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54 **MACHINE AND METHOD FOR IMPRESSING RELEASABLE FOIL ON TO A MOVING WEB.**

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Description

This invention relates to the transfer of foil from a carrier to a moving web such as a web of paper by means of impression dies and particularly concerns the transfer of foil in the form of a device or discontinuous pattern on to bank notes or other security documents which are preprinted on a moving web.

It is generally known to impress thermally releasable foil from a carrier on to paper. The process requires an impression die, which may be mounted within or form part of a heated platen, which may be in cylindrical form, the foil, which is typically a metal foil carried on a substrate from which it can be released by the application of heat and pressure, and a means for applying pressure to the paper so that the foil released from the carrier is transferred on to the paper. The particular characteristics of the material employed in such a technique are not important to the present invention, which may in general be applied to any form of foil which can be transferred on to paper in the manner described: such foils include holograms, diffraction gratings and various thin film devices as well as metallic foils. The web may consist of other materials such as polyesters.

The technique mentioned requires the application of heat and/or pressure for a substantial time dependent upon the heat and/or pressure employed. The foil, the die and the paper must be relatively stationary for a significant period of time required to ensure that the foil is released from the carrier and is securely impressed on the sheet of paper. It is accordingly comparatively easy to impress foil using such a technique on to documents which are presented in cut sheet form.

The present invention however concerns the transfer of foil on to a moving web which may be of paper or other materials such as polyesters. For example, it is common to print bank notes or other security documents on a web which moves at approximately 75 metres per minute, and it is inherently difficult to ensure that the various elements remain relatively stationary for the period of time necessary for transfer of the foil.

A natural solution to the problem is to entrain the foil to move in the same direction as the web, for example by providing a cylindrical platen including a die and moving the foil carrier in synchronism with the web around the platen and applying pressure to the web while the foil carrier is disposed between the die and the web. Such an arrangement as for example known from US-A-3 584 572 can be made to operate satisfactorily for the purpose of transferring foil on to the web. However, such a technique is unsatisfactory for transfers of separate devices because the devices

are spaced apart at least by the distance between successive documents on the paper and accordingly such a technique is very wasteful of foil, and is expensive at least in terms of the waste of time associated with the changing of spools of foil.

The present invention aims generally to provide a compact and versatile machine in which, at least in preferred forms, there is a substantial economy in the use of foil. However the invention includes further improvements which will become apparent from the following description.

Summary of the Invention

The invention is based on the transfer of foil from a carrier tape to a moving web by pressing the web against a die which may be carried in a rotating cylinder, the foil carrier being fed between the die and the web and being transported between successive transfers in a direction generally transverse to the movement of the web.

The important advantages of this technique are that the transporting of the foil carrier is not constrained by the movement of the web and it is possible to achieve a much greater economy in the use of the foil.

In particular, several dies may be carried on a cylinder which is rotated in synchronism with the movement of the web and the tape may be transported in a direction which is inclined relative to the direction in which the dies are spaced apart so that different dies transfer foil from regions which are spaced apart both along and across the strip and preferably, in a row aligned obliquely to the strip. Thus the tape may be transported through a comparatively short distance between transfer operations and the wastage can be substantially reduced. The foregoing technique is particularly suitable for impressing one device on each of a multiplicity of bank notes or security documents which are preprinted on the web in a multiplicity of rows or columns spaced apart across the width of the web.

Pressure may be applied to the web by means of a pressure roller or band which moves in correspondence with the movement of the web. The band or roller may be driven but may idle in engagement with the cylinder. In particular, a band may be carried between rollers or gears which tension the band and drive it so that it remains stationary relative to the paper in the region where the band extends around the said cylinder. The said roller or band may also enable the printing cylinder to be driven by the web by virtue of the friction between the paper and the cylinder.

According to one aspect of the invention there is provided: apparatus for transferring foil from a carrier tape to a moving web comprising a rotatable

cylinder including at least one die, means for traversing the web around the cylinder, means rotatable with the cylinder for transporting the tape generally lengthwise of the cylinder and over the position of the die, and means for applying pressure to the web.

The means for transporting the tape may comprise a supply mechanism and a take-up mechanism which are carried on an assembly which rotates with the said cylinder.

The supply mechanism may comprise a spool and means such as a brake for maintaining tension in the tape, and the take up mechanism may comprise a spool which includes or is associated with means operable to index the tape for a predetermined longitudinal movement each time the take-up mechanism passes through at least one predetermined position in an angular sense of rotation of the rotating cylinder. For example, there may be provided a circular track engaged by a follower which is actuated by cam action to operate a pawl and thereby cause an incremental movement of the tape.

As mentioned hereto, the rotatable cylinder may include a set of impression dies spaced apart along a line which extends generally axially of the rotating cylinder, and the means for transporting the tape may include means for guiding the carrier in a direction such that the impression dies engage the tape from locations which are spaced both longitudinally along and transversely across the tape. There may be a plurality of sets of such dies, angularly spaced around the cylinder: each set is preferably associated with a corresponding transport mechanism for transporting foil past the respective set of dies.

Description of the Drawings

Figure 1 is a general view of a foil transfer machine, showing mainly the path of a web and the various rollers and drive mechanism;
 Figure 2 illustrates a printing cylinder and associated foil transporting mechanism;
 Figure 3 illustrates a tape take-up reel assembly;
 Figure 4 illustrates a tape supply reel assembly;
 Figure 5 illustrates part of the take-up assembly;
 Figure 6 illustrates a further detail of the printing cylinder;
 Figure 7 illustrates a section through part of the printing cylinder;
 Figure 8 is another view of the part illustrated by Figure 7;
 Figure 9 illustrates the region of a die in greater detail;
 Figure 10 is another view of the region illustrated by Figure 9; and

Figure 11 illustrates a section through the take-up assembly.

Detailed Description

The following description is a description of a suitable embodiment of a foil transfer unit which is intended for transferring foil in small devices or patterns on to particular areas of a moving web of paper. The invention is intended for use in the production of impressed foil devices on bank notes or other security documents though the invention may have utility in other contexts.

The general technique for transferring foil, sometimes known as "blocking", is well known. It requires a heated die which may for example be mounted in a heated platen, and a thermally transferable foil, which is normally a metal lamina secured releasably to a substrate. Pressing paper against the die, the foil with its substrate being interposed, for a period of time which depends upon the temperature and pressure, is sufficient to transfer the foil from the substrate to the paper in the pattern determined by the die.

It is, as remarked previously, necessary for the successful transfer of foil to ensure that the die, the carrier (i.e. a tape) and the paper are relatively stationary for a substantial period of time. Normally a fourth element, a means of applying pressure to the back of the paper, has to be stationary relative to the other elements as well. It is known and not difficult to effect foil transfer from dies of any particular size or shape on to a sheet of paper which may be kept stationary for the period of time necessary for the transfer of foil.

