(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 785 833 B9

(12) **CORRECTED EUROPEAN PATENT SPECIFICATION**
Note: Bibliography reflects the latest situation

(15) Correction information:
Corrected version no 1 (W1 B1)
Corrections, see page(s) 9, 10

(48) Corrigendum issued on:
13.11.2002 Bulletin 2002/46

(45) Date of publication and mention of the grant of the patent:
06.02.2002 Bulletin 2002/06

(21) Application number: **95933523.3**

(22) Date of filing: **10.10.1995**

(51) Int Cl.[7]: **B21D 5/08**

(86) International application number:
PCT/GB95/02397

(87) International publication number:
WO 96/011758 (25.04.1996 Gazette 1996/18)

(54) STRIP FORMING METHOD AND APPARATUS

VERFAHREN UND VORRICHTUNG ZUM BLECHFORMEN

PROCEDE ET DISPOSITIF DE FACONNAGE DE BANDES

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

(30) Priority: **15.10.1994 GB 9420832**

(43) Date of publication of application:
30.07.1997 Bulletin 1997/31

(73) Proprietor: **Banro Holdings Public Limited Company**
Walsall, West Midlands WS3 9ES (GB)

(72) Inventor: **HAYWARD, John**
Midland Industrial Holdings Limited
West Midlands WS3 9ES (GB)

(74) Representative: **Mosey, Stephen George et al**
MARKS & CLERK
Alpha Tower
Suffolk Street Queensway
Birmingham B1 1TT (GB)

(56) References cited:
LU-A- 61 061
US-A- 3 068 336

EP 0 785 833 B9

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] This invention relates to a method of and apparatus for the production of articles in continuous succession by forming from strip material and parting-off the formed articles from the strip.

[0002] In some conventional arrangements for forming articles such as generally channel shaped ducting, studding and the like, a special parting-off head is required to support the particular profile of the formed article to enable parting-off to be carried out without deformation or collapse of the article. When a different size or shape of product is required, the head has to be modified or interchanged with another to accommodate the new product, giving rise to a very significant "stand-still" time for the machine, possibly of several hours, while the conversion takes place. Similar problems arise when changing the forming tools, such as rolls, particularly when the channel-shaped profile to be formed has its free edges turned inwardly parallel to its base, requiring additional tools to produce the necessary forming.

[0003] Luxembourg Patent No. 61061 discloses the formation of profiles from strip material in which the lengths of the individual profiles are delimited by the formation of transverse impressions on the strip prior to the forming operation, and subjecting the formed profiles to a bending force applied by an array of rollers, causing separation of the profiles by breakage along the transverse impressions.

[0004] US-A-4,553,418 (closest prior art) discloses forming identical workpieces from metal strip material by roller forming and punching to leave successive workpieces connected together by strap-like portions of the strip which are subsequently removed by shearing to separate the workpieces.

[0005] An object of the invention is to provide a method of producing articles, such as generally channel-shaped ducting, studding and the like, which enables parting-off of the differently shaped and/or sized articles to be performed without substantial modification to the parting-off head, as well as apparatus for carrying out the method and in which the forming tools may be readily modified for changing the shape and/or size of the product.

[0006] According to the invention, a method of producing articles in continuous succession by forming from strip material comprises the combination of features according to claim 1.

[0007] Preferably, the or each connecting portion is formed with the strip stationary and, conveniently, prior to commencement of the forming operation.

[0008] In a particularly convenient form of the method, cutting through the strip is effected on a stationary part of the strip during the performance of the forming operation on another moving part of the strip.

[0009] From a further aspect of the invention, apparatus for carrying out the method comprises the combination of features according to claim 10.

[0010] Preferably, parting-off is effected on the moving strip by means of the cutting unit which is conveniently accelerated to the speed of the moving strip prior to parting-off.

[0011] The invention will now be described, by way of example, with reference to the accompanying drawings in which:-

Figure 1 is a diagrammatic representation of one form of apparatus for carrying out the method of the invention;

Figure 2 is an enlarged diagrammatic view of part of the apparatus of Figure 1;

Figure 3 is an enlarged view, similar to Figure 2, of another part of the apparatus of Figure 1;

Figure 4 illustrates alternative results of one operational step in the method;

Figure 5 is an enlarged diagrammatic perspective view of part of the apparatus of Figure 1 seen from the opposite side to that shown in Figure 1, and

Figure 6 is a further enlarged view of part of the apparatus of Figure 5 seen from the same side as Figure 5.

[0012] In the apparatus illustrated in Figure 1, coated steel strip 1 is supplied from a drum 2 which is driven in rotation by a suitable conventional drive means 3, such as an electric motor, in order to unwind the strip in use. The strip is first fed through a succession of operational stations A, B, C, at which various operations are performed on the strip, as will be described hereafter. Feeding of the strip through the stations A, B, C is effected by a pair of feed rollers 2A driven intermittently under computer control to bring successive locations on the strip beneath the stations A, B, C at which operations are performed while the strip is stationary. Alternative locations for the rollers 2A are shown in broken lines respectively at either end of the stations A, B, C, the chosen location depending upon whether the strip is to be pushed or pulled through the stations.

