June 7, 1966 S. A. MACONDRAY ETAL 3,254,398

CLIP DISPENSING AND ATTACHING APPARATUS

Filed April 7, 1964 2 Sheets-Sheet 1

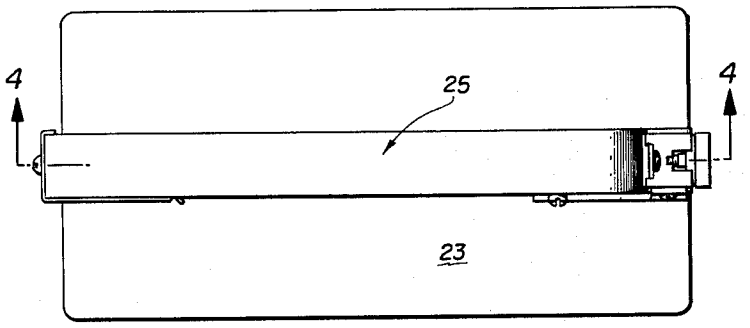

Fig. 2

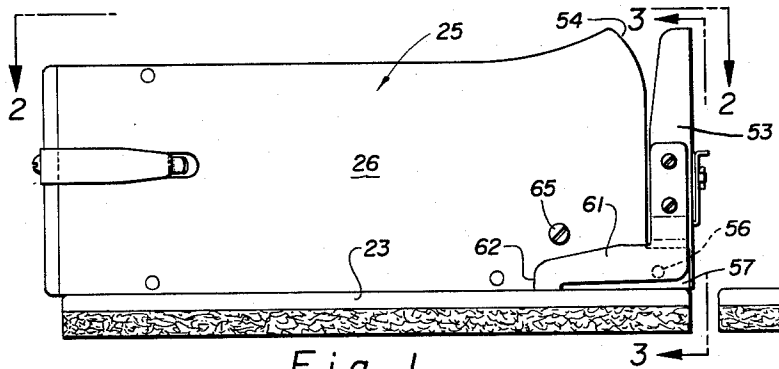

Fig. 1

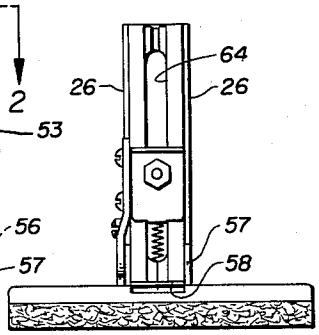

Fig. 3

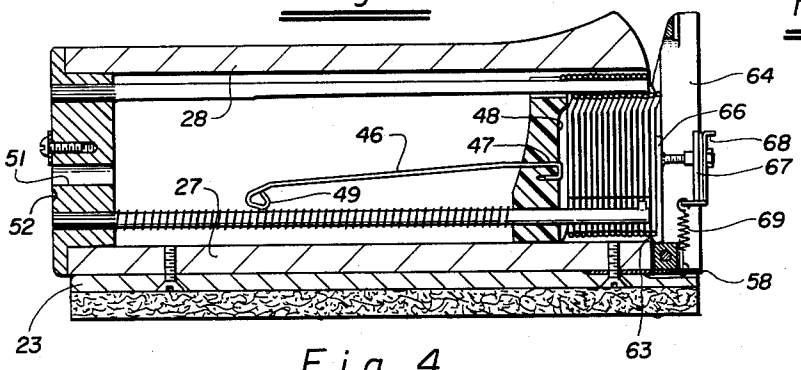

Fig. 4

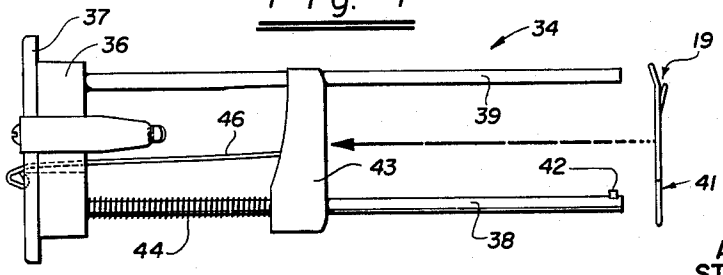

Fig. 5

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CLIP DISPENSING AND ATTACHING APPARATUS

