this will mean that, upon one full rotation of the ring over 360 degrees, the star wheel **8** will be rotated over 120 degrees, meaning two cells (in the case of a six cell wheel). The coupling element **42** engaged by the lip **40** will, during rotation, enter into and subsequently move out of the notch **41** in front of the lip **40**, seen in the direction of movement, whereas the trailing coupling element **42** will move into and out of the trailing notch **41**, thus allowing the rotation over the angle α.

[0034] As can be seen in FIG. **11**B, when the lip **40** is not engaging any coupling element **42**, two of these coupling elements **42** lays against the outer profile **39** of the ring **37**, thus preventing rotation of the star wheel **8**. This effect is used during gathering of the neck **5** of one of the bags **4** and feeding the neck **5**, during gathering, into the cell **12**A in the direction

F_{in} and/or during moving the neck **5** of another one of the bags **4** out of a cell **12**C in the discharging direction F_{out}. Due to the configuration, in the embodiment of FIGS. **11**A-C only cells **12**A, **12**C and **12**E will be used for gathering and closing the neck **5** of ones of the bags **5**.

[0035] Referring primarily to FIGS. **3**, **4** and **9**, the knife construction **33** comprises a hammer block **45** mounted on an axis **46**. The block **45** comprises a first arm **47** extending above a cylindrical wall **51** around the axis **30**, carrying a knife **48** that extends from the free end of the first arm **47** upward. A second arm **49** is provided extending downward from the axis **46** and carrying a follower **50** extending substantially parallel to the first arm **47**. In the cylindrical wall **51** an opening **52** is provided, positioned at an angle γ relative to the lip **40**. When the cylindrical wall **51** is rotated together with the ring **37** the follower **50** will move over the outer surface of the wall **51** until the follower **50** can enter into the opening **52** and rotating the block **45** around the axis **46**. The rotation of the block **45** moves the knife **48** upward into a cell **12** facing downward at that time. This can in an embodiment as shown in FIG. **11** be a cell **12**B following a cell **12**C in which a neck **5** of a one of the bags **4** has been gathered and sealed by a seal **53** formed by tape or tape and foil, as will be discussed hereafter. Tape and/or foil, extending as a trailing part over said following cell **12**B will then be cut by the knife **48**, releasing the sealed one of the bags **5**, in FIG. **1** shown at the right hand side. The angle γ shall, in this embodiment, be chosen such that the star wheel **8** is driven over half the angle α before the knife **48** is forced into the empty following cell **12**B. In that position the cell **12**A in FIG. **11**B is ready to receive a next neck **5** of a bag **4** to be gathered. The knife block **45** can be rotated by gravity and engagement of the follower **50** with the cylindrical wall **51**. In another embodiment the knife **48** can be moved up by a profile on the cylindrical wall **51**, instead of the opening **50**, in which case the follower could be removed. In still another embodiment the knife **48** is moved by a separate drive mechanism such as an individual motor, rod mechanisms, drive belt or any other solution readily available to the person skilled in the art.

[0036] In an embodiment depicted in FIG. **4**, a pin **54** is mounted on an end of the axis **46** and engages a toothed wheel **55**. The wheel **55** is designed such that each time the knife **48** has to be moved up, the pin **54** is moved over a tooth of the wheel **55**, thus forcing the axis **46** to rotate back and forth, forcing the knife **48** into and out off the relevant cell **12** for cutting the tape and/or foil. The wheel **55** will rotate at a slower speed than the drive wheels **27**, **28** and can be coupled to the same motor **31**, for example, by a gear mechanism (not shown).

[0037] As can be seen in FIG. **2** a roll **56** of tape **57** can be mounted on an arm **58** extending from the housing **13**. This is preferably adhesive tape **57** with an adhesive layer **61** facing inward to a core **59** of the roll **56**. During use the tape **57** is fed from the roll **56** over a guide mechanism **70** towards the star wheel **8**. In the embodiment of FIG. **2**, of which part is shown in FIGS. **7** and **8** in more detail, a guide roller **60** is shown over which the tape **57** is guided. FIG. **7** shows the relevant part from a first side, substantially corresponding with the view of FIGS. **2** and **3**, whereas, FIG. **8** shows the opposite side. In FIG. **8** the tape **57** and the foil strip **34** are schematically shown, feeding towards the star wheel **8**. As can be seen in, for example, FIGS. **5** and **6**, the foil dispense roll **35** is positioned such that the foil strip **34** is led in between the first and second drive wheels **27**, **28** and along the guide surface **11** under the star wheel in FIG. **1**. The tape **57** is fed over the guide roller **60** and the star wheel **8**.

