April 17, 1956 A. BRUGGMANN 2,741,765

APPLIANCE FOR ATTACHING CLIPS TO GOODS

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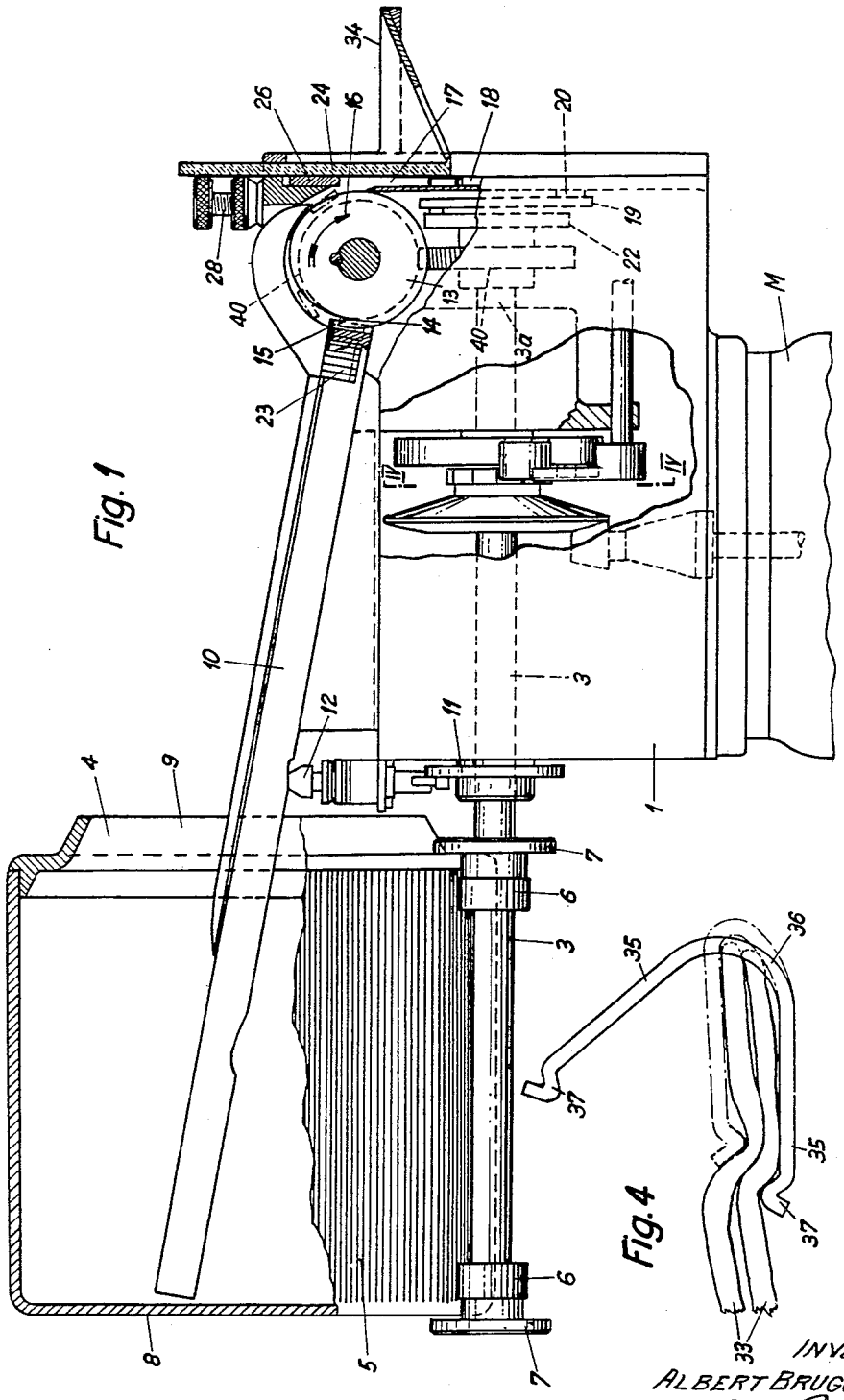