[0013] The strip is then fed through a series of forming rolls, indicated collectively by the reference 4, which act upon the strip in conventional manner to form it into a desired profile, such as a part-rectangular channel, of which the free longitudinal edges may be inwardly or outwardly turned.

[0014] In practice, each roll has an upper roll 4A and a lower roll 4B, the rolls being arranged in pairs transversely of the longitudinal direction of the strip, as illustrated in Figure 2. Each roll 4A, 4B is carried on a bed 5 mounted on a main frame 6 for adjustment in opposed directions transversely of the frame. Adjustment may be effected by any suitable means such as screw devices

or fluid-actuated cylinders (not shown). The rolls 4A, 4B forming the sides of the channel relative to the base are all mounted on the respective beds 50 for simultaneous adjustment as a group at either side of the strip, although they may be sub-divided, if required, depending upon the particular form of the article to be produced. Some of the rolls, indicated at 5 in Figure 1 and each having a pair of rolls 5A, 5B, provide additional forming to turn inwardly the free edges of the channel. In this embodiment of the invention, these rolls are arranged for independent movement relative to the remaining rolls.

[0015] Figure 3 shows one possible arrangement for this, wherein the rolls 5A, 5B are mounted on beds 70 distinct from the beds 50 of Figure 2 and movable transversely of the frame 6 by, for example, hydraulic cylinders 8, which may be remotely controlled, so that the rolls 5A, 5B may be brought into or out of action separately from the remaining rolls, depending upon whether the product to be formed has in turned edges or not. These possibilities for adjustment of the rolls provide an extremely adaptable arrangement, which may be rapidly modified to produce products, within limits, of different shapes and/or dimensions, without the necessity for removing existing rolls and replacing them with different ones. This can reduce the down time of the apparatus very significantly as compared with some conventional apparatus.

[0016] The formed strip leaving the forming rolls requires parting-off into desired lengths and this is effected at a parting-off station by a die 9 cooperating with a cutting device 10. It is advantageous, for continuity of production, to perform the cutting operation on the moving strip, for which purpose it is necessary prior to each cutting operation to accelerate the die 9 to match the speed of travel of the strip. in order to achieve this, the die is coupled to a drive device, illustrated as a screw 11 driven, for example, by an electrical stepper motor 12 which, under automatic computer control, accelerates the die to the required speed and returns it to its starting position after the parting-off operation. The parted off product sections are fed onto a run-out table 13 which can include means 14 for moving the products off the table surface to one side or the other, at will.

[0017] It is an important feature of the invention that the strip is partially severed prior to completion of forming by the rollers 4, 5 and preferably prior to the commencement of such forming, by cutting widthwise through the entire thickness of the strip so as to leave successive strip portions 1A, 1B, each of the required length, connected together by only a small localised connecting portion or lug, or possibly a plurality thereof. The partial severing of the strip, which takes place at station C, can be effected in a plurality of ways, of which three alternatives are illustrated in Figures 4A to 4C. Each manner of partial severing leaves in the strip one or more gaps 14 and one or more connecting lugs 15 between the successive strip portions 1A, 1B. The preferred manner of severing the strip is that shown in Figure 4A and will be used to illustrate the performance of the method using the apparatus of the invention in the following description.

[0018] The forming method of the invention is carried out, using the apparatus described, in the following manner. Strip 1 unwound from the reel 2 is allowed to form a loop L1 prior to being fed through the stations A, B and C. This allows for the intermittent feeding of the strip passing through these stations, by the feed rollers 2A, the strip being stopped momentarily, as governed by suitable automatic computer controlled timing means applied to the roller drive, to enable the necessary functions to be completed at stations A, B and C. Tools arranged at stations A and B can, for example, perforate the strip where required, and a partial severing operation is performed at station C leaving successive lengths of strip 1A, 1B spaced by the gaps 14 and connected only by the remaining lug 15. Following these steps, the strip is once again set in motion and forms a second loop L2 prior to entering the rolls 4 so that the strip passing through the rolls can remain in a continuously moving state, even when the strip is stopped at stations A, B and C. As can be seen more clearly from Figure 5, the flat strip 1 is progressively formed by the rolls 4 and 5 to produce a succession of channel-shaped articles each, in the particular form illustrated, having inwardly turned longitudinal upper edges.