Filed April 7, 1964 2 Sheets-Sheet 2

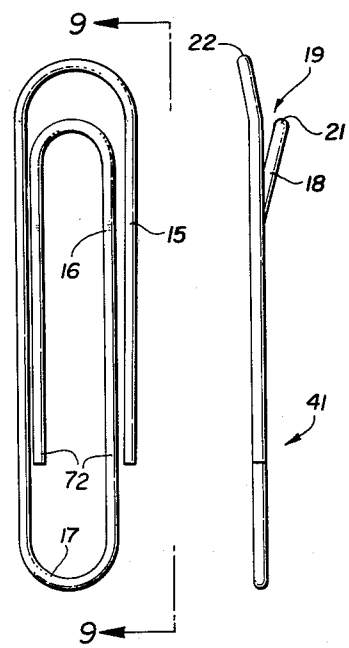

Fig. 8 Fig. 9

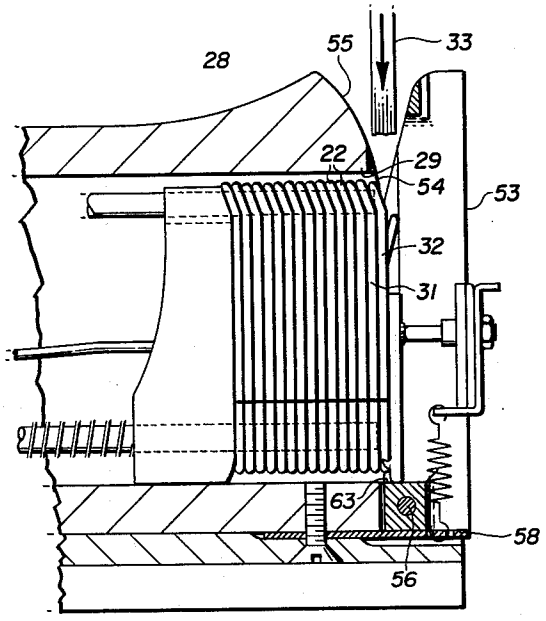

Fig. 6

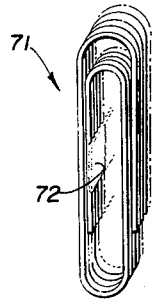

Fig. 10

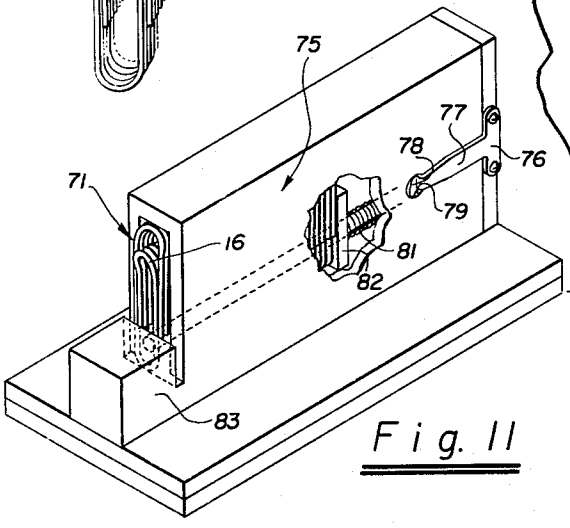

Fig. 11

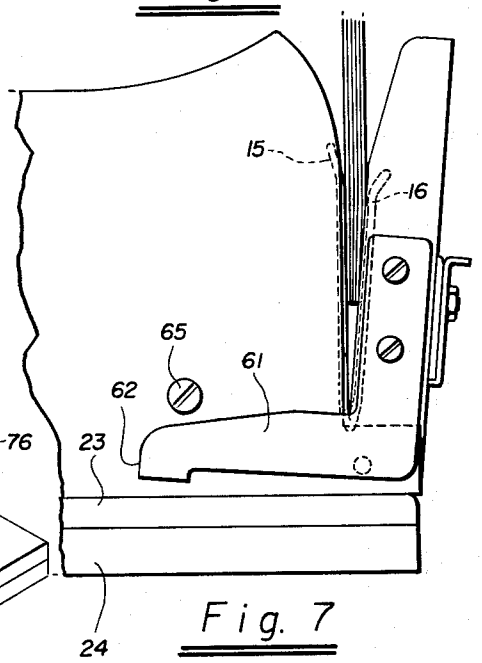

Fig. 7

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CLIP DISPENSING AND ATTACHING APPARATUS

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Filed Apr. 7, 1964, Ser. No. 357,924
10 Claims. (Cl. 29—212)

This invention relates to clip dispensing and attaching apparatus of the type particularly useful for attaching paper clips and the like to a sheaf of sheet materials.

Apparatus and devices for dispensing and attaching paper clips to a sheaf of sheet material have previously been employed. In the past, these devices have required a two-handed operation. Thus, a sheaf, held in one hand, is inserted into the dispensing slot and then, with the other hand, means are actuated which serve to eject the paper clip onto the sheaf.

In general, it is an object of the present invention to provide a paper clip attaching apparatus whereby one-handed operation is permitted.

According to the present invention a sheaf of material held in one hand can be moved into a clip dispensing slot where a paper clip is held stationary to receive the sheaf between the leaves of the clip and, upon withdrawal of the sheaf, the paper clip is released from the slot and carried with the sheaf.

It is another object of the invention to provide a clip dispensing apparatus whereby clips are applied to a sheaf of material as it is inserted into a dispensing station and whereby the clips are released from the station after attachment to the sheaf so as to be carried away with the sheaf upon removal of same.

It is another object of the invention to provide a paper clip dispensing apparatus wherein clips from a plurality thereof can be manually dispensed singly. Thus, it is possible to dispense a single paper clip and manually attach it to whatever material is intended to receive it.

These and other objects of the invention will be more clearly apparent from the following detailed description of a preferred embodiment thereof when considered in conjunction with the accompanying drawings, in which:

FIGURES 1–3 represent side elevation, plan, and end elevation views respectively of a clip dispensing apparatus according to the invention;

FIGURE 4 is an elevation section view taken along the line 4—4 of FIGURE 2;

FIGURE 5 is a detailed view showing a cartridge construction for loading clips into the dispensing apparatus;

FIGURE 6 is an enlarged detailed section view similar to a corresponding portion of FIGURE 4;

FIGURE 7 is an enlarged detailed view in side elevation showing a sheaf of sheet material entering the clip dispensing station;

FIGURES 8 and 9 are front and side elevational views of a paper clip adapted to be employed with the apparatus;

FIGURE 10 is a perspective view of a unitary charge of clips adhered together for use in the apparatus; and

FIGURE 11 is a perspective view of a simplified embodiment according to the invention.

The clip dispensing apparatus as described herein is particularly useful in dispensing paper clips or other clips of the type characterized by resilient leaves joined at one end and resiliently spreadable from each other at the other end when receiving a sheaf of material between the leaves. The leaves resiliently grip the sheaf and engage the same by friction. In particular, as is known, clips of this type can include an outer coil **15** and an inner coil **16** as shown in FIGURE 8. Coils **15**, **16** are joined at one end, as by a bridge portion **17** and are resiliently spreadable from each other at the opposite end. It

is particularly desirable in the present instance that at least one of the leaves be formed at the open end of the clip so as to diverge away from the plane of the clip as shown by the diverging portion **18** in FIGURE 9. Portion **18**, as it diverges from the plane of the clip thereby provides an open mouth **19**, adapted to receive a sheaf of sheet material. The ends of leaves **15**, **16** at the mouth **19** serve to provide lips **21**, **22** thereof. It is further desirable, though not entirely necessary, that both lips **21**, **22** diverge away from the plane of the clip and in opposite directions so as to widen the mouth **19**.