Fig. 1

Fig. 4

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Fig. 2

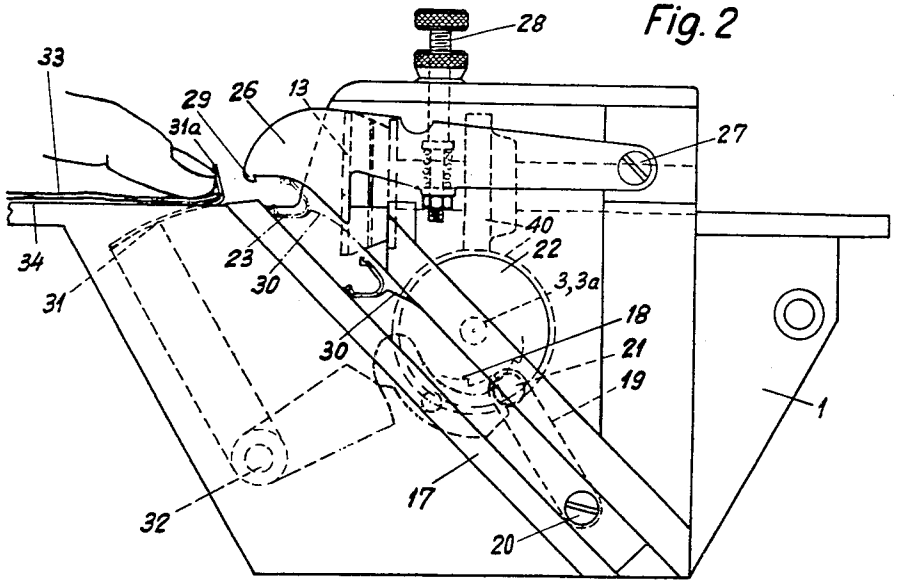
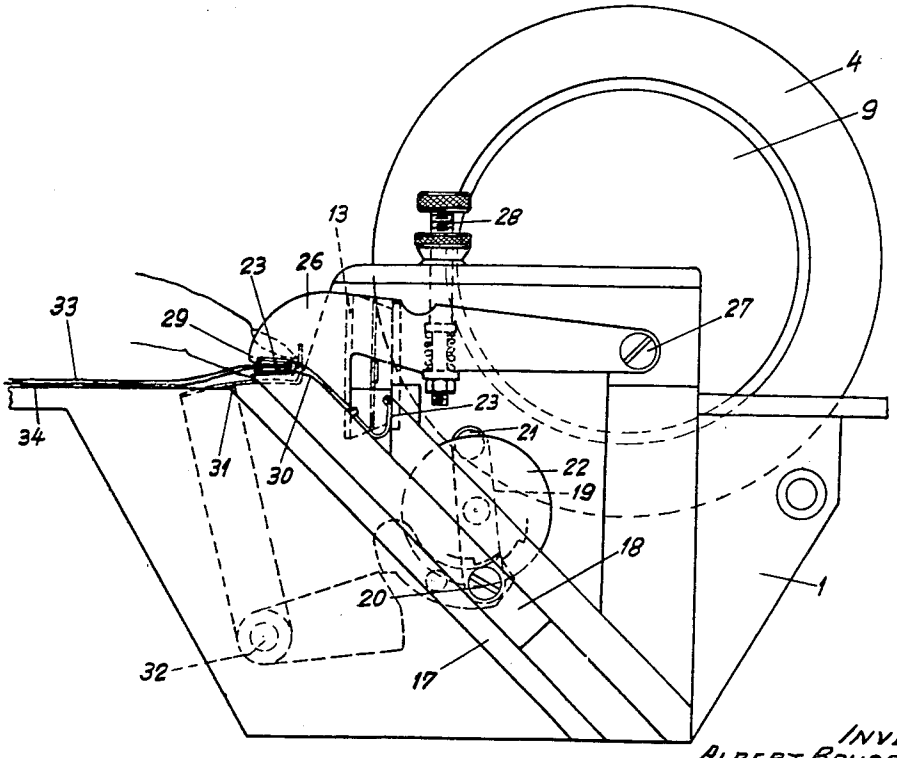


Fig. 3



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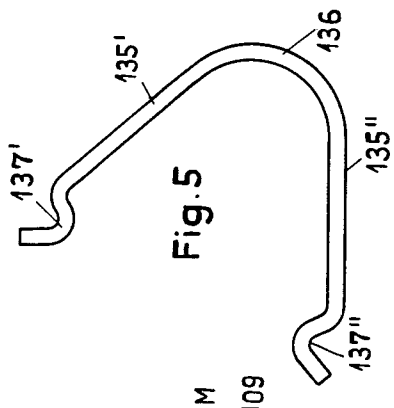