[0038] FIGS. **10**A-D schematically show, in four steps, applying a seal **53** around the neck **5** of a bag **4** or other such flexible container. The container has to be flexible enough for part thereof, such as a neck, to be gathered in a cell **12** of the star wheel **8**. In FIG. **10**A the star wheel **8** is shown in a first position, stationary with a cell **12** open to the feeding means **2**, for feeding a neck **5** into the cell. As can be seen in FIG. **10**A, the neck **5** is gathered into a substantially closed bundled up position by the gathering means as discussed before. The neck **5** is grabbed between the first wheel **9** and the first drive wheel **27** and between the second wheel **10** or band **15** and the second drive wheel **28** and pushed towards the cell **12**C. Adhesive tape **57** is led over the outer circumference of part of the star wheel **8**, with the adhesive layer **61** facing outward, such that it extends at least over the opening **61** of the cell **12**C. A foil strip **34**, for example a paper strip, is led from a lower side to the star wheel **8** and is attached to a forward end **62** of the adhesive tape **57**. In FIG. **10**B the gathered neck **5** has been fed into the cell **12**C, forcing the tape **57** into the cell, substantially against the inner wall **63** thereof, the star wheel still being in the same position. The gathered neck **5** can be held in this position by the rotating element, as discussed before. The neck **5** is thus almost entirely surrounded by the adhesive tape **57**. In FIG. **10**C the star wheel is shown in a position in which it has been rotated counter clockwise over about 60 degrees, for example, by engagement of the star wheel **8** by the rotating element or ring **37**. The tape **57** can have been pulled further around the neck **5**, for example, but not necessarily to such extent that it is attached to itself, forming a joint **65**, fully circumventing the neck **5**. As can be seen the foil strip **34** has been drawn off the roll **35** further and has been attached to the tape **57** over such length that it traverses the joint **65**. In FIG. **10**D a position is shown in which the star wheel **8** has been rotated further, counter clockwise over, for example, substantially another 60 degrees such that the opening **61** of the cell **12**C extends above the guide surface **11**, or at least to such extend that the bag **4** can be discharged from the cell **12**A. The knife **48** can, for example as discussed before, be driven upward into the cell **12**B, cutting through the combined tape **57** and foil strip **34**, cutting the seal **53** off from the tape **57** and foil strip **34**. At the same time the adjacent cell **12**A has become available for feeding a further neck **5** into it.

[0039] The foil strip **34** can be made of paper or plastic or another material. Preferably it can easily be torn by a user, preferably easier than the tape **57**, such that the seal **53** can be broken easily. In an alternative embodiment the foil strip is left out, the seal formed by tape only. In still another embodiment the foil strip is replaced by a strip of individual elements to be adhered to the tape **57** at one or opposite sides of the joint **65**, such that the ends of the tape on opposite sides of said joint will not adhere to each other. These individual elements can, for example, be carried on a strip like backing. In another embodiment a substantially non adhesive tape can be used, which is provided with adhesive only in the parts that have to enclose the neck **5** of a bag **4**, but not the parts that form the free ends of the seal, distanced over a certain distance from the joint. The adhesive can, for example, be applied to the non-adhesive tape in blocks prior to delivery or near or at the star wheel, before feeding the neck into the cell **12**.

[0040] In FIG. **1** a control **31** is shown, for example, connected to a sensor **32** for sensing a bag in a desired proximity of the star wheel **8** such that the gathering can be advanced and the rotating element should be rotated. The control can also be provided with a communication means **67** and/or positioning means **68** such as, but not limited to, wireless communication means and/or wired communication means, such as a telephone, GPS or GPRS. The communication means **67** can be designed to communicate with, for example, a computer of telephone network, with a supplier of tape and/or foil, with a maintenance firm or the like. Further sensors can be connected to the control, such as one or more sensors for sensing the amount of tape **57** and/or foil **34** strip dispensed and/or used and/or sensing a remaining amount of tape **57** and/or strip **34** remaining on the respective rolls **35**, **56**. The rolls **35** and/or **56** can be provided with indicators, such as but not limited to RFID chips, bar codes or other means that can be physically or electronically read by sensors in the apparatus, for identification of the rolls and setting a mode of the apparatus through the control **31**, for example the length of tape to be dispensed, tension of the strip **34** and/or tape **57** to be applied, or even bringing the apparatus in a working or non working mode. The positioning means **68** can be provided for sensing and communicating location and/or location changes of the apparatus **1**, such that it is easy to keep track of the apparatus. Counting means can be provided for counting the number of seals manufactured with the apparatus, for example by counting the number of revolutions of the star wheel **8** and/or of one of the drive wheels and/or of the rotating element **37**.

