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(54) **PACKAGING METHOD AND APPARATUS**
VERPACKUNGSVERFAHREN UND -VORRICHTUNG
PROCEDE ET APPAREIL DE CONDITIONNEMENT

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Description

[0001] This invention relates to a packaging method and apparatus and in particular to a method and apparatus for packaging trimmer line such as is used in trimmer apparatus, generally known as 'strimmers'.

[0002] Presently, trimmer line is packaged by firstly coiling the line - either manually or with the aid of suitable machinery or apparatus - into a generally circular form. The generally circular form of trimmer line is then secured and maintained in its circular form either by means of adhesive tape or by other suitable means, whereafter the coiled line is placed in a pack for display and sale purposes.

[0003] Whilst the above-described packaging system adequately maintains the trimmer line within the pack, such that it is suitable for display and sale, it has a number of disadvantages. Firstly, such a system is very labour-intensive and time-consuming, and therefore very costly, and secondly and perhaps of greater importance to the end-user of the trimmer line, it is very often very difficult to remove the trimmer line from the pack without the trimmer line suddenly releasing itself from the pack and ending up as a tangled mess, resulting in time having to be spent in sorting out the tangle so that the line can be used, or in the extreme discarding the tangled line altogether.

[0004] There have been prior proposals for the packaging of filamentary material, but these suffered from one disadvantage or another. United Kingdom Patent No 1 143 756 discloses a method of and apparatus for packaging sutures, but the apparatus is unduly complicated, and United Kingdom Patent No 2 030 537 discloses a method of and apparatus for packaging filamentary material, and again the apparatus is similarly complicated, and includes apparatus parts which are not necessary to achieve the desired end result of the present invention.

[0005] The present invention therefore seeks to provide a method of and apparatus for packaging trimmer line which will obviate the above and other disadvantages.

[0006] According to the present invention there is provided apparatus for the packaging of trimmer line comprising a pair of pinch wheels to feed a length of trimmer line from a supply source into guide means and thence into a closed container or package through a hole or aperture in said container or package, means being provided to sever the trimmer line when a predetermined length has been fed into said container or package, said guide means comprising feed pipes or needles located one above and one below said pinch wheels, the trimmer line being sequentially fed into the upper pipe or needle and then into the lower pipe or needle from which it is fed through the hole or aperture into the closed container or package, characterised in that said lower pipe or needle is movable axially and towards and away from said upper pipe or needle, said pinch wheels and said

closed container or package so as to enable the distance between a lower end of said lower pipe or needle and said pinch wheels to be varied.

[0007] At least one of said pinch wheels will preferably be positively driven, whilst the other of said pinch wheels will preferably be spring-loaded so that it is biased towards the driven pinch wheel.

[0008] The lower pipe or needle or a portion thereof may be rotatable about its axis relative to said container or package, and the lower extremity of said lower pipe or needle may be flared.

[0009] Located in close proximity to the lower end of the lower of said pipes or needles there will preferably be cutting means to sever the trimmer line when a predetermined length thereof has been fed into said container or package, said cutting means preferably being pneumatically operated.

[0010] The closed container or package will preferably be mounted on a conveyor which is movable relative to said pipes or needles so as to move said container or package to and from a position beneath said pipes or needles.

[0011] Said apparatus will preferably include a control or programme unit to control, inter alia, the length of trimmer line fed to said closed container or package, the speed of feed of said trimmer line to said closed container or package, and the number of containers or packages completed.

[0012] In order that the invention may be more readily understood, an embodiment thereof will now be described, by way of example only, reference being made to the accompanying drawings, wherein:

Figure 1 is a front elevation of apparatus for packaging trimmer line in accordance with the invention; Figure 2 is a side elevation on Figure 1; and Figure 3 is a plan view of the apparatus of Figures 1 and 2.