[0019] The formed articles leaving the rolls 4 and 5 approach a cutting station to be separated by the cutter 10 cooperating with the die 9. Again, in order to achieve continuity of operation, it is desirable to perform the cutting operation with the strip in continuous motion and, for this purpose, the die 9 is accelerated by the stepper motor 12 and screw drive 11 to the speed of the travelling strip, prior to separating successive articles by severing the connecting lug 15 between them while the articles continue in motion. Initiation of movement of the die 9 is effected in response to sensing the presence of the gap 14 between successive articles by means of sensors 20, preferably of an optical or infra-red type, signals from which are fed to the controlling computer which then initiates acceleration of the die and cutter assembly by way of the screw 11 and motor 12. By careful timing of commencement of acceleration of the die and cutter assembly, these latter can be brought into very close proximity with the lug to be severed. As can be seen more clearly in Figure 6, the thickness of the cutting blade is substantially the same as the width of the slot 14, so that the blade is effectively guided during its movement through the slot. The lower edge 21 of the blade forms the cutting edge and this is bounded by a pair of ears 22 which are spaced by substantially the width of the lug 15 so that the lug is embraced by the ears during the initial part of the descent of the blade for accurate location of the blade relative to the lug. Moreover, the die 9 has a degree of free movement in the direction of strip movement. The die is provided with a slot 23, which again is of substantially the same width

as the blade thickness, and this enables a final location of the blade relative to the die and lug to be effected as the ears 22 enter the slot 23, causing a small longitudinal adjustment of the die to take place, if necessary, prior to the final downward movement of the blade 10 to effect parting-off of the articles. The articles to be severed are supported adjacent the lug by a plain flat surface 23A of the die 9 surrounding the slot 23, obviating the need for complex support apparatus. The timing of the cut in relation to the various other movements and adjustments is effected by the controlling computer.

[0020] A severed article is illustrated at P (Figures 1 and 5) and this falls onto a run-off table 13 from which it may be removed by an ejector mechanism in the form of one or more projections 24 extending radially from a body 14 carried by a drive shaft 25 rotatable in one direction or the other, again under the control of the computer, to eject an article laterally of the table to one side or the other thereof. The direction of rotation of the shaft may be computer controlled to enable one or more articles to be ejected at one side of the table, followed by ejection of one or more articles at the opposite side of the table.

[0021] It will be seen that, with the arrangement described, parting-off of a variety of sizes and shapes of article can be effected by a single blade and die assembly, without modification of the latter, thereby avoiding the significant down times experienced in conventional forming apparatus having die heads designed to sever through the entire product. It will be understood that the invention is not limited by the size and shape of product, large variations in which may be accommodated.

Claims

1. A method of producing articles in continuous succession by forming from strip material, comprising cutting entirely through the strip (1) in a widthwise direction, prior to completion of the forming, so as to leave adjacent strip portions (1A, 1B) joined only by at least one localised connecting portion (15), and parting-off a pair of successive formed articles (P) by severing the or each connecting portion (15) using a cutting unit comprising a co-acting cutter device (10) and die (9), the die having an opening (23) of substantially the same width as the cutter device thickness for receiving the cutter device (10) therein, the method **characterised by** causing at least one projecting portion (22) of the cutter device to enter the opening (23) prior to parting-off the articles (P) by co-action between the cutter device and the die.

2. A method according to Claim 1, wherein the or each connecting portion (15) is formed with the strip (1) stationary.

3. A method according to Claim 1 or Claim 2, wherein the connecting portion (15) is formed prior to commencement of the forming operation.

4. A method according to any one of Claims 1 to 3, wherein said cutting through the strip (1) is effected on a stationary part of the strip during the performance of the forming operation on another moving part of the strip.

5. A method according to any one of the preceding claims, wherein severing of the connecting portion (15) is effected on the moving strip.

6. A method according to Claim 5, wherein the cutting unit is accelerated to match the speed of the strip (1) prior to severing of the connecting portion (15).

7. A method according to any one of the preceding claims, wherein said cutting through of the strip is effected so as to leave a single localised connecting portion (15) disposed generally centrally of the strip (1).

8. A method according to any one of Claims 1 to 5, wherein said cutting through of the strip is effected in such a manner that a gap (14) is formed between the adjacent ends of successive articles (P) and the cutter device (10) has a thickness substantially the same as the width of said gap, so that the cutter device is guided during its movement within the gap (14) prior to severing the or each connecting portion (15).

9. A method according to any one of Claims 1 to 8, wherein severing of the or each connecting portion (15) is carried out with a part of the formed strip adjacent the portion (15) supported on a surface and the connecting portion unsupported.

10. Apparatus for carrying out the method of any one of Claims 1 to 9, comprising forming means (4, 5) for forming the strip to a desired profile, means (C) for cutting entirely through the strip (1) in a widthwise direction, prior to completion of the forming, so as to leave adjacent strip portions (1A, 1B) joined only by at least one localised connecting portion (15), and means (9, 10) for parting-off a pair of successive formed articles (P) by severing the or each connecting portion (15), said means for parting-off comprising a cutting unit in the form of a cutter device (10) and die (9), the die having an opening (23) of substantially the same width as the cutter device thickness for receiving the cutter device (10), **characterised in that** the cutter device is provided with at least one projecting portion (22), and that, in use, said at least one projecting portion (22) enters the die opening (23) prior to parting-off the articles (P)

by co-action between the cutter device and the die.