Bank notes and other security documents are made by two generally different types of machine. The documents can be printed on sheets or they may be printed on to a web. At some stage a web is cut up into sheets but normally there is a distinction between a cut sheet machine and a web machine. In a cut sheet machine most of the printing processes are performed on the separate sheets on which there is normally an array of bank notes or other security documents. In a web machine almost all the processing and printing is performed on a moving paper web. It is for the latter type of machine that the present invention is particularly intended. Typically the documents are printed several rows wide and the web of paper moves continuously through a multiplicity of stages which are required for the printing of a bank note or other security document. A web machine of this general character is of known construction and will not be described herein. For the purposes of the present invention it is only important to understand that the web of paper which traverses the foil transfer unit is normally in continuous motion, typi-

cally at about 75 metres per minute.

Figure 1 illustrates the path of a paper web through one embodiment of a foil transfer unit according to the invention. Figure 1 shows mainly the web, the rollers over which it passes, and in

general schematic form, the drive arrangement for the rollers.

An arrow 1 shows the direction of movement of a web 2 of paper entering the foiling unit near the bottom thereof. The web passes over a fixed roller 3, a dancing roller 4, a fixed roller 5 and an additional fixed roller 6. The dancing roller 4 is mounted on an arm 7 disposed on a pivot 8 mounted on support 9. Means in customary form may be provided for measuring the angular position of the arm 7. The arm 7 and its roller 4 constitute a tension arm, the angular position of which depends upon the loop of web formed between the rollers 3 and 5. The rate of change of the length of this loop depends on the difference between the speed of the web entering the foiling unit and the speed of a roller 13 which pulls the web into the foiling unit and may be used to control the speed of the web. After leaving the roller 6 the web passes over a steering unit comprising a roller 10 and a roller 10a which are mounted one at each end of a pivoted chassis 11 which can be rotated about a vertical axis so as to maintain the correct lateral position of the web within the foiling unit.

From the steering unit the web passes around a roller 12 and then a draw roller 13, which is driven by means later described from a motor 26. From the draw roller 13 the web passes over a fixed roller 14, and then to an input guide wheel 15 disposed at one end of a circumferential path, in this example a semicircular path 16, extending around a printing cylinder 17. The end of the path is defined by a second guide wheel 18 around which the web passes, proceeding thence to a roller 19. The web, shown at 2a, leaves the unit near the top of the machine.

Associated with the draw roller 13 is a larger wheel 13a which is connected by a flexible drive coupling 20 to a wheel 21 which is in fixed rotational relationship with a larger wheel 22 linked by a flexible drive coupling 23 to a wheel 24. The coupling 23 is tensioned by jockey wheel 25. The wheel 24 is driven differentially relative to a wheel 24a by a variable ratio derived from a gearbox through which wheels 24 and 24a are coaxially connected. The purpose of this mechanism, which varies the speed of the draw roller 13 relative to the impression cylinder 17, is to synchronise the pitch of the preprinted web 2 to the pitch of impression dies on the printing cylinder 17. The angular position of the cylinder 17 is monitored by an encoder, and the position of the preprinted web coming off draw roller 13 is monitored using an

optical sensor. An error in the web's position relative to the correct position is used to cause a change in the gearbox ratio. This results in a change in tension in the web between the draw roll and the printing cylinder in a sense to eliminate the error. For convenience this mechanism, which is in generally known form, is not illustrated in Figure 1. The wheel 24a is linked by means of a flexible drive coupling 27 to a wheel 26 driven by the output shaft of a motor M, a wheel 28, and two wheels 29 and 30 which tension the coupling 27. The wheel 28 rotates with a pinion 31 which meshes with a pinion 32 that is fixed to rotate with a wheel 33.

The printing cylinder 17 is driven, in this embodiment, by at least one band and preferably at least two bands 34, 37 which may apply pressure on the rear of the paper so as to urge the paper against the dies which are carried by the printing cylinder, as will be described later. The belt 34 is driven by the wheel 33, and passes over the roller 18, around the path 16, over the roller 15, around a tensioning roller 35 which is mounted on a moveable carriage 36 which is adjustable to alter the tension in the band 34. Another drive and tensioning belt 37 is also carried on the roller 33, at a position axially displaced from the belt 34, and passes over roller 18, around path 16, over roller 15 and over roller 38 which is mounted on carriage 39, which is adjustable to adjust the tension in the band 37.

The bands 34 and 37 may each be called an impression band because they serve to urge the web towards the cylinder in the manner of an impression roll which presses a sheet of paper against a printing cylinder. The bands 34 and 37 are preferably made of a synthetic rubber or plastics material. They may each have a flat, smooth surface on the side which is to face the cylinder 17 and each may have its rear face formed as a toothed rack engaging co-operating gear teeth on the associated wheels so that the bands 34 and 37 are driven without slip.

Alternatively, pressure may be applied to the web where it passes over a die by a roller fitted in place of roller 15. Such a pressure roller may either be an idler or be driven.

Figure 1 also shows diagrammatically a tape supply cassette assembly 49 which is mounted to rotate with the printing cylinder 17. Also mounted for rotation with the printing cylinder is a take-up assembly, described with reference to Figures 3 and 5.

Figure 2 illustrates one embodiment of a printing cylinder 17. This cylinder includes in this example a set of dies 51, 52 and 53. These dies are in this embodiment aligned along an axis which extends parallel to the axis of the printing cylinder.

Each die can be held in a forward or impression position by a conical cam, the retraction of which allows the dies to retract under the action of return springs, to be described later.

Typically, there may be a multiplicity of sets of dies spaced apart around the printing cylinder which may correspond in circumferential extent to an integral number of lengths of preprinted sheets, including the spacing therebetween, on the web.

As indicated in the foregoing, the web of paper is wrapped around a substantial angle of the printing cylinder. The printing cylinder is driven in synchronism with the web of paper so that each row of dies is brought into register with the locations on the documents in a particular row where it is desired to produce the foil devices. Since the printing cylinder and the paper web are driven synchronously, the paper will be stationary relative to the dies and the impression bands over a substantial angle of movement of the printing cylinder.

Carried at one side of the printing cylinder is a cassette assembly 42 including a spool 43 which takes up the foil transfer tape 48. The tape is aligned in a direction which is inclined relative to the line 54 along which the dies 51, 52 and 53 are disposed. The width of the tape should be such that all the dies in a given set can engage the carrier tape at the same time.

In order to control the longitudinal transport or indexing of the tape 48 there is a circular track 45, of which only a small segment is shown in Figure 2. This track 45 is coaxial with the axis of rotation of the printing cylinder 17 and is engaged by a roller follower 46 mounted on a lever 47. The track is shaped to cause movement of the lever 47, and thereby indexing of the ratchet wheel and incremental transport of the tape 48 at some suitable time when the tape and dies are not in proximity to the web, that is to say at some point in the semicircular arc opposite the path 16.