[0013] Referring to the drawings, the trimmer line 2 mounted on a drum 4 is located on a drum table 6 which is rotated by a geared motor 8 so as to feed the trimmer line from the drum to a closed container or package 10 - having a hole or aperture 10A therein - located on a conveyor 12.

[0014] Located above the drum 4 is a guide bearing 14 through which the trimmer line 2 is fed and line guide rollers 16, 18, and 20 are provided as indicated. Adjacent the guide roller 20 is an upper feed pipe or needle 22 whose lower end is in close proximity to a pair of pinch rollers 24 and 26. A lower feed pipe or needle 28 whose upper end is located in close proximity to the pinch rollers 24 and 26 is provided to deliver the trimmer line to the container or package 10.

[0015] A pneumatically operated cutting means is located between the lower end of the feed pipe or needle 28 and the conveyor 12 so as to enable the trimmer line to be severed when a predetermined length of trimmer

line has been inserted into the container or package 10.

[0016] The pinch roller 24 is positively driven by being mounted on the output shaft of a motor 34 - which may be of the variable speed type or an induction motor having pulleys and a belt in order to vary its speed - and the pinch roller 26 is pivotable about a pivot pin 36 and is spring-loaded by means of a spring 38 so that it is biased towards the pinch roller 24.

[0017] As will be seen from Figures 2 and 3, the output shaft 32 of the motor 34 carries a pulley wheel 40 which, through the intermediary of an endless belt 42, is in engagement with and causes rotation of a pulley wheel 44 to which is mounted a disc 46 carrying a reflector 48. A counter sensor 50 acts in conjunction with the reflector 48 as will be explained hereinafter.

[0018] The apparatus will incorporate a control panel including a suitable programme unit 52, the unit 52 including start and stop buttons 54 and 56 respectively, a length counter 58, a speed control 60, a delay unit 62, and a tally counter 64, the appropriate electronic components and circuitry (not shown) being located within the unit 52.

[0019] Although not shown in the drawings, the apparatus will preferably include a series of safety and/or warning lights in order to indicate any malfunctioning of the apparatus, and in order to indicate to an operator of the apparatus when, for example, the line drum needs to be replaced. The apparatus described will be mounted within a suitable casing 66.

[0020] The container or package 10 to be filled with the trimmer line 2 has, as will be seen from Figures 1 and 2, the hole or aperture 10A therein, and it is through this hole or aperture 10A that the trimmer line 2 is fed in to the otherwise completely closed container or package 10. The container or package 10 may be any suitable form of cavity pack, examples being a box, a blister card, a clam shell, or the like.

[0021] The sequence of operations of the apparatus described above is:

- (i) position container or package 10 beneath the pipes or needles 22 and 28;
- (ii) lower the pipe or needle 28 to the required position relative to the container or package 10;
- (iii) feed the required length of trimmer line 2 from the drum 4 through the pipes or needles 22 and 28 into the closed container or package 10 through the hole or aperture 10A therein;
- (iv) retract the pipe or needle 28;
- (v) sever the trimmer line 2 by means of the cutting means 30 leaving a portion of the trimmer line projecting from the container or package 10; and
- (vi) move the conveyor so as to move the filled container or package away from the filling station and so as to position the next container or package beneath the pipes or needles 22 and 28 in readiness to be filled with trimmer line.

[0022] Describing the operation of the apparatus in more detail, the trimmer line 2 is fed from the line drum 4 by actuating the motor 8 - it being understood that the drum will need to be driven at varying speeds (depending on the thickness of the trimmer line) in order to compensate for the take-off of the line - whereafter the line 2 passes through the guide bearing 14, over the line guides 16, 18, and 20, and thence into the upper pipe or needle 22. When the line 2 issues from the pipe or needle 22, it passes to the pinch rollers 24 and 26 which feed the line into the lower pipe or needle 28 from which the line enters the closed container or package through the hole or aperture 10A therein. When the predetermined length of trimmer line has been fed into the container or package 10, the cutting means 30 is actuated so as to sever the line 2, leaving a portion of line projecting from the container or package through the hole or aperture 10A. The conveyor 12 is then operated so as to move the filled container or package 10 away from the filling station and to simultaneously position the next container or package on the conveyor at the filling station. In some instances, depending on the thickness of the line, size of drum etc., it may be unnecessary to drive the table 6.