Fig. 5

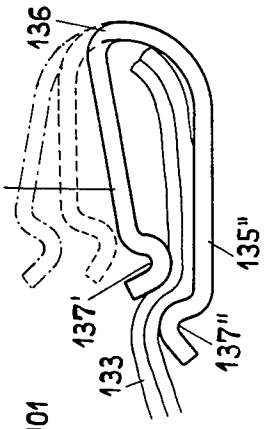


Fig. 6

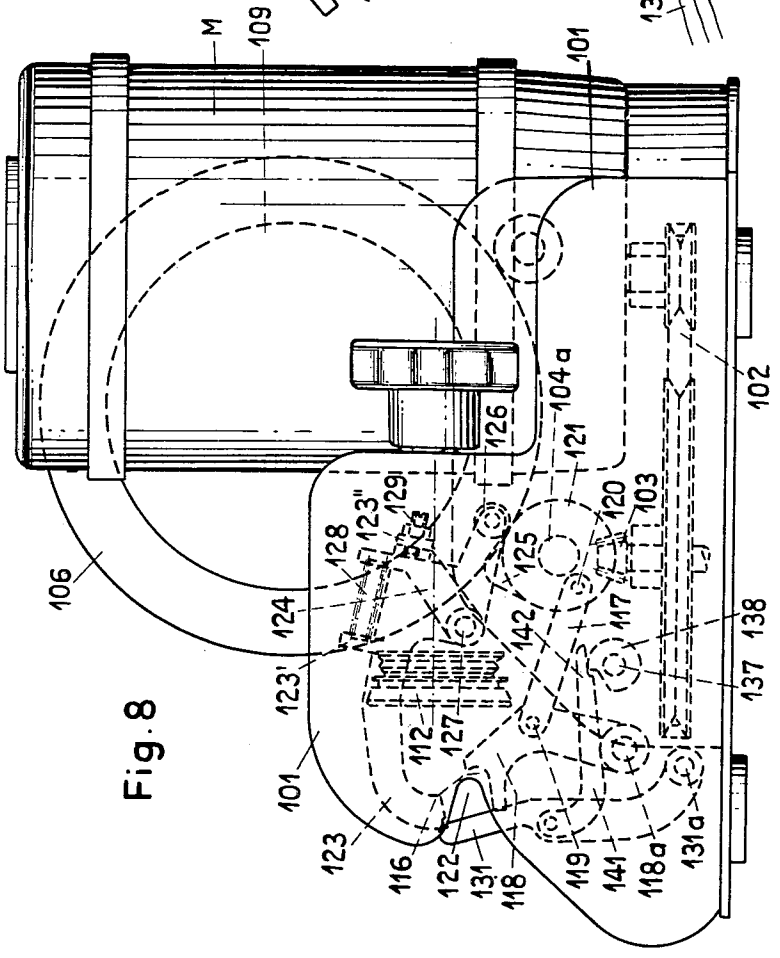


Fig. 8

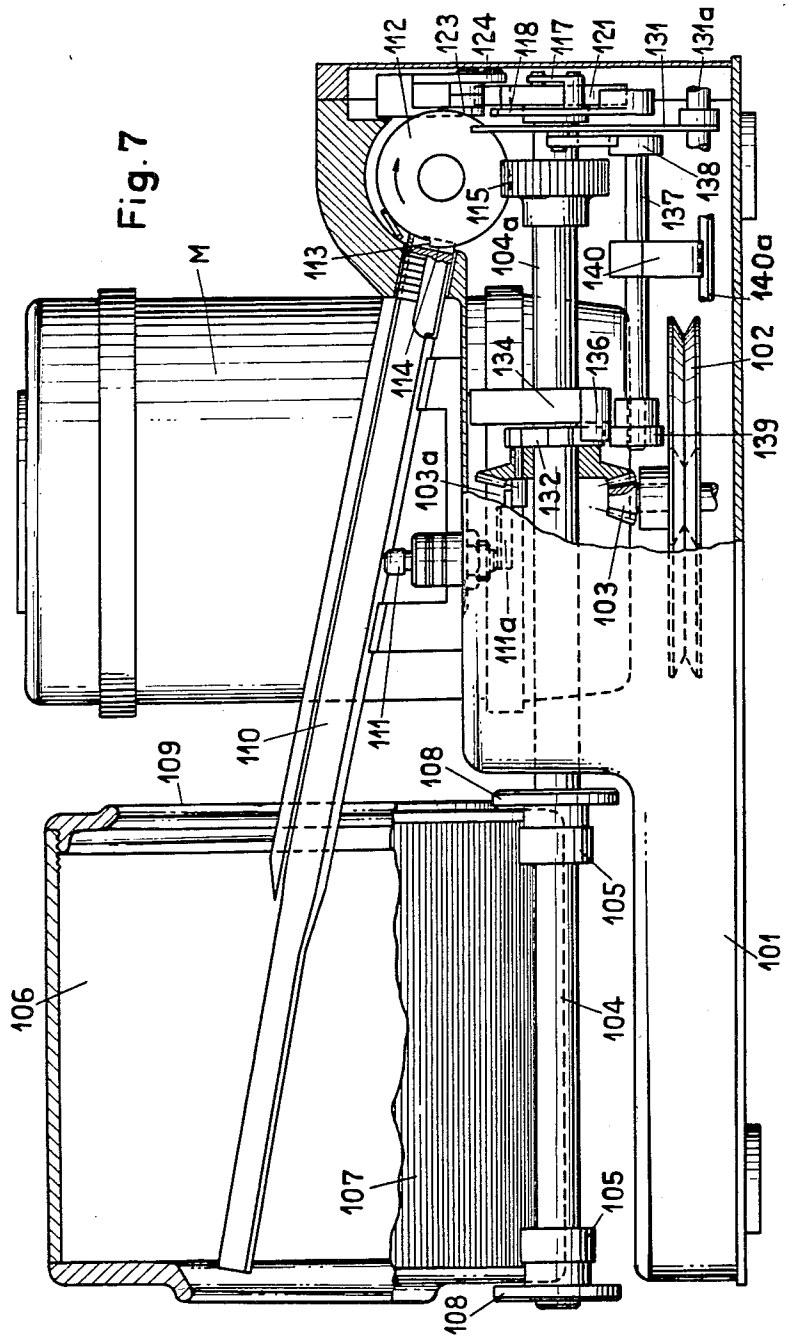
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Fig. 7