Figures 3, 5 and 11 show the take-up assembly 42 in greater detail.

A cassette 58 is mounted on a holder 57. The spool 43 is associated with two pinch rollers 44 and 55, there being a small entrance guide roller 56 round which the tape enters the drive system from an elongate guide 59 connecting the supply and take-up assemblies and serving to guide the tape 48 between the printing cylinder and the web. This guide is described later with reference to Figures 7 to 10.

As is shown in Figures 5 and 11, the roller 44 rotates with a coaxial ratchet wheel 63, which is controlled by a pawl 64 mounted by a pivot 67 on the arm 47. The ratchet wheel is adjacent a pulley wheel 63a. The adjacent side faces of the ratchet wheel 63 and the wheel 63a are in frictional engagement. The wheel 63a is coupled by means of

a flexible band 65 to a wheel 66 which is mounted on the axis of the spool 43. This arrangement forms a slipping drive to maintain foil tension on the take-up spool. Each lifting of the follower 46 rocks the lever 47 about its pivot 47a (shown diagrammatically in Figure 5) and causes the pawl to push the ratchet wheel 63 and accordingly to produce one increment of longitudinal movement of the tape 48.

Referring now to Figures 7 and 8, the guide 59 has a shallow, inverted U section. The guide fits into an oblique slot 100 in the cylinder 17 and is held in place by tabs 101 held by screws 102 and extending over the margins 103 of the guide 59. For most of its travel adjacent the cylinder 17 the tape passes through the narrow passageway 104 between the underside of the guide 59 and the bottom 105 of the slot 100.

Figure 4 illustrates schematically a tape supply mechanism 49. This comprises a spool 50 which is mounted in a cassette 60 disposed in a holder 61. The tape 48 is wound off the tape supply spool, passes round a small guide roller 62 and is pulled, by the take-up reel mechanism previously described, along and adjacent the guide 59. The spool 50 preferably includes a brake to maintain tension in the tape.

Figure 6 is a simplified sectional view of the printing cylinder 17. The cylinder is mounted on two half shafts 68 and 69, which rotate on bearings 70 and 71 respectively. Each tape take-up assembly 42 is mounted on the half shaft 69 and is located by means of a spigot 72 engaging an aperture 73 in the adjacent end plate 74 of the cylinder 17. Likewise each tape supply assembly 49 is mounted on the half shaft 68 and is located in position by means of a spigot 75 engaging an aperture 76 in the adjacent end plate 77 of the cylinder 17.

The cylinder 17 includes as previously mentioned at least one row of retractable dies although in practice there are a plurality (e.g. twelve) of rows of dies each associated with a tape supply assembly and a take-up assembly. For convenience only one die is shown in Figure 6. The region of the die 53 is illustrated in greater detail in Figures 9 and 10.

Figure 9 is a sectional view of the die assembly in a plane lengthwise of the guide 59 and Figure 10 is a view in a plane transversely of the guide 59.

As is shown in Figures 9 and 10, a die assembly is mounted in the peripheral wall 78 of the cylinder 17. The wall has a circular aperture 79 which includes an internal annular shoulder 80. A body 81 has a tubular part 82 which fits into the aperture 79 and an annular flange 83 which abuts the shoulder 80. The flange may be secured to the

wall 78 by means of at least one bolt 84. Slidable within the body is a plunger 85 which has a central bore through which a fixing screw 86 secures the die 53 at the outer end of the plunger 85. The plunger is biased to a retracted position by means of a helical compression spring 87 between the plunger and the flange 83. The inner face 88 of the plunger 85 is shaped to conform to a respective conical cam 90 (Figure 6).

The die 53 comprises a flanged bush 110 which is held within the plunger 85 by means of the screw 86 and a die plate 111 secured to the flange of the bush 110 by rivets 112 (Figure 9).

As mentioned previously, the tape 48 passes underneath the guide 59. Around the die 53 the guide 59 has a window 113 defined by two tapered portions 114, 115 of the guide. This window enables the web to be pressed against the tape and the die by the respective impression band or roller. In the space under the tapering portions 114, 115 is a guide 116 in the form of a bridge. This is apertured to accommodate the die 53. The guide 116 serves to guide the tape from the passageway to a position approximately flush with the outer surface of the guide 59 so that the tape is close to the paper and is guided as not to be fouled by the die. The guide 116 is fixed to the floor of the slot 100 by a fixing screw (not shown).

As is shown in Figure 6, within the half shafts 68 and 69 is a hollow shaft 91 which carries the conical cams 90, 90a and 90b. Each cam actuates a respective die or dies by engagement with the face 88 of the respective plunger. The shaft 91 is mounted for rotation on bearings 92, 92a and can be moved axially by means of a spigot 93 which is operable by a pneumatic assembly 94 of any suitable form.

The assembly 94 may be deactuated to allow the dies to retract when cylinder rotation stops, because heated dies need to be retracted when the cylinder is not rotating to prevent heated dies being in continuous pressurized contact with the web or the impression belt.

Heat for the dies may be provided by electrical heaters 95 each clamped to one of the conical cams, as shown for cam 90, the heaters being supplied with electrical current by way of slip rings (not shown).

Claims

1. A method of transferring foil from a carrier (48) to a moving web (2) by pressing the web against a die, the foil carrier being fed between the die and the web, and the die being moved in synchronism with the web, characterized in that and the foil carrier is transported between successive transfers in a direction generally

transverse to the movement of the web.

2. A method according to claim 1 in which the die is carried in a rotatable cylinder (17) around which the web has a substantial angle of wrap.
3. A method according to claim 1 or claim 2 in which the web is pressed against the die by means of a continuous impression band (34, 37) extending around the rotatable cylinder.
4. A method according to any foregoing claim wherein a multiplicity of transfers are made at the same time by means of a respective plurality of dies (51, 52, 53) arranged in a line extending along the rotatable cylinder and wherein the foil carrier is transported obliquely relative to a line along which the dies extend.
5. A method according to any foregoing claim in which the die is heated.
6. A method according to any foregoing claim in which the web is a paper web.
7. Apparatus for transferring foil from a carrier tape (48) to a moving web (2), characterized by a rotatable cylinder (17) including at least one die, means (15, 18) for traversing the web around the cylinder, means (42, 49) rotatable with the cylinder for transporting the tape generally lengthwise of the cylinder and over the position of the die, and means (34, 37) for applying pressure to the web.
8. Apparatus according to claim 7 in which the means for transporting the tape comprises a supply mechanism (49) and a take-up mechanism (42) which are carried on an assembly (68, 69) rotatable with the cylinder.
9. Apparatus according to claim 8 in which the supply mechanism comprises a spool (50) including means for maintaining tension in the tape and the take-up mechanism comprises a spool (43) which includes or is associated with means (45, 46, 47) operable to index the tape for a predetermined longitudinal movement each time the take-up means passes through a predetermined position in the rotation of the cylinder.
10. Apparatus according to any of claims 7 to 9 in which the rotatable cylinder includes a plurality of impression dies (51, 52, 53) spaced apart along a line which extends generally axially of the rotating cylinder and the means for transporting the tape includes means (59) for guid-

ing the tape in a direction such that the impression dies engage the tape along a line oblique to the length thereof.