[0023] When the filled container or package is moved away from the filling station and subsequently removed from the conveyor, the portion of line projecting from the container or package is secured in place on the outside of the container or package 10 either manually or by suitable mechanical or electrical/electronic means, not shown.

[0024] During the operation of the apparatus, the disc 46 is rotating, due to its interconnection with the motor 34, so that the reflector 48 carried by the disc 46 is also rotating, the rotation of the reflector 48 being sensed by the sensor 50 so as to count the number of revolutions of the disc and hence control the length of trimmer line fed from the drum 4 to the container or package 10.

[0025] In order to ensure correct filling of the container or package, it is critically important that the size of the container or package used is correct for the diameter of the line being packaged. In addition, the distance of the lower end of the lower pipe or needle 28 from the hole or aperture 10A in the container or package 10 is also critical, as is the diameter of the pipe or needle 28.

[0026] If considered necessary or if it is desirable, the lower end of the lower pipe or needle 28, or indeed the whole pipe or needle 28, may rotate relative to the container or package being filled in order to aid the coiling of the trimmer line within the container or package 10. In addition, the lower end of the lower pipe or needle 28 may be provided with a flared end in order to better feed the line into the container or package being filled.

[0027] The apparatus described above may be incorporated into a complete forming and packaging line, wherein the required container or package is formed in situ, fed to the filling station and filled with trimmer line, and security tagged either manually or otherwise, the completed containers or packages then being placed in

outer containers for onward transmission to storage or to a point of sale.

[0028] Thus the invention provides a method of and apparatus for packaging of trimmer line which obviates the known disadvantages of presently used packagings. The apparatus according to the invention is relatively inexpensive to manufacture and easy to operate, and trimmer line packaged in accordance with the invention can readily be removed from the container or package easily and quickly with no resultant tangle.

[0029] Finally, it will be appreciated that modifications to the above-described apparatus will readily suggest themselves to persons skilled in the art, and it is intended that such modifications be included within the scope of the appended claims. One such modification is the use of a magnetic field counter instead of the mechanical counter referred to above. A further modification is that instead of mounting the drum of trimmer line vertically on a drum table, the drum may be mounted horizontally, the line merely being drawn from the drum for feeding to the packaging position. In such a case, the drum would be provided with a magnetic brake to arrest movement of the drum at the appropriate time.