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Fig. 9

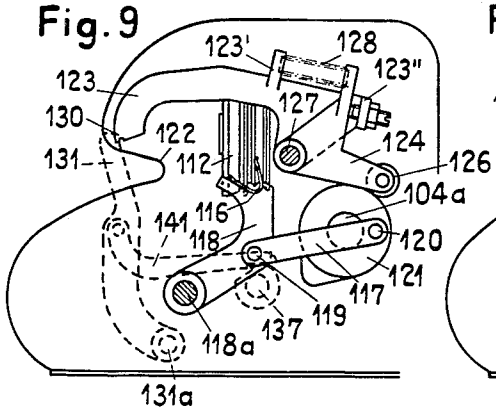


Fig. 10

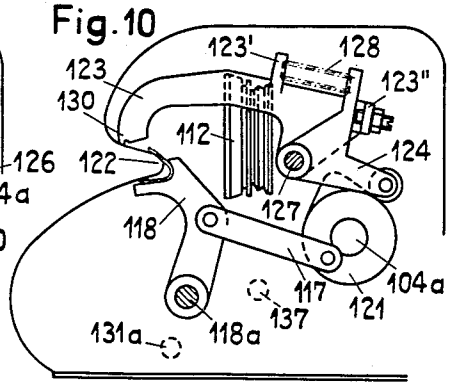


Fig. 11

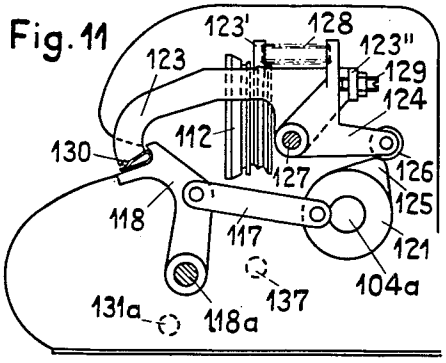


Fig. 12

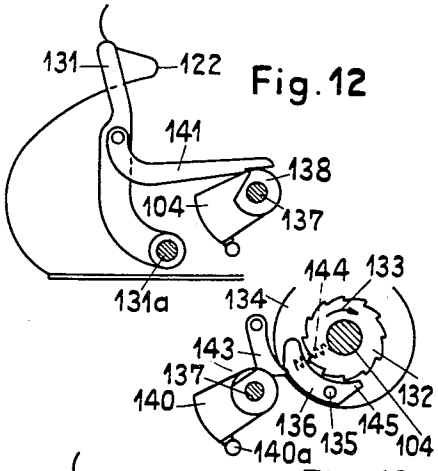


Fig. 12a

Fig. 13

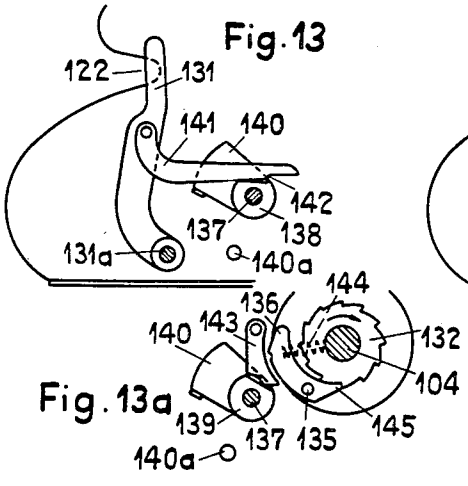


Fig. 13a

Fig. 14

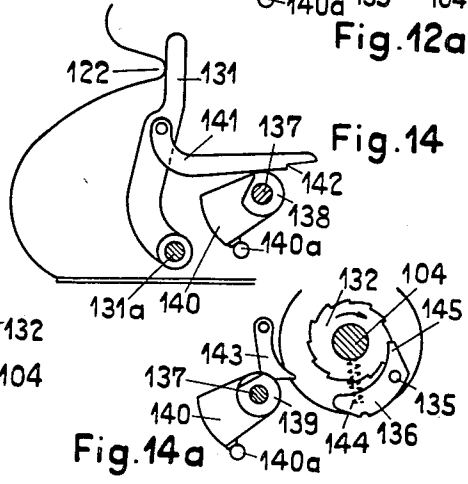


Fig. 14a

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APPLIANCE FOR ATTACHING CLIPS TO GOODS

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Application July 23, 1952, Serial No. 301,311

Claims priority, application Switzerland September 2, 1949

2 Claims. (Cl. 1—101)

This invention relates to appliances for attaching clips to sheet material and is a continuation-in-part of application Serial No. 182,521, filed August 31, 1950, now issued as Patent No. 2,709,809.

The invention relates to appliances for attaching clips to goods, especially textiles, such clips to be used especially for the purpose of fastening together several layers of goods (e. g. textiles) or for the purpose of fastening together a paper or cardboard ticket and the goods (e. g. textiles). Devices of this type are already known, in which clips with legs of unlike lengths are introduced into the apparatus and then are clamped together with the goods (e. g. piece of textile) by the apparatus, in which the uneven legs of the clips are hook-shaped on both ends, so that the fastening together process is achieved by means of the pressing together of the hook-shaped ends.

Apparatuses into which clips with uneven legs are fed are not nearly so advantageous in their construction and safety of operation as appliances built for the feeding in of clips with equal legs. This is because the construction of the former is more complicated than the construction of the latter and their safety of operation is naturally less, due to the more complex structure. The more complex construction of appliances into which the clips with uneven legs are fed is shown by the fact that the appliance must have a special device in it to place the incoming clips in a very exact and definite position with relation to the part of the machine which takes up the clips and carries them onward, thus preventing any sticking or stopping during the