11. Apparatus according to claim 10 further comprising a shaft (91) extending axially of the rotary cylinder, means for moving said shaft in an axial direction relative to the cylinder and, for each die, a conical cam (90) coaxial with and moveable with the shaft, the respective die being advanceable and retractable relative to the cylinder and having a support including a follower (85) co-operative with the cam surface. 5
12. Apparatus according to any of claims 7 to 11 and including electrical heaters within the cylinder. 10
13. Apparatus according to any of claims 7 to 12 in which the means for applying pressure to the web comprises a flexible band (34, 37), mounted for longitudinal movement between at least two wheels (15, 18) which define for the band a substantial angle of wrap around the cylinder, and means (35, 36, 38, 39) for tensioning the band. 20
14. Apparatus according to any of claims 7 to 12 in which the means for applying pressure to the web comprises a pressure roller. 25

Patentansprüche

1. Verfahren zum Übertragen einer Folie von einem Träger (48) auf eine sich bewegende Bahn (2) durch Pressen der Bahn gegen einen Stempel, wobei der Folienträger zwischen den Stempel und die Bahn zugeführt wird und der Stempel synchron mit der Bahn bewegt wird, dadurch gekennzeichnet, daß der Folienträger zwischen aufeinanderfolgenden Übertragungen in einer Richtung im wesentlichen quer zur Bewegung der Bahn transportiert wird. 35
2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Stempel in einem drehbaren Zylinder (17) aufgenommen ist, um den die Bahn einen beträchtlichen Umschlingungswinkel aufweist. 40
3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Bahn mittels eines durchgehenden Andruckbandes (34,37), das sich um den drehbaren Zylinder erstreckt, gegen den Stempel gepreßt wird. 45
4. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß mittels 50

einer entsprechenden Mehrzahl von Stempeln (51, 52, 53), die in einer sich um den drehbaren Zylinder erstreckenden Reihe angeordnet sind, gleichzeitig eine Mehrzahl von Übertragungen durchgeführt wird, und daß der Folienträger schräg zu einer Linie transportiert wird, entlang derer sich die Stempel erstrecken.

5. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Stempel beheizt ist. 10
6. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Bahn eine Papierbahn ist. 15
7. Vorrichtung zum Übertragen von Folie von einem Trägerband (48) auf eine sich bewegende Bahn (2), gekennzeichnet durch einen drehbaren Zylinder (17), der wenigstens einen Stempel umfaßt, Mittel (15, 18) zum Führen der Bahn um und über den Zylinder, mit dem Zylinder drehbare Mittel (42, 49) zum Transportieren des Bandes im wesentlichen in Längsrichtung des Zylinders und über die Position des Stempels und Mittel (34, 37) zum Aufbringen von Druck auf die Bahn. 20
8. Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, daß die Mittel zum Transportieren des Bandes einen Zuführmechanismus (49) und einen Aufnahmemechanismus (42) umfassen, die auf einer mit dem Zylinder drehbaren Baugruppe (68, 69) gelagert sind. 25
9. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß der Zuführmechanismus eine Spule (50) mit Mitteln zum Aufrechterhalten von Spannung in dem Band umfaßt und der Aufnahmemechanismus eine Spule (43) umfaßt, die Mittel (45, 46, 47) enthält oder mit ihnen in Verbindung steht, die betätigbar sind, um das Band jedesmal schrittweise um eine vorbestimmte Längsbewegung weiterzuschalten, wenn das Aufnahmemittel eine vorbestimmte Position in der Drehung des Zylinders durchläuft. 30
10. Vorrichtung nach einem der Ansprüche 7 bis 9, dadurch gekennzeichnet, daß der drehbare Zylinder eine Mehrzahl von Abdruckstempeln (52, 52, 53) umfaßt, die entlang einer Linie voneinander beabstandet sind, die sich im wesentlichen axial des sich drehenden Zylinder erstreckt, und daß die Mittel zum Transportieren des Bandes Mittel (59) zum Führen des Bandes in eine solche Richtung umfassen, daß die Abdruckstempel an dem Band in einer 35

schräg zu dessen Länge verlaufenden Linie angreifen.

11. Vorrichtung nach Anspruch 10, dadurch gekennzeichnet, daß sie außerdem eine sich axial des Drehzylinders erstreckende Welle (91), Mittel zum Bewegen dieser Welle in einer bezüglich des Zylinders axialen Richtung und, für jeden Stempel, einen konischen, mit der Welle koaxialen und mit dieser beweglichen Nocken (90) umfaßt, wobei der entsprechende Stempel bezüglich des Zylinders vorschieb- und zurückziehbar ist und eine Lagerung aufweist, die ein Nockenfolgeelement (85) aufweist, das mit der Oberfläche des Nockens zusammenwirkt. 5 10
12. Vorrichtung nach einem der Ansprüche 7 bis 11, gekennzeichnet durch elektrische Heizelemente im Inneren des Zylinders. 15
13. Vorrichtung nach einem der Ansprüche 7 bis 12, dadurch gekennzeichnet, daß die Mittel zum Aufbringen von Druck auf die Bahn ein flexibles Band (34, 37), das für eine Längsbewegung zwischen mindestens zwei für das Band einen beträchtlichen Umschlingungswinkel um den Zylinder definierenden Rädern (15, 18) montiert ist, und Mittel (35, 36, 38, 39) zum Spannen des Bandes umfassen. 20 25
14. Vorrichtung nach einem der Ansprüche 7 bis 12, dadurch gekennzeichnet, daß die Mittel zum Aufbringen von Druck auf die Bahn eine Druckrolle umfassen. 30

Revendications

1. Procédé de transfert de feuille sur une bande en déplacement (2) à partir d'un support (48), par pressage de la bande contre une matrice, le support de feuille étant alimenté entre la matrice et la bande et la matrice étant déplacée en synchronisme avec la bande, caractérisé en ce que le support de feuille est transporté entre des transferts successifs dans une direction généralement transversale au mouvement de la bande. 40 45
2. Procédé suivant la revendication 1, caractérisé en ce que la matrice est supportée dans un cylindre rotatif (17) autour duquel la bande présente un angle d'enroulement important. 50
3. Procédé suivant l'une des revendications 1 et 2, caractérisé en ce que la bande est pressée contre la matrice au moyen d'une bande d'impression continue (34, 37) s'étendant autour du cylindre rotatif. 55