In general, in the apparatus described in detail further below, there is provided a magazine to contain and direct each of a plurality of clips to a dispensing and attaching station where each clip can be attached to a sheaf of sheet material and withdrawn with same upon removal thereof from the station. That clip which is to be attached to the sheaf is restrained from moving with the sheaf during entry of the sheaf between the leaves of the clip. The device is arranged to permit the leaves to spread so as to become attached to the sheaf and is further arranged to release the attached clip during removal of the sheaf from the attaching station after attachment of the clip to the sheaf. Means are further provided to retain the clip which is next adjacent to the attached clip during withdrawn movement of the sheaf from the station.

As will be readily evident from the following description of the dispensing device, it can, without departing from the spirit and scope of the invention, be oriented in virtually any plane. However, as disclosed herein it is shown and described to rest upon a base plate **23**, the under side of which is prepared with a soft pad **24** so that the device can sit upon a desk top or the like without marking the surface.

Means forming a magazine to contain and direct each of a plurality of clips provides the main body portion of the apparatus. The magazine **25** includes a pair of parallel side plates **26** spaced apart and enclosed top and bottom by a bottom plate **27** and a top plate **28**. Plates **26** can be screwed to plates **27**, **28** to form a hollow box construction forming magazine **25**. Magazine **25** is open at one end forming a dispensing opening through which each clip is fed to a dispensing station.

Means for retaining that clip which is next adjacent to the clip being attached to the sheaf is provided whereby upon withdrawal of the sheaf and attached clip, the next adjacent clip is retained and moved into position to be attached to the next sheaf entering the dispensing station. Thus, the lower edge of top plate **28** forms a parting or separating edge **29**. Edge **29** is disposed to abut lip **22** of a clip **31**. Clip **31** is adjacent a clip **32** which is to be attached to a sheaf **33** of sheet material. Edge **29** in addition, permits clip **32** to be dispensed by passing clear of the edge and thereby separates clip **32** from clip **31**.

A cartridge construction **34** carries a charge of clips within magazine **25**. See FIGURE 5. A back plate **36** is dimensioned to be received in the loading end of magazine **25** and is provided with a flange **37** formed to abut the ends of plates **26**, **27**, and **28**. Two spaced parallel rods **38**, **39** serve to support and guide a plurality of clips such as **41** within magazine **25**. Rods **38**, **39** can be dimensioned to prevent improper loading of clips **41**, for example, in an upside down position, by taking advantage of the fact that the width between the sides of loop **15** is greater than the width between the sides of the clip at the bottom end **17**. In addition, if desired, a tab **42** can be provided which increases the vertical extent of rod **38** at its loading end whereby the vertical spacing between the lips **21**, **22** of a clip will not pass over the tab. A

pressure plate 43 is provided to slidably ride on rod 38 and be guided by rod 39.

A spring 44 carried on rod 38 between plate 43 and plate 36 serves to apply a biasing force along an axis substantially normal to the plane of a clip 41 and passes through the plane thereof at the region of the end of the clip remote from its mouth 19. The advantage of so arranging spring 44 will be more readily apparent from the description further below.

Means are provided for retaining pressure plate 43 in a retracted position while clips 41 are loaded onto rods 38, 39. Thus, a wire 46 having a J-shaped end 47 is engaged in a slot 48 to be recessed below the pressure surface of plate 43. The other end of wire 46 is turned upon itself to form a hook 49 which when passed through a hole 51 in back plate 36 is adapted to engage a detent 52 and be retained therein. After a full charge of clips 41 has been loaded onto rods 38, 39, hook 49 is moved out of detent 52 and aligned with hole 51 whereby the biasing force of spring 44 is released to urge pressure plate 43 to feed clips 41 to the dispensing station.