11. Apparatus according to Claim 10, wherein drive means (2A) are provided for advancing the strip (1) intermittently between cutting operations by a distance equal to the length of a severed article (P).

12. Apparatus according to Claim 11, wherein the drive means is a pair of opposed rollers (2A).

13. Apparatus according to any one of Claims 10 to 12, wherein means (11, 12) are provided for accelerating the cutting unit, in use, to the speed of the moving strip prior to parting-off of the moving articles.

14. Apparatus according to any one of Claims 10 to 13, wherein a cutting edge (21) of the cutter device (10) is bounded by a pair of spaced projecting ears (22), such that, in use, the ears embrace a connecting portion (15) prior to a cutting operation so as to effect accurate location of the cutter device (10) relative to the connecting portion (15).

15. Apparatus according to any one of Claims 10 to 14, wherein the opening in the die (9) is a slot (23) of substantially the same cross-sectional dimensions as an opposed end of the cutter device (10), the die being capable of movement to permit longitudinal location of the die relative to the cutter device during entry of the cutter device into said slot (23).

16. Apparatus according to any one of Claims 10 to 15, wherein the die has a surface (23A) on which, in use, a part of the formed strip adjacent a connecting portion (15) is supported, with the portion (15) lying over the opening (23), when the ears (22) of the cutter device embrace the connecting portion (15) and are engaged within the opening (23)

17. Apparatus according to any one of Claims 10 to 16, wherein the forming means are rolls (4A, 4B, 5A, 5B), and means are provided for adjusting some of the rolls relative to others in order to modify the format of the formed article without substantial dismantling of the rolls.

18. Apparatus according to Claim 17, wherein the roll-adjusting means are fluid-operated.

19. Apparatus according to Claim 17 or Claim 18, wherein the roll -adjusting means are remotely operable.

Patentansprüche

1. Verfahren zur Herstellung von Artikeln in einer kontinuierlichen Folge durch Formung von Streifenmaterial, das folgendes umfaßt: vollständiges Durchschneiden des Streifen (1) in einer Breitenrichtung, bevor die Formung abgeschlossen ist, so daß aneinandergrenzende Streifenabschnitte (1A, 1B) nur durch wenigstens einen lokalisierten Verbindungsabschnitt (15) miteinander verbunden bleiben, und Abtrennen eines Paares von aufeinanderfolgenden geformten Artikeln (P) durch Durchtrennen des oder jedes Verbindungsabschnitts (15) unter Anwendung einer Schneideinheit, die einen zusammenwirkenden Schneidmechanismus (10) und ein Unterwerkzeug (9) umfaßt, wobei das Unterwerkzeug eine Öffnung (23) von im wesentlichen derselben Breite wie die Dicke des Schneidmechanismus' hat, um darin den Schneidmechanismus (10) aufzunehmen, wobei das Verfahren **dadurch gekennzeichnet ist, daß** der Eintritt wenigstens eines vorspringenden Abschnitts (22) des Schneidmechanismus' in die Öffnung (23) bewirkt wird, bevor die Artikel (P) durch das Zusammenwirken zwischen dem Schneidmechanismus und dem Unterwerkzeug abgetrennt werden.

2. Verfahren nach Anspruch 1, bei dem der oder jeder Verbindungsabschnitt (15) gebildet wird, während der Streifen (1) stationär ist.

3. Verfahren nach Anspruch 1 oder Anspruch 2, bei dem der Verbindungsabschnitt (15) vor Beginn des Formungsvorgangs gebildet wird.

4. Verfahren nach einem der Ansprüche 1 bis 3, bei dem das Durchschneiden des Streifens (1) an einem stillstehenden Teil des Streifens während der Durchführung des Formungsvorgangs an einem anderen, sich bewegenden Teil des Streifens ausgeführt wird.

5. Verfahren nach einem der vorhergehenden Ansprüche, bei dem das Durchtrennen des Verbindungsabschnitts (15) an dem sich bewegenden Streifen ausgeführt wird.

6. Verfahren nach Anspruch 5, bei dem die Schneideinheit beschleunigt wird, um sie vor dem Durchtrennen des Verbindungsabschnitts (15) der Geschwindigkeit des Streifens (1) anzupassen.

7. Verfahren nach einem der vorhergehenden Ansprüche, bei dem das Durchschneiden des Streifens so ausgeführt wird, daß ein einzelner, lokalisierter Verbindungsabschnitt (15) verbleibt, der allgemein in der Mitte des Streifens (1) angeordnet ist.

8. Verfahren nach einem der Ansprüche 1 bis 5, bei dem das Durchschneiden des Streifens auf eine solche Weise ausgeführt wird, daß zwischen aneinandergrenzenden Enden von aufeinanderfolgen-

den Artikeln (P) ein Spalt (14) gebildet wird, und der Schneidmechanismus (10) eine Dicke hat, die im wesentlichen gleich der Breite des Spaltes ist, so daß der Schneidmechanismus während seiner Bewegung innerhalb des Spaltes (14) geführt wird, bevor er den oder jeden Verbindungsabschnitt (15) durchtrennt.