Claims

1. Apparatus for the packaging of trimmer line comprising pinch wheels (24,26) to feed a length of trimmer line (2) from a supply source (4) into guide means (22,28) and thence into a closed container or package (10) through a hole or aperture (10A) in said container or package, means (30) being provided to sever the trimmer line (2) when a predetermined length has been fed into said container or package (10), said guide means comprising feed pipes or needles (22,28) located one above and one below said pinch wheels (24,26), the trimmer line being sequentially fed into the upper pipe or needle (22) and then into the lower pipe or needle (28) from which it is fed through the hole or aperture (10A) into the closed container or package (10), **characterised in that** said lower pipe or needle (28) is movable axially and towards and away from said upper pipe or needle (22), said pinch wheels (24,26) and said closed container or package (10) so as to enable the distance between a lower end of said lower pipe or needle (28) and said pinch wheels (24,26) and said container or package (10) to be varied.
2. Apparatus according to Claim 1, **characterised in that** at least one of said pinch wheels (24) is positively driven.
3. Apparatus according to Claim 2, **characterised in that** the other of said pinch wheels (26) is spring-loaded so that it is biased towards said driven pinch wheel (24).
4. Apparatus according to any of Claims 1 to 3, **characterised in that** the lower pipe or needle (28) or a portion thereof is rotatable about its axis relative to said container or package (10).
5. Apparatus according to any of Claims 1 to 4, **characterised in that** the lower pipe or needle (28) is provided with a flared lower end to better feed the trimmer line (2) into said container or package (10).
6. Apparatus according to any of Claims 1 to 5, **characterised in that** cutting means (30) are located in close proximity to the lower end of the lower pipe or needle (28) to sever the trimmer line (2) when a predetermined length thereof has been fed into said container or package (10).
7. Apparatus according to Claim 6, **characterised in that** said cutting means (30) are pneumatically operated.
8. Apparatus according to any of Claims 1 to 7, **characterised in that** said closed container or package (10) is mounted on a conveyor (12) which is movable relative to said pipes or needles (22,28) so as to enable the container or package (10) to be moved to and from a position beneath said pipes or needles (22,28).
9. Apparatus according to any of Claims 1 to 8, including a control or programme unit (52) to control, inter alia, the length of trimmer line (2) to be fed to said closed container or package (10), the speed of feed of said trimmer line (2) to said closed container or package (10) and the number of containers or packages (10) filled with trimmer line.
10. A method for the packaging of trimmer line including the steps of positioning a closed container or package (10) beneath a line filling station, lowering a lower pipe or needle (28) to the required position relative to said container or package (10) and to pinch wheels (24,26) for the line, feeding a required length of line (2) through an upper feed pipe or needle (22) and thence through said lower feed pipe or needle (28) into said closed container or package (10) through a hole or aperture (10A) therein, retracting said lower pipe or needle (28), severing the trimmer line (2) so as to leave a portion of said trimmer line (2) projecting from said container or package (10), and thereafter moving the filled container or package (10) away from said filling station and simultaneously positioning a further closed container or package (10) beneath said filling station.