operation of the machine. The present invention faces the fundamental problem of constructing an apparatus of the species originally mentioned in which clips having unequal legs (which are in many respects more advantageous in their fastening powers) are used to bind the goods but in which clips having equal legs are at first introduced into the apparatus. The present apparatus is built accordingly, by means of the combination (*a*) a device for introducing and transporting clips which allows for the use of clips having unequal legs and (*b*) a bending device for bending clips having equal legs into clips having unequal legs and (*c*) a clamping device for clamping the last clips onto the goods, and (*d*) a power device to actuate the above devices. Such an apparatus combines for the first time the advantages of the use of clips having equal legs which are to be introduced into the machine and also of the use of clips having unequal legs when it comes to fastening them onto the goods.

This invention forming a combination that is especially advantageous in its construction and operation when their elements, i. e. the device for introducing the clips and for transporting the clips; the bending and clamping device; and the power device have the detailed characteristics explained in the description and drawing and defined in the claims.

Other objects and features of the invention will become apparent from the now following description of an embodiment given by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a part view of the appliance as seen from the front,

Fig. 2 is a part side view,

Fig. 3 is a view corresponding to Fig. 2, but with the components in another position;

Fig. 4 shows one of the clips being applied to a piece of textile fabric;

Fig. 5 shows another form of clip in the undeformed state,

Fig. 6 shows the clip according to Fig. 5, as applied to a piece of textile fabric, in various stages of deformation,

Fig. 7 is part front elevation, partly in section, of a modified embodiment of the appliance according to the invention,

Fig. 8 is a part lateral elevation thereof,

Figs. 9 to 11 show the transport and closing members of Fig. 8 in various operative positions,

Figs. 12 to 14*a* show the coupling members of Fig. 8 in various operative positions.