9. Verfahren nach einem der Ansprüche 1 bis 8, bei dem das Durchtrennen des oder jedes Verbindungsabschnitts (15) durchgeführt wird, während ein Teil des geformten Streifens angrenzend an den Abschnitt (15) auf einer Oberfläche aufgelagert wird und der Verbindungsabschnitt nicht aufgelagert ist.

10. Vorrichtung zur Ausführung des Verfahrens nach einem der Ansprüche 1 bis 9, die folgendes aufweist: Formungsmittel (4, 5) zur Formung des Streifens in ein gewünschtes Profil, Mittel (C) zum vollständigen Durchschneiden des Streifens (1) in einer Breitenrichtung, bevor die Formung abgeschlossen ist, so daß aneinandergrenzende Streifenabschnitte (1A, 1B) nur durch wenigstens einen lokalisierten Verbindungsabschnitt (15) miteinander verbunden bleiben, und Mittel (9, 10) zum Abtrennen eines Paares von aufeinanderfolgenden geformten Artikeln (P) durch Durchtrennen des oder jedes Verbindungsabschnitts (15), wobei die Mittel zum Abtrennen eine Schneideinheit in Form eines Schneidmechanismus' (10) und eines Unterwerkzeugs (9) umfassen, wobei das Unterwerkzeug eine Öffnung (23) von im wesentlichen derselben Breite wie die Dicke des Schneidmechanismus' hat, um den Schneidmechanismus (10) aufzunehmen, **dadurch gekennzeichnet, daß** der Schneidmechanismus mit wenigstens einem vorspringenden Abschnitt (22) versehen ist und daß bei der Arbeit der wenigstens eine vorspringende Abschnitt (22) in die Unterwerkzeug-Öffnung (23) eintritt, bevor die Artikel (P) durch das Zusammenwirken zwischen dem Schneidmechanismus und dem Unterwerkzeug abgetrennt werden.

11. Vorrichtung nach Anspruch 10, bei der Antriebsmittel (2A) bereitgestellt werden, um den Streifen (1) zwischen den Schneidvorgängen aussetzend um eine Entfernung vorwärts zu bewegen, die gleich der Länge eines abgetrennten Artikels (P) ist.

12. Vorrichtung nach Anspruch 11, bei der die Antriebsmittel ein Paar gegenüberliegender Rollen (2A) sind.

13. Vorrichtung nach einem der Ansprüche 10 bis 12, bei der Mittel (11, 12) bereitgestellt werden, um die Schneideinheit bei der Arbeit auf die Geschwindigkeit des sich bewegenden Streifens zu beschleunigen, bevor die sich bewegenden Artikel abgetrennt werden.

14. Vorrichtung nach einem der Ansprüche 10 bis 13, bei der eine Schneidkante (21) des Schneidmechanismus' (10) durch ein Paar von mit Zwischenraum angeordneten vorspringenden Ösen (22) begrenzt wird, derartig, daß die Ösen bei der Arbeit einen Verbindungsabschnitt (15) vor einem Schneidvorgang umfassen, um so eine genaue Lokalisierung des Schneidmechanismus' (10) im Verhältnis zum Verbindungsabschnitt (15) zu bewirken.

15. Vorrichtung nach einem der Ansprüche 10 bis 14, bei der die Öffnung im Unterwerkzeug (9) ein Schlitz (23) mit im wesentlichen denselben Querschnittabmessungen wie ein gegenüberliegendes Ende des Schneidmechanismus' (10) ist, wobei das Unterwerkzeug bewegt werden kann, um die Längsausrichtung des Unterwerkzeugs im Verhältnis zum Schneidmechanismus während des Eintritts des Schneidmechanismus' in den Schlitz (23) zu erlauben.

16. Vorrichtung nach einem der Ansprüche 10 bis 15, bei der das Unterwerkzeuge eine Oberfläche (23A) hat, auf der bei der Arbeit ein Teil des geformten Streifens anschließend an einen Verbindungsabschnitt (15) aufgelagert wird, wobei der Abschnitt (15) über der Öffnung (23) liegt, wenn die Ösen (22) des Schneidmechanismus' den Verbindungsabschnitt (15) umfassen und innerhalb der Öffnung (23) ineinandergreifen.

17. Vorrichtung nach einem der Ansprüche 10 bis 16, bei der die Formungsmittel Walzen (4A, 4B, 5A, 5B) sind und Mittel bereitgestellt werden, um einige der Walzen im Verhältnis zu anderen einzustellen, um das Format des geformten Artikels zu modifizieren, ohne die Walzen wesentlich zu demontieren.