Patentansprüche

1. Vorrichtung zum Verpacken von Trimmerfaden, die Transporträder (24, 26) zum Einbringen einer Länge Trimmerfaden (2) aus einer Vorratsquelle (4) in Führungsmittel (22, 28) und von dort in einen geschlossenen Behälter oder eine geschlossene Packung (10) durch ein Loch oder eine Öffnung (10A) in dem genannten Behälter oder der genannten Packung aufweist, wobei Mittel (30) zum Abschneiden des Trimmerfadens (2) vorgesehen sind, wenn eine vorbestimmte Länge in den genannten Behälter oder die genannte Packung (10) eingebracht ist, wobei das genannte Führungsmittel Zuführrohre oder Nadeln (22, 28) aufweist, von denen eins/eine über und eins/eine unter den genannten Transporträdern (24, 26) angeordnet ist, wobei der Trimmerfaden nacheinander in das obere Rohr oder die obere Nadel (22) und dann in das untere Rohr oder die untere Nadel (28) eingebracht wird, aus dem/der er durch das Loch oder die Öffnung (10A) in den geschlossenen Behälter oder die geschlossene Packung (10) eingebracht wird, **dadurch gekennzeichnet, dass** das genannte untere Rohr oder die genannte untere Nadel (28) axial und zu dem genannten oberen Rohr oder der genannten oberen Nadel (22), den genannten Transporträdern (24, 26) und dem genannten geschlossenen Behälter oder der genannten geschlossenen Packung (10) hin und von diesen weg bewegbar ist, um so Variation des Abstands zwischen einem unteren Ende des genannten unteren Rohrs oder der genannten unteren Nadel (28) und den genannten Transporträdern (24, 26) und dem genannten Behälter oder der genannten Packung (10) zu ermöglichen.
2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** mindestens eins der genannten Transporträder (24) positiv angetrieben wird.
3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** das andere der genannten Transporträder (26) so federbelastet ist, dass es in Richtung auf das genannte angetriebene Transportrad (24) vorgespannt wird.
4. Vorrichtung nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** das untere Rohr oder die untere Nadel (28) oder ein Teil desselben/derselben in Bezug zu dem genannten Behälter oder der genannten Packung (10) um seine/ihre Achse rotiert werden kann.
5. Vorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** das untere Rohr oder die untere Nadel (28) mit einem aufgeweiteten unteren Ende versehen ist, um den Trimmerfaden (2) besser in den genannten Behälter oder die genannte Packung (10) einzubringen.
6. Vorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** Schneidmittel (30) in dichter Nähe zu dem unteren Ende des unteren Rohrs oder der unteren Nadel (28) angeordnet sind, um den Trimmerfaden (2) abzuschneiden, wenn eine vorbestimmte Länge desselben in den genannten Behälter oder die genannte Packung (10) eingebracht wurde.
7. Vorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** die genannten Schneidmittel (30) pneumatisch betätigt werden.
8. Vorrichtung nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** der genannte geschlossene Behälter oder die genannte geschlossene Packung (10) an einer Fördereinrichtung (12) angebracht ist, die in Bezug zu den genannten Rohren oder Nadeln (22, 28) so bewegbar ist, um Bewegung des Behälters oder der Packung (10) in und aus einer Position unter den genannten Rohren oder Nadeln (22, 28) zu ermöglichen.
9. Vorrichtung nach einem der Ansprüche 1 bis 8, die eine Steuer- oder Programmeinheit (52) zum Steuern, unter anderem, der Länge von dem genannten geschlossenen Behälter oder der genannten geschlossenen Packung (10) zuzuführendem Trimmerfaden (2), der Zuführungsgeschwindigkeit des genannten Trimmerfadens (2) zu dem genannten geschlossenen Behälter oder der genannten geschlossenen Packung (10), und der Anzahl von Behältern oder Packungen (10) einschließt, die mit Trimmerfaden gefüllt werden.
10. Verfahren zum Verpacken eines Trimmerfadens, das die Schritte einschließt, einen geschlossenen Behälter oder eine geschlossene Packung (10) unter einer Fadenfüllstation zu positionieren, ein unteres Rohr oder eine untere Nadel (28) zu der erforderlichen Position in Bezug zu dem genannten Behälter oder der genannten Packung (10) und zu Transporträdern (24, 26) für den Faden abzusenken, eine benötigte Länge von Faden (2) durch ein oberes Zuführrohr oder eine obere Zuführröhre (22) und von dort durch das genannte untere Zuführrohr oder die genannte untere Zuführröhre (28) in den genannten geschlossenen Behälter oder die genannte geschlossene Packung (10) durch ein Loch oder eine Öffnung (10A) darin einzubringen, das genannte untere Rohr oder die genannte untere Nadel (28) zurückzuziehen, den Trimmerfaden (2) so abzuschneiden, dass ein Teil des genannten Trimmerfadens (2) aus dem genannten Behälter oder der genannten Packung (10) vorsteht, und danach den gefüllten Behälter oder die gefüllte Packung (10) einzubringen.

kung (10) von der genannten Füllstation weg zu bewegen und gleichzeitig einen weiteren geschlossenen Behälter oder eine weitere geschlossene Pakkung (10) unter der genannten Füllstation zu positionieren.