The dispensing station is characterized by a sheaf receiving slot defined between the dispensing end of magazine 25 and a pivoted jaw member 53. As previously noted, the dispensing end of magazine 25 includes the shearing edge 29 formed at the end edge of top plate 28. Top plate 28 and the end edges of side plates 26 are rounded to diverge upwardly and outwardly so as to guide sheaf 33 into a clip position to be dispensed as designated at 32 in FIGURE 6. Thus, the end edges 54 and end surface 55 serve to direct the left face of sheaf 33 as shown in FIGURE 6 over lip 22 of clip 32 and direct sheaf 33 into the throat of the clip.

After entry of sheaf 33 into the throat 19 of clip 32 it will be readily apparent that the left hand leaf of clip 32 will be retained upright between the left face of sheaf 33 on the one side and the next adjacent clip 31 on the other. Pivoted jaw member 53 is carried to pivot about a pin 56 disposed between forwardly extending tabs 57 formed at the lower edge of, and integral with, side plates 26. A leaf spring 58 resiliently urges jaw member 53 in a counterclockwise direction as shown. Thus, jaw member 53 permits leaf 16 of clip 32 to be resiliently spread away from leaf 15 thereof, as sheaf 33 moves downwardly through throat 19. (See FIGURE 7.) In short, it is to be noted that a resiliently yielding, hinged jaw member is pivoted adjacent the lower end region of clip 32 to abut the same thereat for purposes yet to be described. The pivoted end of the jaw member is positioned transversely of the axis of spring 44 to yieldingly resist the applied biasing force thereof at the lower end of clip 32. Jaw member 53 thereby serves to pinch the lower end of the clip to be dispensed between the pivoted end of the jaw member 53 and the lower end region of the clip disposed next adjacent to the clip to be dispensed.

Inasmuch as lip 21 of each clip diverges out of the plane thereof, the face of jaw member 53 should be relieved to form a channel accommodating the protruding lip.

The upper portion of jaw member 53, starting slightly above the midpoint, diverges outwardly away from the plane of the clip to be dispensed. Thus, as the clip is drawn out of the dispensing slot, it makes less and less frictional contact with the face of jaw member 53.

The width of jaw member 53 is slightly less than the width of the opening in magazine 25 whereby the jaw member fits between tab portions 57. An L-shaped stop member 61 is screwed to the side of jaw member 53 and is provided with a foot 62 disposed to abut base plate 23. Stop member 61 is dimensioned to dispose jaw member 53 whereby sheaf 33 when comprised of only two or three lightweight sheets of paper, for example, need not force its way into the dispensing slot by pushing jaw member 53 out of the way. Stop member 61 is further dimensioned whereby one and only one clip 41 is allowed to

enter the dispensing slot. Thus, as shown in FIGURE 6, clip 32 is held in position whereby edge 54 serves to direct the left face of sheaf 33 over lip 22 thereof. On the other hand, lip 22 of the adjacent clip 31 is held to the rear of separating edge 29. Accordingly, stop 61 serves to properly position the clips in the dispensing slot.

The dispensing slot is arranged to include means serving to restrain that clip which is to be attached, from moving with the sheaf 33 during entry of the sheaf between the leaves thereof. See FIGURE 6. As sheaf 33 enters the throat 19 of clip 32, clip 32 immediately bottoms in the dispensing slot against a pair of projecting teeth 63 formed to extend into the plane of clip 32 at a position below same.

Means are provided whereby clips can be dispensed from the magazine individually without inserting a sheaf 33, if desired. Thus, jaw member 53 includes a way 64 and a clip ejector member 66 slidably movable along the way between retracted and advanced positions. Ejector member 66 includes a portion 67 extending beyond jaw member 53 to the right thereof as shown. Portion 67 is formed with a lip 68 adapted to be engaged by a finger of a person using the device in order to move the ejector member 66 to its upper position.