18. Vorrichtung nach Anspruch 17, bei der die Walzeneinstellmittel fluid-betätigt sind.

19. Vorrichtung nach Anspruch 17 oder Anspruch 18, bei der die Walzeneinstellmittel fernbedient werden können.

Revendications

1. Procédé de production d'articles dans une succession continue par formage à partir d'un matériau en bande, comprenant un découpage complet à travers la bande (1) dans une direction de la largeur, avant l'achèvement du formage, de sorte à que les parties de bande adjacentes (1A, 1B) sont reliées uniquement par une partie de raccordement localisée (15), et de séparation d'une paire d'articles for-

més successivement (P) par détachement de la ou de chaque partie de raccordement (15) par l'intermédiaire d'une unité de coupe comprenant un dispositif de coupe (10) et une filière (9) à coopération, la filière comportant une ouverture (23) ayant une largeur pratiquement égale à l'épaisseur du dispositif de coupe pour recevoir le dispositif de coupe (10), le procédé étant **caractérisé par** l'entrée d'au moins une partie en saillie (22) du dispositif de coupe dans l'ouverture (23) avant la séparation des articles (P) par l'intermédiaire de la coopération entre le dispositif de coupe et la filière.

2. Procédé selon la revendication 1, dans lequel la ou chaque partie de raccordement (15) est formée lorsque la bande (1) est stationnaire.

3. Procédé selon les revendications 1 ou 2, dans lequel la partie de raccordement (15) est formée avant de commencer l'opération de formage.

4. Procédé selon l'une quelconque des revendications 1 à 3, dans lequel ledit découpage à travers la bande (1) est réalisé sur une partie stationnaire de la bande au cours de l'exécution de l'opération de formage sur une autre partie en déplacement de la bande.

5. Procédé selon l'une quelconque des revendications précédentes, dans lequel le détachement de la partie de raccordement (15) est réalisé sur la bande en déplacement.

6. Procédé selon la revendication 5, dans lequel l'unité de coupe est accélérée en vue d'une adaptation à la vitesse de la bande (1) avant le détachement de la partie de raccordement (15).

7. Procédé selon l'une quelconque des revendications précédentes, dans lequel ledit découpage à travers la bande est réalisé de sorte à laisser une seule partie de raccordement localisée (15) agencée en général au centre de la bande (1).

8. Procédé selon l'une quelconque des revendications 1 à 5, dans lequel ledit découpage à travers la bande est réalisé de sorte qu'un espace (14) est établi entre les extrémités adjacentes d'articles successifs (P), le dispositif de coupe (10) ayant une épaisseur correspondant pratiquement à la largeur dudit espace, de sorte que le dispositif de coupe est guidé pendant son déplacement dans l'espace (14) avant le détachement de la ou de chaque partie de raccordement (15).

9. Procédé selon l'une quelconque des revendications 1 à 8, dans lequel le détachement de la ou de chaque partie de raccordement (15) est réalisé pendant qu'une partie de la bande formée adjacente à la partie (15) est supportée sur une surface, la partie de raccordement n'étant pas supportée.

10. Dispositif destiné à l'exécution du procédé selon l'une quelconque des revendications 1 à 9, comprenant un moyen de formage (4, 5) pour former la bande selon un profil voulu, un moyen (C) pour découper entièrement la bande (1) dans une direction de la largeur, avant l'achèvement du formage, de sorte que les parties de bande adjacentes (1A, 1B) sont reliées uniquement par au moins une partie de raccordement localisée (15), et un moyen (9, 10) pour séparer une paire d'articles formés successivement (P) par détachement de la ou de chaque partie de raccordement (15), ledit moyen destiné au détachement comprenant une unité de coupe sous forme d'un dispositif de coupe (10) et une filière (9), la filière comportant une ouverture (23) ayant une largeur pratiquement égale à l'épaisseur du dispositif de coupe pour recevoir le dispositif de coupe (10), **caractérisé en ce que** le dispositif de coupe comporte au moins une partie en saillie (22) et **en ce qu'**en service ladite au moins une partie en saillie (22) rentre dans l'ouverture de la filière (23) avant la séparation des articles (P) par l'intermédiaire de la coopération entre le dispositif de coupe et la filière.

11. Dispositif selon la revendication 10, comportant des moyens d'actionnement (2A) pour faire avancer la bande (1) par intermittence entre les opérations de coupe d'une distance égale à la longueur de l'article détaché (P).

12. Dispositif selon la revendication 11, dans lequel le moyen d'entraînement est constitué par une paire de rouleaux opposés (2A).

13. Dispositif selon l'une quelconque des revendications 10 à 12, comportant des moyens (11, 12) pour accélérer l'unité de coupe en service en vue de l'adaptation à la bande en déplacement avant le détachement des articles en déplacement.

14. Dispositif selon l'une quelconque des revendications 10 à 13, dans lequel une arête de coupe (21) du dispositif de coupe (10) est délimitée par une paire de pattes en saillie espacées (22), de sorte qu'en service les pattes entourent une partie de raccordement (15) avant l'opération de coupe, afin d'assurer un positionnement précis du dispositif de coupe (10) par rapport à la partie de raccordement (15).