4. Procédé suivant l'une quelconque des revendications précédentes, caractérisé en ce qu'une multiplicité de transferts sont réalisés en même temps au moyen d'un grand nombre correspondant de matrices (51, 52, 53) agencées suivant une ligne s'étendant le long du cylindre rotatif et en ce que le support de feuille est transporté en oblique par rapport à une ligne le long de laquelle les matrices s'étendent.
5. Procédé suivant l'une quelconque des revendications précédentes, caractérisé en ce que la matrice est chauffée.
6. Procédé suivant l'une quelconque des revendications précédentes, caractérisé en ce que la bande est une bande de papier.
7. Dispositif de transfert de feuille depuis un ruban de support (48) à une bande en déplacement (2), caractérisé par un cylindre rotatif (17) comprenant au moins une matrice, des moyens (15, 18) pour faire passer la bande autour du cylindre, des moyens (42, 49) capables de tourner avec le cylindre pour transporter le ruban d'une manière générale longitudinalement au cylindre et sur la position de la matrice, et des moyens (34, 37) pour appliquer une pression à la bande. 20 25 30
8. Dispositif suivant la revendication 7, caractérisé en ce que les moyens pour transporter le ruban comprennent un mécanisme d'alimentation (49) et un mécanisme d'enroulement (42) qui sont supportés sur une unité (68, 69) capable de tourner avec le cylindre. 35
9. Dispositif suivant la revendication 8, caractérisé en ce que le mécanisme d'alimentation comprend une bobine (50) comportant des moyens pour maintenir une tension dans le ruban et en ce que le mécanisme d'enroulement comprend une bobine (43) qui comporte ou est associée à des moyens (45, 46, 47) capables de fonctionner pour avancer le ruban d'un mouvement longitudinal prédéterminé chaque fois que le moyen d'enroulement passe par une position prédéterminée dans la rotation du cylindre.
10. Dispositif suivant l'une quelconque des revendications 7 à 9, caractérisé en ce que le cylindre rotatif comprend plusieurs matrices d'impression (51, 52, 53) espacées le long d'une ligne qui s'étend d'une manière générale axialement au cylindre de rotation et en ce que les moyens pour transporter le ruban comprennent

des moyens (59) pour guider le ruban suivant une direction telle que les matrices d'impression entrent en prise avec le ruban le long d'une ligne oblique par rapport à sa longueur.

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11. Dispositif suivant la revendication 10, comprenant en outre un arbre (91) qui s'étend axialement au cylindre rotatif, des moyens pour déplacer l'arbre suivant une direction axiale par rapport au cylindre et, pour chaque matrice, une came conique (90) coaxiale à l'arbre et déplaçable avec celui-ci, la matrice respective pouvant être avancée ou retirée par rapport au cylindre et ayant un support comportant un suiveur (85) coopérant avec la surface de came. 10 15
12. Dispositif suivant l'une quelconque des revendications 7 à 11 et comportant des dispositifs de chauffage électriques à l'intérieur du cylindre. 20
13. Dispositif suivant l'une quelconque des revendications 7 à 12, caractérisé en ce que les moyens pour appliquer une pression à la bande comprennent une bande flexible (34, 37), montée pour effectuer un mouvement longitudinal entre au moins deux roues (15, 18) qui définissent pour la bande flexible un angle d'enroulement important autour du cylindre, et des moyens (35, 36, 38, 39) pour amener la bande flexible sous tension. 25 30
14. Dispositif suivant l'une quelconque des revendications 7 à 12, caractérisé en ce que les moyens pour appliquer une pression à la bande comprennent un rouleau presseur. 35