In Figs. 1 to 4, 1 denotes the frame of the appliance, to which a motor M is fitted. Through a bevel gear 2, the motor M drives a shaft 3 and rollers 6, on which the drum 4 rests freely. On its periphery this drum is provided with fluting 5 so that, when the shaft 3 rotates, the drum 4 is carried round by the rollers 6 in rotation. Flanges 7 arranged adjacent the rollers 6 prevent the drum from moving in the longitudinal direction of the shaft 3. Whilst the drum 4 is closed at one side by the bottom 8, it is provided at the other side with an opening 9. Through this opening, a bar 10, for example of approximately triangular cross section, projects into the said drum 4, and is kept vibrating by impacts imparted to it by the shaft 3 through a noncircular disc 11 and pin 12. The front end of the bar 10, i. e. the end on the right hand side in Fig. 1, is within the range of a transfer member 13 which has the form of a disc having a dog or nose 14 on its periphery. This transfer member 13 is geared by a gear 40 to a secondary shaft 3*a* which is temporary coupled to the shaft 3 by coupling means which will be described later.

The dog 14 of the transfer member 13 enters into a slot 15 of the bar 10, and at each revolution of the transfer member 13 removes one of the clips resting astride the bar 10. The direction of rotation of the disc 13 is indicated by the arrow 16.

In an obliquely inclined guide channel 17 (see Figs. 2 and 3) of the frame 1, a pusher 18 can be moved to-and-fro by link 19. This link is connected at one end to the pusher 18 by means of a pin 20, and at the other end by means of a crank pin 21 to a disc 22 which is mounted on the said secondary shaft 3*a*. A reciprocating motion is imparted to the pusher 18 by the rotary motion of the shaft 3*a*.

In order to be able to keep the clips 23 upon the pusher 18 and to prevent them from falling off, to supervise the operation, and quickly to remove stoppages, the guide channel 17 is covered on its side by a removable plate 24 (Fig. 1) preferably made of a transparent plastic.

Above the upper end of the guide channel 17 for the pusher 18 a counter-holder or closing member 26 is arranged whose shape is concave on the underside as can be seen from Figs. 2 and 3. This counter-holder 26 is pivoted on an axle 27 about which it can be turned by means of an adjustment screw 28. The head of the counter-holder 26 has a nose 29 against which the clips 23 come to bear at the end of the stroke of the pusher 18. On the other hand, the upper side of the pusher 18 is provided with a nose 30 (Figs. 2 and 3), against which the bend in the middle of the clip 23 comes to lie, while the nose 29 of the counter-holder 26 engages the upper end of the clip 23. As the movement of the pusher 18 is oblique, it has one component tending to close the clip

23, and another component tending to shift the clip relative to its upper end which is held in the horizontal direction by the nose 29 of the counter-holder. The clip 23 is accordingly deformed asymmetrically in a manner which will be described later more in detail with reference to Fig. 4.

In front of the counter-holder 26 a guide piece 31 is pivoted on an axle 32, as can be seen from Figs. 2 and 3. The guide piece 31 is turned up at an angle at its front end 31*a* facing the counter-holder, so that the goods 33 to which the clips are to be applied can be laid on the machine table 34 in such a manner that their ends abut against the said upward bend 31*a* of the guide piece 31.

The axle 32 is operatively connected (Fig. 1) to the aforesaid coupling means or clutch by means of which the secondary shaft 3*a* can be temporary coupled to the shaft 3. This is effected for just one rotation of shaft 3*a* whenever the axle 32 is angularly deflected about its axis.

Now if clips 23 have to be attached to goods, in particular to textiles, they are for this purpose filled into the drum 4. Because of the rotation of the drum, they fall on to the bar 10 along which they slide astride down from the left to the right in Fig. 1, in consequence of the vibratory movement of the bar. Since the clips are formed absolutely symmetrical with equal arms, no mechanism is required to introduce them in the desired position into the closing mechanism.