[0041] The invention is by no means limited to the embodiments shown and discussed here above. Many amendments and variations are possible within the scope of the invention. For example the orientation of the apparatus can be different, such that for example the bags are fed through the apparatus vertically, for example hanging from transport means or carried on transport means with the necks upward, wherein the axis **44** of the star wheel can include an angle with a horizontal directed, can be inclined or disposed vertically. The rotating element **37** and especially the lip **40** can be positioned such that it engages the star wheel **8** at a side spaced apart from the area where the neck is gathered an fed into a cell, for example in FIG. **10** on the upper side of the star wheel **8** or at least at a side of the star wheel opposite the guide surface **11**. The star wheel can also be driven differently, for example, through a step motor engaging the axis **44** or by the feeding and/or discharging means, the ring **37** only being used for blocking and allowing rotation of the star wheel **8** over a specific angle. Instead of the star wheel **8** in the present form, rotatable around an axis **44**, a star wheel **8** can be in the form of an endless star belt, formed as a belt having a series of cells in an outwardly facing surface, guided over at least two end wheels, such that a series of cells **12** is fed along the guide surface, allowing a series of bags to be handled at the same time. The position of the tape roll **56** and the foil strip roll **35** can be changed such as, for example, changed over. Means can be provided to print information on and/or in the tape and/or the foil strip, such as sealing date, expiration date of the product P, packing apparatus identification, advertisements or other information. In the embodiments shown, the width of the strip of foil **34** is about the same as the width of the tape **57**. These widths can be different, for example, when the foil strip **34** should have a greater width in order to provide further information, such as user information, warranties and other communications. These and other modifications, including all combinations and permutations of aspects and parts of the embodiments shown are supposed to have been disclosed here, both in isolation and in combination.

What is claimed is:

1. An apparatus for sealing flexible bags, comprising:

a gathering assembly for a neck of the bag including a transport means and a tape dispenser,

wherein the gathering assembly comprises a star wheel, and the tape dispenser comprises a guide for guiding tape from the tape dispenser over part of the star wheel, the transport means extending into or along at least a cell of the star wheel,

wherein the star wheel is coupled to the transport means such that when the transport means is driven, to feed the neck of the bag into a cell of the star wheel, the star wheel is driven intermittently.

2. The apparatus according to claim **1**, wherein the transport means comprise two sets of transport elements such as wheels and/or transport bands, substantially parallel to each other at a distance from each other, the star wheel extending at least partly between said two sets.

3. The apparatus according to claim **1**, wherein the transport means comprise or are coupled to a rotating element comprising at least one extending element, said element during use moving in a path extending through or along a side of the star wheel, such that when the rotating element is rotated over a first angle, the star wheel is engaged by the extending element for rotating the star wheel over an second angle.

4. The apparatus according to claim **3**, wherein the star wheel includes at least one coupling element engaging said rotating element, said rotating element including at least one profile, such as an opening or notch into or onto which said coupling element can move during rotation of said rotating element, such that the star wheel is rotated over said second angle, before releasing said coupling element.

5. The apparatus according to claim **3**, wherein the star wheel has a number of cells, wherein the transport means are designed such that if said first angle is 360 degrees, the second angle is such that the star wheel is rotated over a second angle defined by a discreet number of cells, preferably two or three cells.

6. The apparatus according to claim **1**, wherein a proximity sensor is provided near the transport means and/or the gathering means.

7. The apparatus according to claim **1**, wherein means are provided for guiding a foil strip along part of the star wheel and/or a guide surface extending along the star wheel, for engagement with tape led over the star wheel.

8. The apparatus according to claim **1**, wherein a communication device is provided for communication between the apparatus and a control device, preferably wireless communication.

9. The apparatus according to claim **1**, wherein a positioning device is provided for sensing and communicating location and/or location changes of the apparatus.

10. The apparatus according to claim **1**, wherein a control device is provided, the control device being connected to at least one sensor for detecting presence of the tape and/or the foil.

11. A method for sealing flexible containers, comprising the steps of:

leading a strip of adhesive tape along part of a star wheel, such that the tape extends over an opening of at least one cell of said star wheel;

gathering neck material of a container by feeding the neck material into the cell of the star wheel in a first direction, keeping the star wheel substantially stationary during said gathering, such that the tape is forced against an inside wall of said cell and around the gathered neck material;

rotating the star wheel over an angle such that the gathered neck material, tied into a closed state by at least the tape, comes out of the cell in a second direction;

adhering a foil strip to part of the tape; and

during or following said rotation of the star wheel feeding and/or holding tape over an opening of a next cell of the star wheel.

12. The method according to claim **11**, wherein said gathering is done using at least one gathering wheel or band, driven by a drive mechanism, wherein a rotating element is provided, coupled to the drive mechanism and/or the gathering means, the rotating element being rotated and brought into and out of engagement of the star wheel or an element associated therewith, for intermittently rotating the star wheel over an angle.

13. The method according to claim **12**, wherein the star wheel is kept in the stationary position by the rotating element during part of a rotation of the rotating element.

14. The method according to claim **11**, wherein container necks are fed into the gathering means in a substantially flat position.

15. The method according to claim **11**, wherein a container neck approaching the gathering means is detected, on the bases of which the gathering of the container neck is started and a rotating element for rotating the star wheel over said angle is made to be driven in a rotating direction.

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