Revendications

1. Appareil servant à effectuer le conditionnement d'une ligne de taillage, comprenant des roues de pincement (24, 26) pour faire passer une longueur de ligne de taillage (2) à partir d'une source d'alimentation (4) dans des moyens de guidage (22, 28) et de là dans un contenant ou un emballage fermé (10) à travers un trou ou une ouverture (10A) pratiqué dans ledit contenant ou emballage, des moyens (30) étant prévus pour sectionner la ligne de taillage (2) lorsqu'une longueur prédéterminée a été mise dans ledit contenant ou emballage (10), lesdits moyens de guide comportant des tubulures ou des aiguilles d'alimentation (22, 28) qui sont positionnées de manière à ce que l'une se trouve au-dessus et l'autre au-dessous desdites roues de pincement (24, 26), la ligne de taillage passant de façon séquentielle dans la tubulure ou l'aiguille supérieure (22) et puis dans la tubulure ou l'aiguille inférieure (28), à partir de laquelle elle est amenée dans ledit contenant ou emballage fermé (10) à travers le trou ou l'ouverture (10A), **caractérisé en ce que** ladite tubulure ou aiguille inférieure (28) peut être déplacée dans le plan axial et peut se rapprocher et s'éloigner de ladite tubulure ou aiguille supérieure (22), desdites roues de pincement (24, 26) et dudit contenant ou emballage fermé (10), pour qu'il soit possible de faire varier la distance entre une extrémité inférieure de ladite tubulure ou aiguille inférieure (28) et lesdites roues de pincement (24, 26) et ledit contenant ou emballage (10).
2. Appareil, selon la revendication 1, **caractérisé en ce que** l'une au moins desdites roues de pincement (24) a un entraînement positif.
3. Appareil, selon la revendication 2, **caractérisé en ce que** l'autre desdites roues de pincement (26) est chargée par ressort de sorte qu'elle soit poussée vers ladite roue de pincement entraînée (24).
4. Appareil, selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** la tubulure ou l'aiguille inférieure (28), ou une section de celle-ci, peut être tournée autour de son axe par rapport audit contenant ou emballage (10).
5. Appareil, selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la tubulure ou l'aiguille inférieure (28) est pourvue d'une extrémité

inférieure évasée afin de mieux faire passer la ligne de taillage (2) dans ledit contenant ou emballage (10).

6. Appareil, selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** les moyens de sectionnement (30) sont positionnés à proximité immédiate de l'extrémité inférieure de la tubulure ou de l'aiguille inférieure (28) afin de sectionner la ligne de taillage (2) lorsqu'une longueur prédéterminée de celle-ci a été mise dans ledit contenant ou emballage (10).
7. Appareil, selon la revendication 6, **caractérisé en ce que** lesdits moyens de sectionnement (30) ont un fonctionnement pneumatique.
8. Appareil, selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** ledit contenant ou emballage fermé (10) est monté sur un convoyeur (12) qui est mobile par rapport auxdites tubulures ou aiguilles (22, 28) de sorte que le contenant ou l'emballage (10) puisse être déplacé vers un emplacement situé sous lesdites tubulures ou aiguilles (22, 28), et puisse être déplacé à partir de celui-ci.
9. Appareil, selon l'une quelconque des revendications 1 à 8, comprenant une unité de commande ou de programmation (52) qui est utilisée pour commander, entre autres, la longueur de la ligne de taillage (2) destinée à être acheminée vers ledit contenant ou emballage fermé (10), ainsi que la vitesse d'acheminement de ladite ligne de taillage (2) vers ledit contenant ou emballage fermé (10) et le nombre de contenants ou d'emballages (10) remplis d'une ligne de taillage.
10. Procédé servant à effectuer le conditionnement d'une ligne de taillage, comprenant les étapes consistant à positionner un contenant ou emballage fermé (10) sous un poste de remplissage de ligne, à abaisser une tubulure ou aiguille inférieure (28) vers la position requise par rapport audit contenant ou emballage (10) et aux roues de pincement (24, 26) pour la ligne, à acheminer une longueur de ligne (2) requise à travers une tubulure ou aiguille d'alimentation supérieure (22) et de là à travers ladite tubulure ou aiguille d'alimentation inférieure (28) jusque dans ledit contenant ou emballage fermé (10) à travers un trou ou une ouverture (10A) qui y est pratiqué, à rétracter ladite tubulure ou aiguille inférieure (28), à sectionner la ligne de taillage (2) de sorte à laisser dépasser une partie de ladite ligne de taillage (2) hors dudit contenant ou emballage (10), et ensuite à déplacer le contenant ou l'emballage rempli (10) afin de l'éloigner dudit poste de remplissage et à positionner simultanément un

autre contenant ou emballage fermé (10) sous ledit
poste de remplissage.