In the appliance described it is of no importance whether a clip lies with one arm or the other on the pusher 18. From the lower end of the bar 10 the clips are raised by the dog 14 of the rotating disc 13, and are thrown with one of their arms into the pusher guide 17 where they slide downwards. The lower end position of the pusher 18 is shown in Fig. 2. When the goods 33 to which the clip has to be attached are now placed on the machine table 34, laid against the upward bend 31*a* of the guide piece 31, and when the latter is swung clockwise in Figs. 2 and 3, then in the manner described hereinabove the drive of the pusher 18 is started, and the said pusher moves into its top end position as shown in Fig. 3. In the course of this movement, the clip 23 is deformed in the manner shown in Fig. 4, by the faces of the pusher 18 and of the counter-holder 26 facing one another.

In the range of the middle bend 36 connecting the arms 35 the clip is deformed asymmetrically by being doubled-up, and is turned over into the position shown in chain-dotted lines, whereby stresses are set up in the material which increase the clamping force. The end bends 37 of the arms 35 are thus displaced with respect to one another in the longitudinal direction of the clip, so that with the altered shape of the middle bend 36 and with the end bends 37 a particularly good clamping effect is attained with the least possible damage to the goods.

The appliance described works fully automatically in that it is merely necessary to lay the goods 33 on to the table 34 and to swing the guide piece 31 manually, after which the pushing forward of the clip 23 and its subsequent closing take place automatically.

The advantage in comparison with known clamping appliances making a sharp angular kink in the clips consists in that the specific deformation of the clip material is considerably less because of the radius of curvature of the bend of the clip is merely being reduced. This allows, for the same clamping force, the use of a harder material and thus of one of smaller cross section, so that a saving in clip material can be attained.

Referring now to Fig. 5, a somewhat modified clip is shown in the underformed state in which its arms 135', 135'' are symmetrical about its central bend 136, and their ends 137', 137'' are firstly bent towards one another and then bent away from one another in an S-shape.

In Fig. 6 various stages of deformation of this clip are shown: the broken-off full lines show just the beginning of deformation; the chain-dotted lines show how the radius of curvature of the bend 136 is reduced adjacent the arm 135' while remaining substantially unaffected adjacent the arm 135''; the dotted lines show a further stage of deformation, resulting in that the end 137' is shifted inwards towards the bend 136; and the complete full lines show the final position in which the end 137' has moved inwards past the other end, 137'', clamping the goods 133 between the convex part of the S-shaped end 137' and the concave part of the S-shaped end 137'', holding the same firmly without exposing the same to being damaged by the cut-off ends of the clip.

Referring now to Figs. 7 to 14*a*, the casing of the machine is denoted 101, on top of which an electric motor M is attached. This motor drives a shaft 104 and rollers 105 via a V-belt drive 102 and bevel gearing 103. The drum 106 lies freely on the rollers 105 and is provided with fluting 107 on its circumference so that it is carried along in rotation by the rotating rollers 105. Flanges 108 arranged on the shaft 104 prevent any longitudinal movement of the drum 105 relative to the shaft 104 and rollers 105.

Through an aperture 109 on the right hand side (Fig. 7) of the drum 106, a bar 110 projects into the interior of the drum. This bar 110 has for example a substantially triangular cross section, and a more or less strong vibratory motion is imparted to it by a pin 111 which is reciprocated by an arm 111*a* engaged by a dog 103*a* attached to the bevel gear wheel on shaft 104 and forming part of the bevel gearing 103.

The forward end of the bar 110 (Fig. 7, right hand side) projects into the range of a transfer member 112 which is geared by a gear 115 to a shaft 104*a* (which will be described later) and is constructed as a disc having a dog or nose 113 on its periphery. This nose enters into a slot 114 of the bar 110, and at every revolution of the disc 112, one clip riding astride the bar 110 is carried off by said nose. The direction of rotation of the disc 112 is indicated by an arrow.

The clip carried off by the disc 112 drops into an appropriately shaped recess 116 (Fig. 9) of a transport member 118 which reciprocated on a substantially horizontal arc by means of a link 117 articulated to it by a pin 119, and articulated by a pin 120 to a disc 121 attached to said shaft 104*a* which is temporarily coupled to the aforesaid shaft 104 in a manner which will be described later in detail. Upon rotary movement of the shaft 104*a* the clip is accordingly carried by the transport member 118 towards a recess 122 (Figs. 8 to 10) provided provided laterally on the casing 101, and is clamped there on to the goods by the closing member 123 (Fig. 11) which is pivoted on an axle 127 and which has a nose 130. Its end moves on a substantially vertical arc i. e. perpendicular to the path of the end of the transport member 118.