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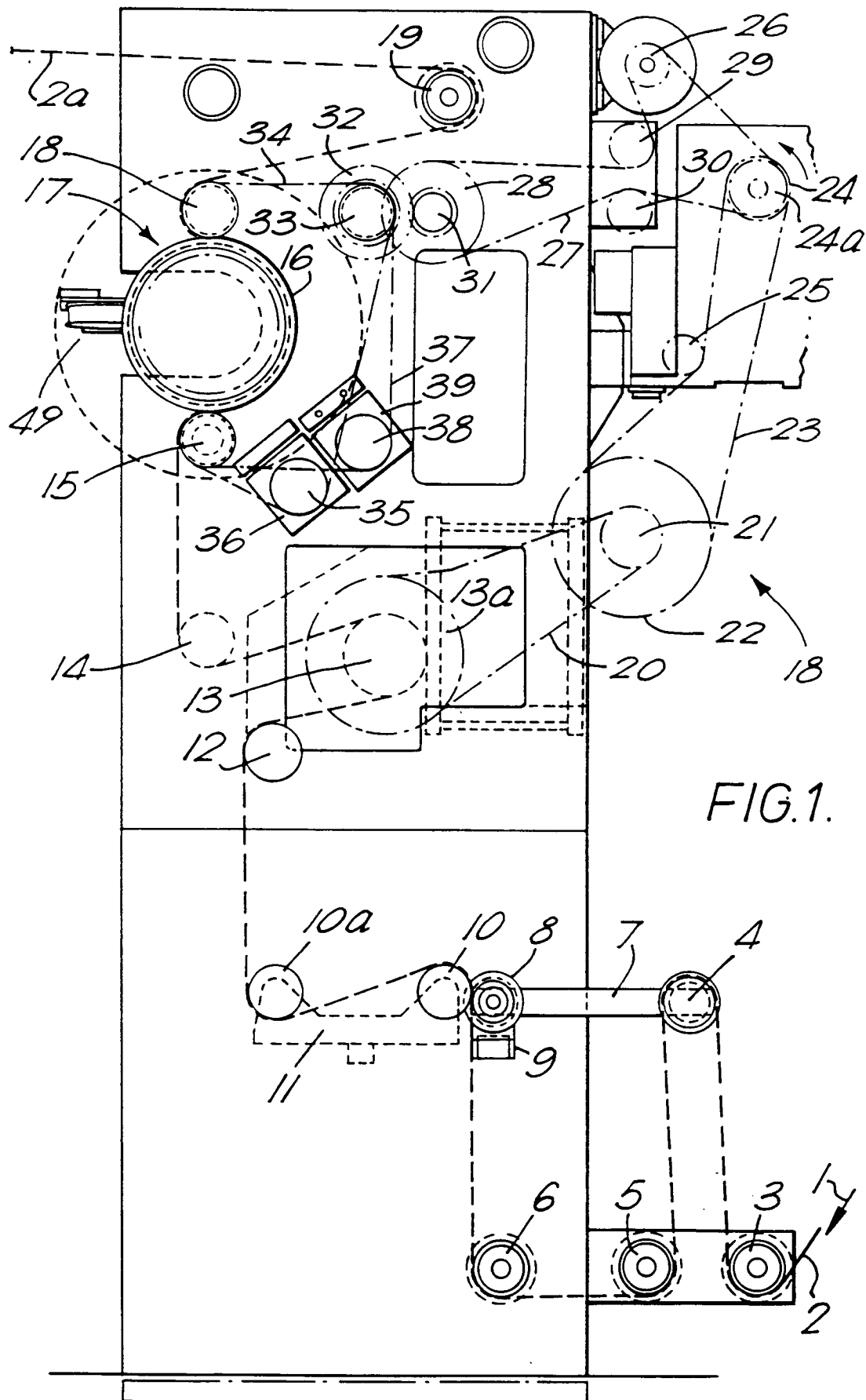
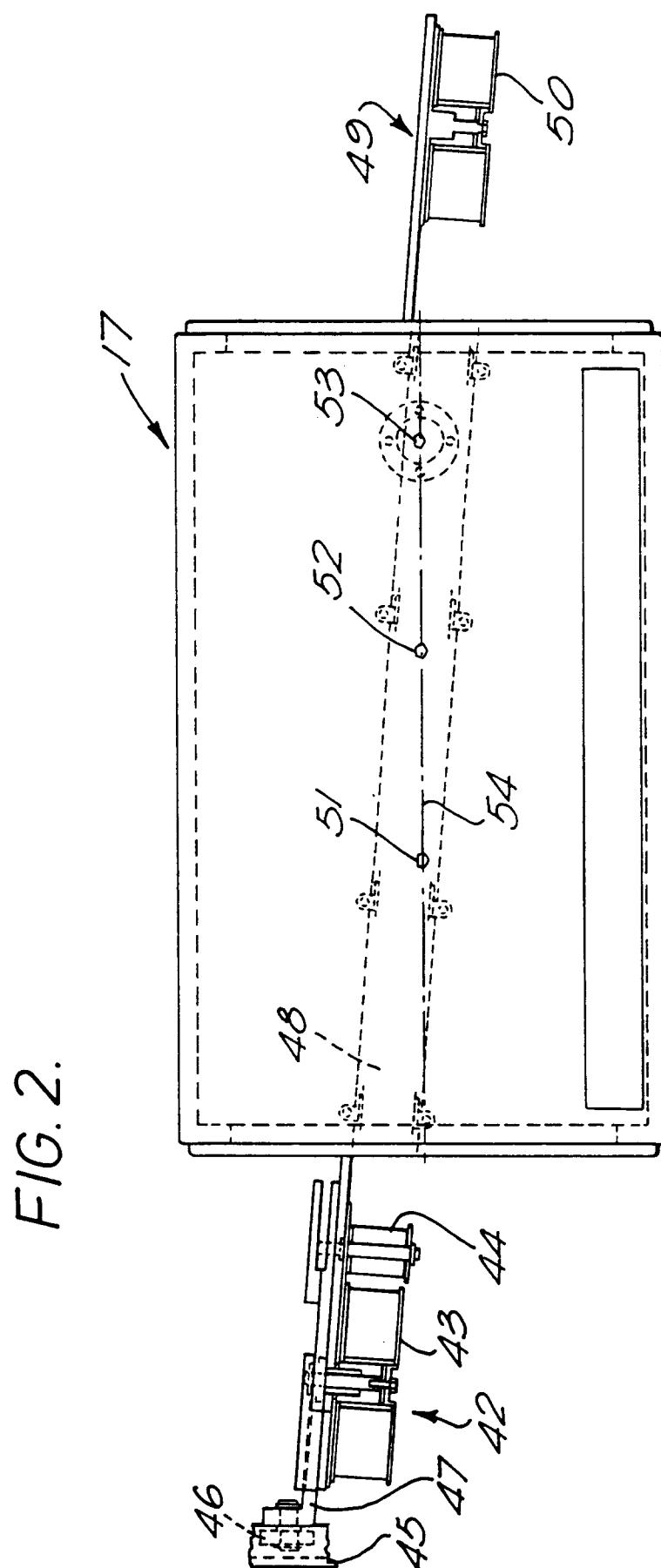


FIG.1.



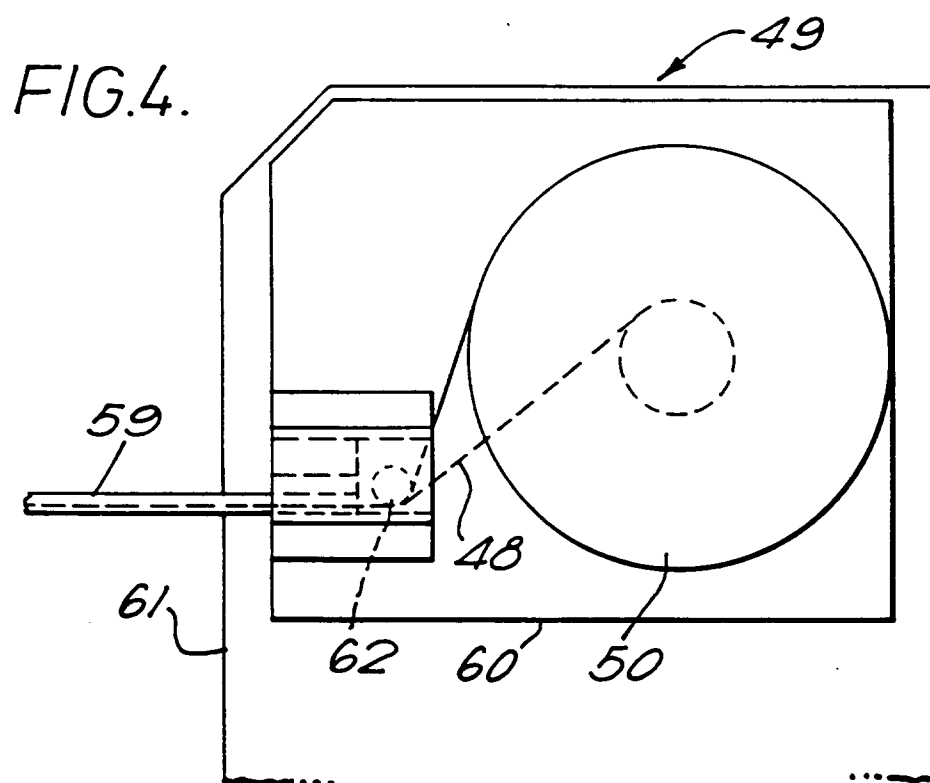
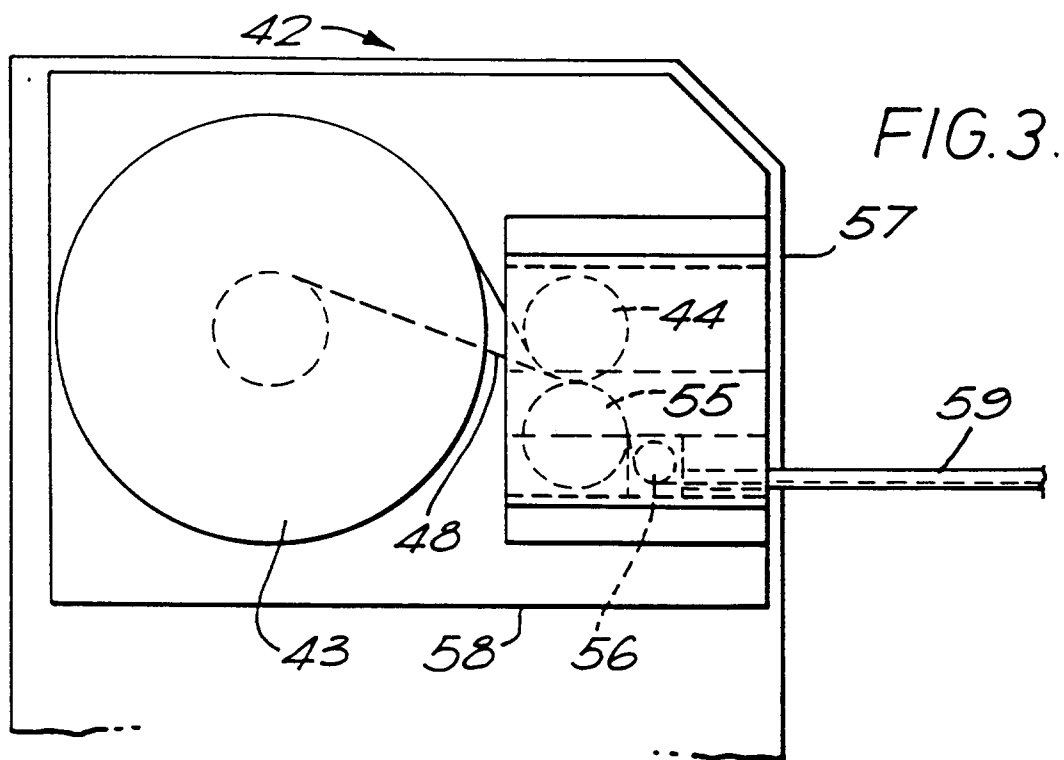