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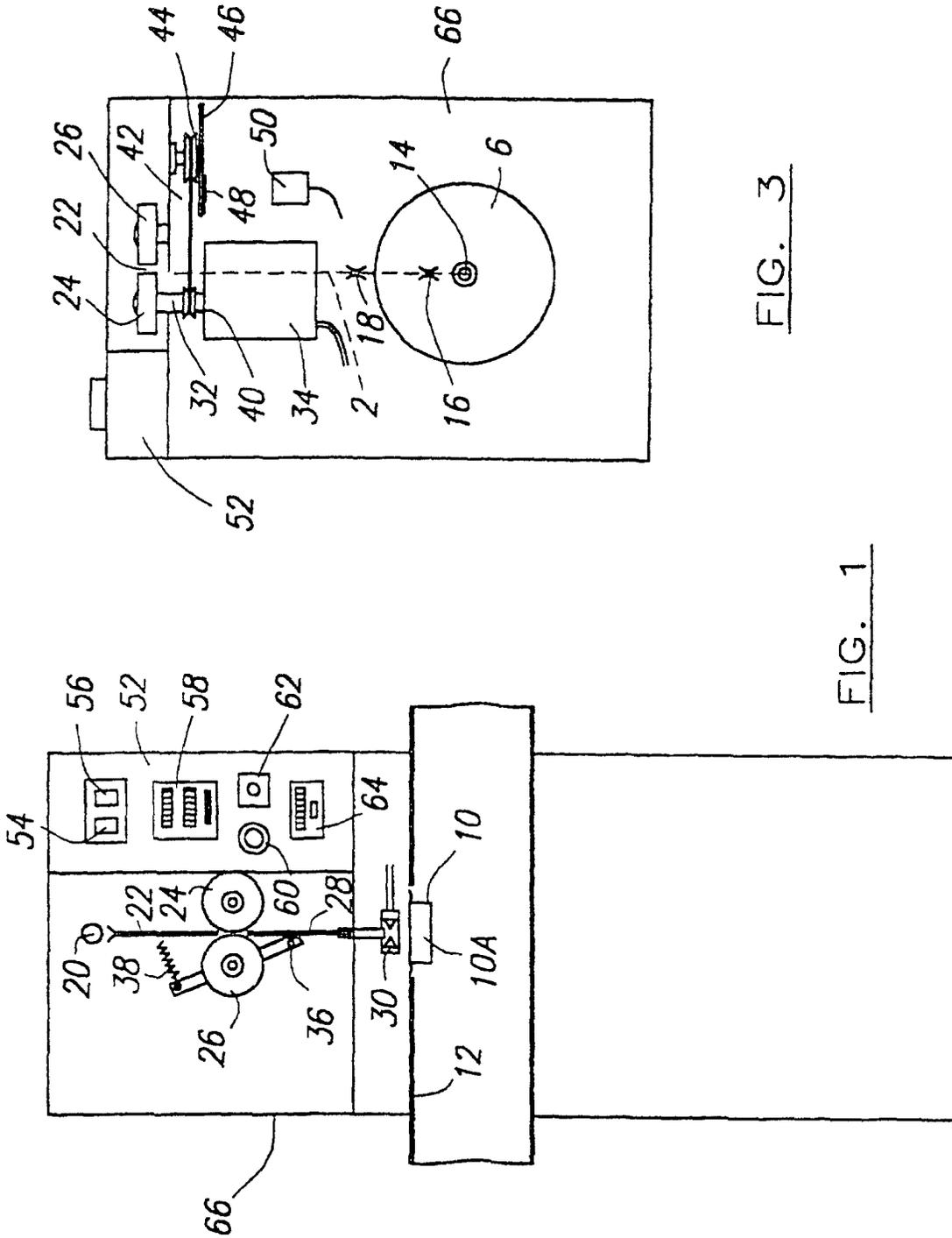


FIG. 1

FIG. 3