On the axle 127 a bell crank lever 124 is pivoted independently of the closing member 123, one arm of which lever carries a roller 126 running on the periphery of the disc 121 which has a cam 125 cooperating with the roller 126. The movement of the bell crank lever 124 is transmitted through a compression spring 128 to the closing member 123, which spring is interposed between the other arm of the bell crank lever and a projection 123' of the closing member. By means of an adjustment screw 129 screwed into an extension 123'' of the closing member and abutting against the adjacent arm of the bell crank lever 124 the relative initial position of the latter and the closing member 123 can be adjusted.

As pointed out hereinabove, Fig. 9 shows how a clip, still undeformed, is inserted by the transfer member 112 into the transport member 118; Fig. 10 shows how this transport member is moved by the link 117 to a position adjacent the recess 122, and Fig. 11 shows how the nose 130 of closing member 123 catches the end of the clip lying on top of transport member 118 in such a manner

that by the combination of the substantially horizontal movement of the latter with the substantially vertical movement of the closing member **123** the ends of the legs of the clip are shifted relative to one another longitudinally when being rolled-in whereby the final asymmetrical shape of the clip is gradually attained as described hereinabove with reference to Fig. 6.

A control lever **131** is pivoted on the casing at **131***a* and extends into the range of the recess **122**. An arm **141** is pivoted to the said lever **131** and extends with its nose **142** into the range of a cam **138** which is attached to a shaft **137**.

Further components which have been omitted from Figs. 7 to 11 for clarity will now be described with reference to Figs. 12 to 14*a* which show these components in conjunction with the components described hereinabove in various operative positions.

Figs. 12 and 12*a* show these components in the starting position: a ratchet wheel **132**, fixedly mounted on the shaft **104**, rotates in the direction of the arrow **133** when the motor M has been switched on. A disc **134** fixed to the shaft **104***a* carries a pawl **136** pivoted on a pin **135**. Two cams **138** (Fig. 12) and **139** (Fig. 12*a*) as well as a counterpoise **140** are fixedly connected to a shaft **137**.

Figs. 13 and 13*a* show these components during the insection of the goods to be stapled into the recess **122**, whereby the lever **131**, too, is moved back. The lever **131** then pushes the arm **141** along in such a manner that the nose **142** thereof transmits an rotational movement to the cam **138**. Consequently the cam **139** on the opposite side (Fig. 13*a*) releases the intermediate member **143**. The pawl **136** can now turn about the pin **135** under the pressure of the spring **144** whereby the nose **145** gets into the range of the rotating ratchet wheel **132**. Accordingly the rotary motion of the shaft **104** is transmitted on to the shaft **104***a*.

The device described operates in a fully automatic manner: it is merely necessary to insert the goods to be stapled into the recess **122** by means of the thumbs and and forefingers of both hands. Thereby the lever **131**, too, is simultaneously moved, whereupon the advancing of the clip and the closing thereof is effected automatically. The inner coupling members are so constructed that, after their operation, the shaft **104***a* can perform a single revolution only, and then comes to a standstill, again in the starting position:

When the goods are inserted into the recess **122**, the lever **131** gets into its end position (Fig. 14), immediately after the coupling operation described hereinabove.

The nose **142** of the arm **141** slides over the cam **138**, and the counterpoise **140** restores the shaft **137** with the two cams **138** and **139** to its initial position. The intermediate member **143** (Fig. 14*a*) is shifted forward again, and raises the pawl **136**, which in the meantime has completed exactly one revolution owing to the ratchet wheel **132**, out of range of the ratchet teeth thereof. The transporting and closing members of the machine are then immobilised until a further operation of the lever **131** is effected.

While I have described and illustrated what may be considered a typical and particularly useful embodiment of my said invention I wish it be understood that I do not limit myself to the particular details described and illustrated for obvious modifications will occur to a person skilled in the art.

What I claim is:

1. An appliance for forming clips having unequal leg lengths and attaching the same comprising means for supplying individual clip banks having legs of equal length to a receiving station, a die member movable to and from said station for conveying said blanks to a forming station and a forming and clamping member at said forming station cooperating with said die member to bend said blank at an intermediate point nearer one leg than the other and about material presented between the legs to secure the clamp to the material by pressure exerted between legs of different length, and power means for successively moving said die member and said forming and clamping member.

2. An apparatus according to claim 1 in which said power means includes clutch mechanism for actuating said die member and said forming and clamping member successively, and means actuating said clutch mechanism in response to positioning of the material to be clipped.

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