FIG.5.

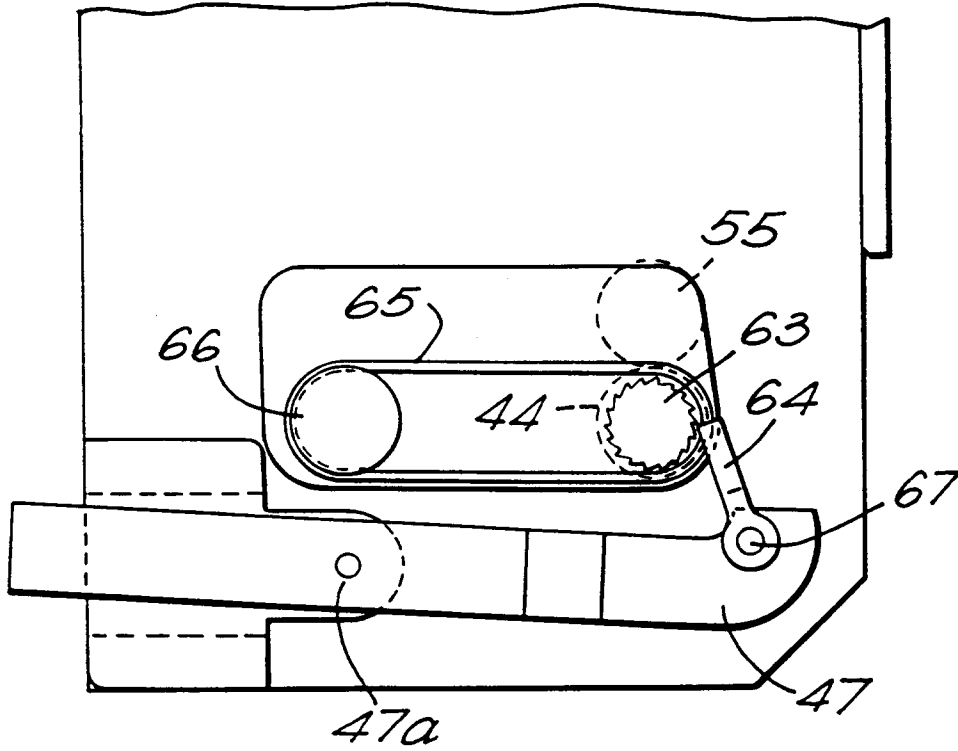


FIG.7.

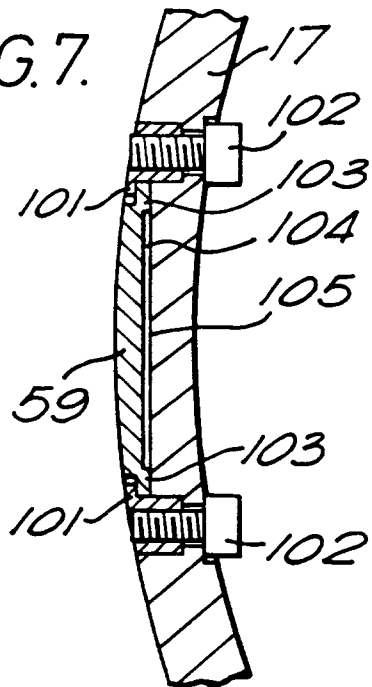
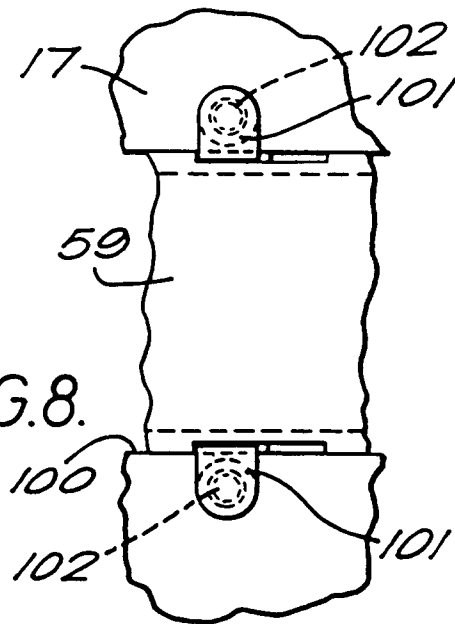


FIG.8.