15. Dispositif selon l'une quelconque des revendications 10 à 14, dans lequel l'ouverture dans la filière (9) est une fente (23) ayant pratiquement les mêmes dimensions de section transversale qu'une ex-

trémité opposée du dispositif de coupe (10), la filière pouvant se déplacer pour permettre le positionnement longitudinal de la filière par rapport au dispositif de coupe pendant l'entrée du dispositif de coupe dans ladite fente (23).

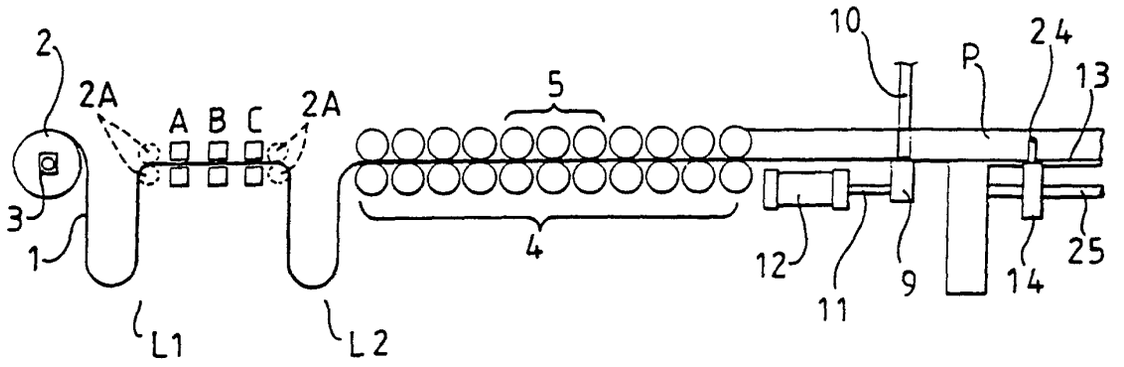
16. Dispositif selon l'une quelconque des revendications 10 à 15, dans lequel la filière comporte une surface (23A) supportant en service une partie de la bande formée près d'une partie de raccordement (15), la partie (15) étant située au-dessus de l'ouverture (23) lorsque les pattes (22) du dispositif de coupe entourent la partie de raccordement (15) et sont engagées dans l'ouverture (23).

17. Dispositif selon l'une quelconque des revendications 10 à 16, dans lequel les moyens de formage sont des rouleaux (4A, 4B, 5A, 5B), et comportant des moyens pour ajuster certains des rouleaux par rapport à d'autres en vue de modifier le format de l'article formé sans désassembler pratiquement les rouleaux.

18. Dispositif selon la revendication 17, dans lequel les moyens d'ajustement des rouleaux sont actionnés par un fluide.

19. Dispositif selon les revendications 17 ou 18, dans lequel les moyens d'ajustement des rouleaux peuvent être actionnés à distance.