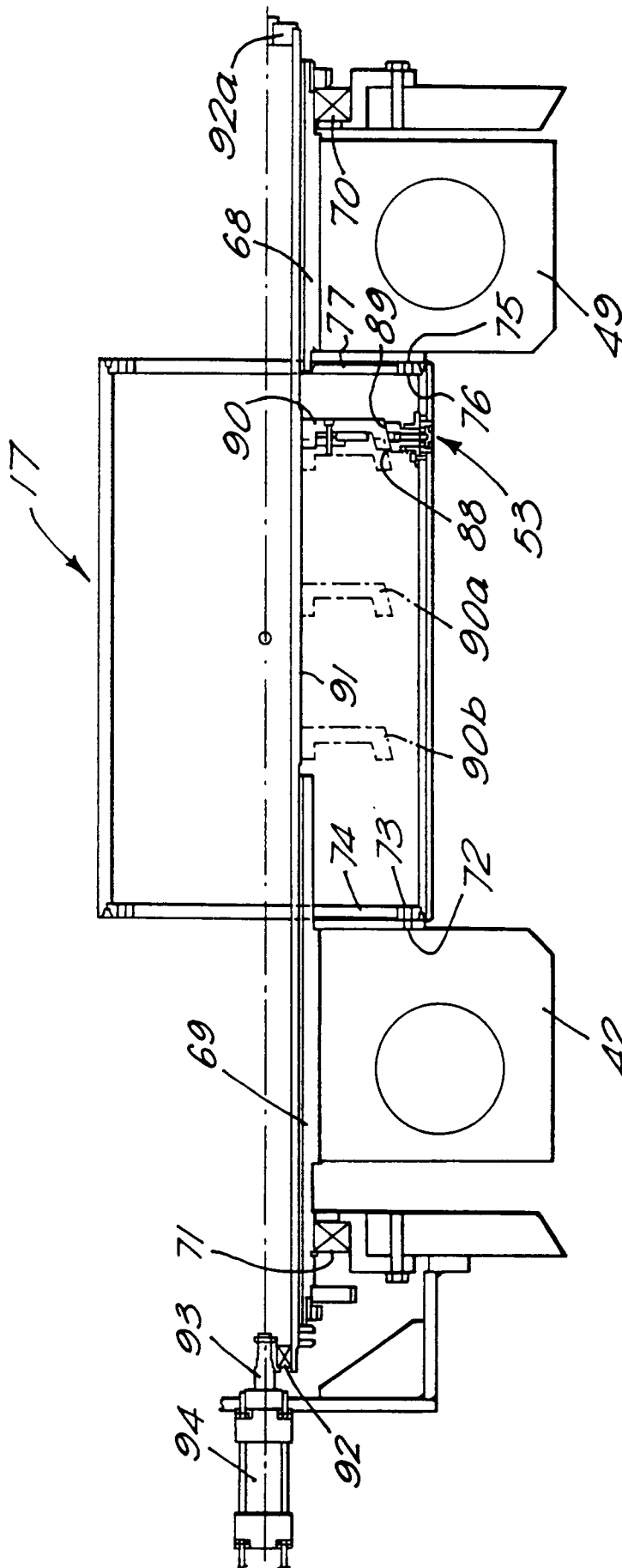


FIG.9.

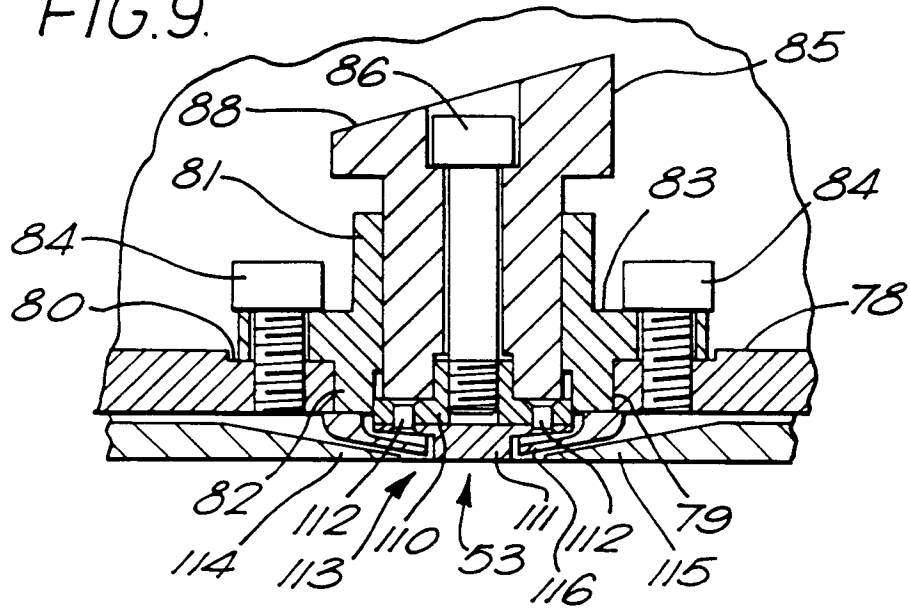


FIG.10.

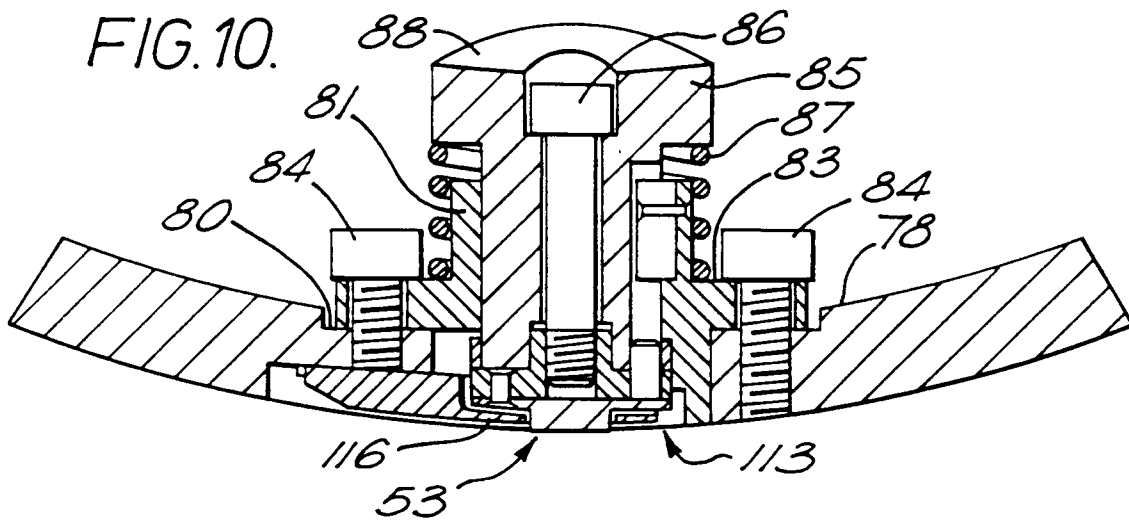


FIG.11.