FIG 1



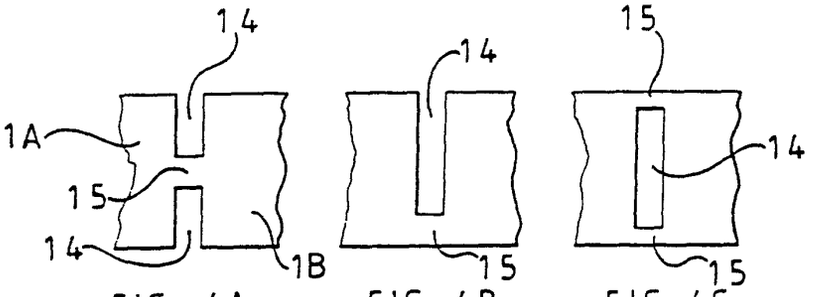


FIG 4A FIG 4B FIG 4C

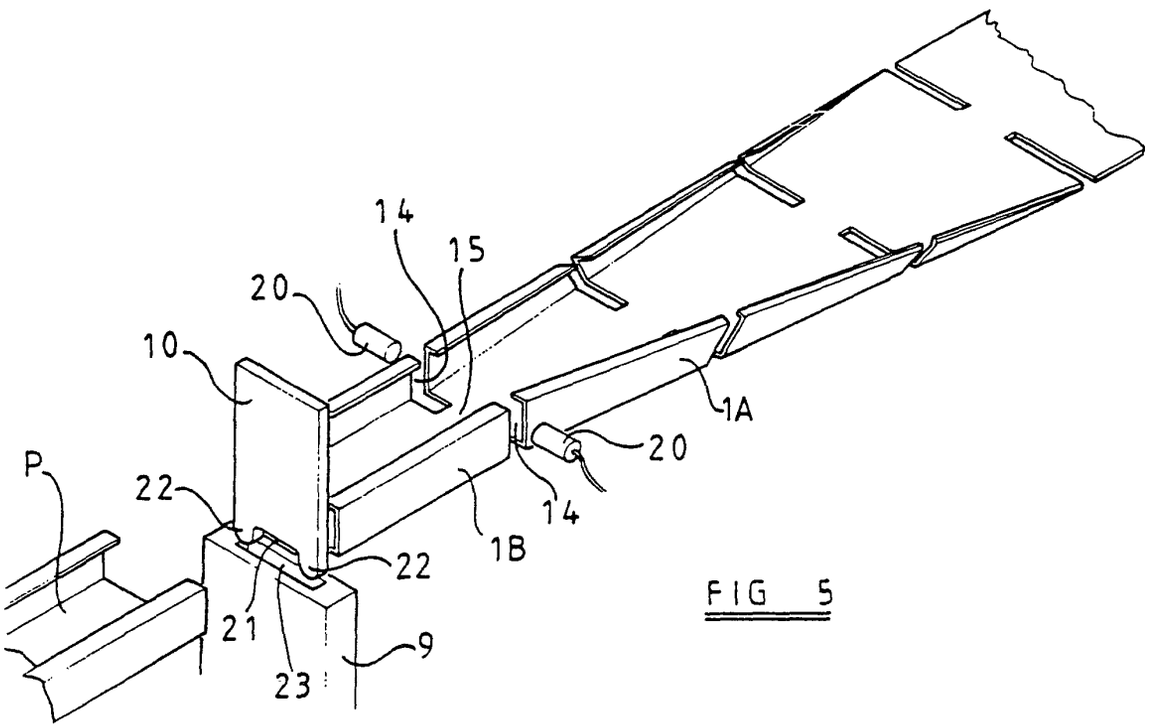


FIG 5

FIG 6

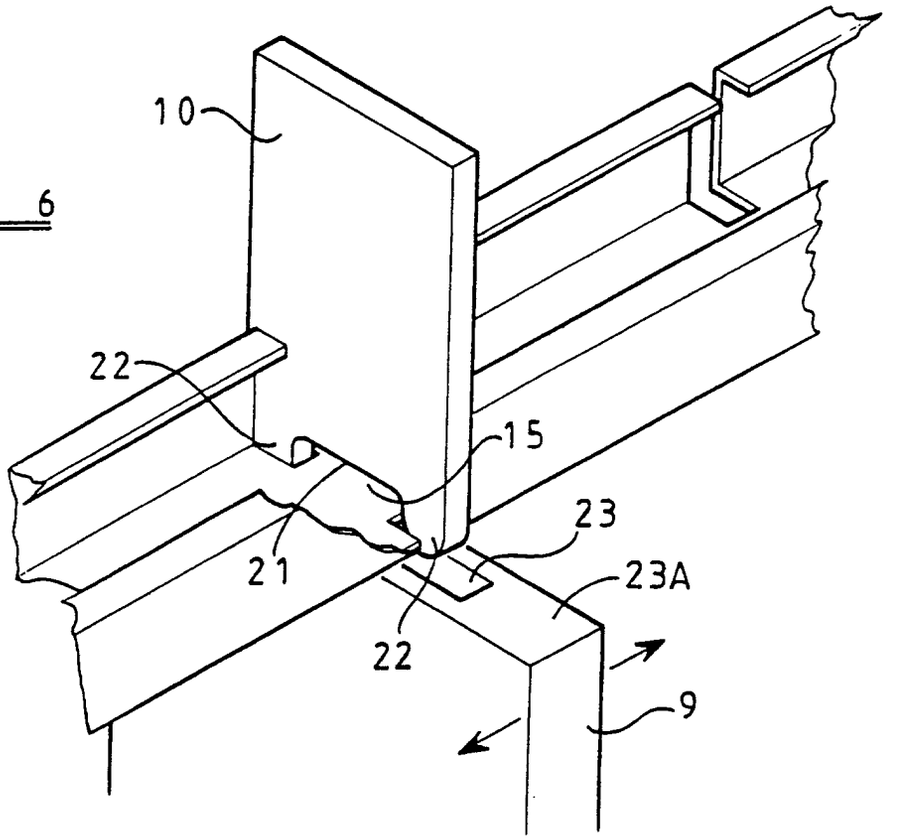


FIG 2

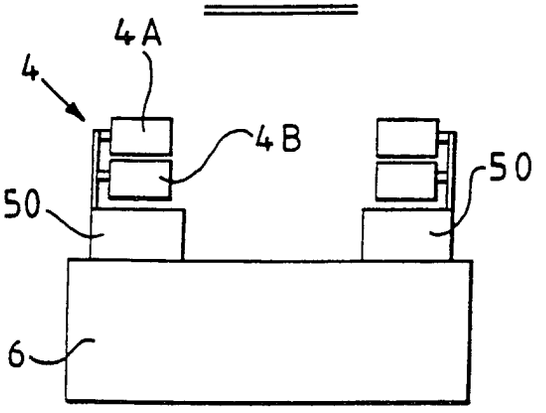


FIG 3