Ejector member 66 is formed to include the clip engaging teeth 63 extending into the plane of the clip which is to be dispensed. Teeth 63 are disposed to engage a portion of the clip as ejection member 66 moves upwardly to its advanced position. In so moving, teeth 63 carry the clip to be dispensed (e.g., clip 32) upwardly to an advanced position whereby the upper end of the clip is exposed to be manually withdrawn. A helical spring 69 couples portion 67 to leaf spring 58 and thereby serves to resiliently return ejection member 66 to its retracted position after release of ejector 68.

A screw 65 extends outwardly into the plane of movement of arm 61 to arrest pivotal movement of same whereby jaw member 53 cannot inadverently be rocked fully away from the open end of magazine 25. Thus, the inadvertent discharge of a complete charge of clips is prevented.

In order to readily insert a loaded cartridge of clips into magazine 25, a preferred charge 71 of clips is provided as a unitary construction to be loaded into magazine 25. Each clip is adhered to the next at a portion 72 of leaf 16 of each. As will be recalled, leaf 16 is the leaf of the clip which is permitted to be resiliently spread apart during entry of sheaf 33 into throat 19. Portion 72 of leaves 16 is disposed substantially remote from the throat 19 of each clip to permit the entering sheaf 33 to spread the leaves 15, 16, and rupture the bond between the adhering portions of adjacent clips. Thus, each clip, after it becomes attached to the sheaf 33, is released in the process from the other clips forming the remainder of charge 71. In order to adhere clips to each other along a portion disposed at 72, suitable adhesive material can be applied; the wire of each clip can be modestly fused thereat; or a light deposit of bonding metal can be disposed along a narrow band of the inner portion of leaf 16.

One suitable method for achieving this adhesion of the clips one to the other is by means of an elongated thin heated tongue which can be inserted along the charge of clips as they are held closely together on a rod passing between lips 21, 22. After the tongue is inserted along the charge of clips, it can be axially rotated to cause a modest fusion between the clips in the region of portion 72.

The apparatus is arranged whereby after attachment of a clip to sheaf 33, the clip is released so as to be carried with the sheaf as it is withdrawn from the dispensing slot. As noted above, each clip to be dispensed is held primarily at its lower end. A holding pressure is applied by spring 44 forcing the lower region of the

clips into abutment with jaw member **53** at its pivoted end. The fact that the sheaf **33** serves to wedge the leaves of each clip apart, causes the clip to be held along a limited length thereof by frictional engagement.

The frictional engagement of the resiliently yielding surface of jaw member **53** and the frictional engagement between the clip to be dispensed and the next adjacent clip provides substantially the total friction serving to hold the clip within the device. This total friction is insufficient to overcome the grip of the clip with respect to a sheaf **33** so that withdrawal of sheaf **33** carries the clip with it. During withdrawal of the clip from the device, edge **29** serves to hold the next adjacent clip from being carried along.

A simplified embodiment according to the invention is shown in FIGURE 11 wherein a magazine **75** is provided with a cartridge **76** similar to cartridge **34** described above. Cartridge **76** is retained within magazine **75** by engagement of a leaf spring **77** including an inwardly formed lip **78** engaging a hole **79** in the side of magazine **75**. A spring **81** urges a pressure plate **82** against the rear of a charge **71** of clips to be dispensed. Spring **81** acts along an axis which intercepts an abutment portion **83** aligned whereby the lower end of each clip is pinched between abutment portiton **83** and the lower end of the next adjacent clip of charge **71**. Thus, as a sheaf of sheet material moves downwardly into the open throat **19** of each clip, leaf **16** thereof will be permitted to bend forwardly and rupture the adhering bond between the clip to be dispensed and the adjacent clip of the charge. The top of magazine **75** extends sufficiently far along the charge to overlie the upper lip **22** of the next adjacent clip to be dispensed. Thus, (although not entirely necessary when the remaining charge includes a considerable number of clips) for the last few clips to be dispensed, the overhanging separating edge formed by the top of magazine **75** serves to retain the clips from being withdrawn or dislodged from the magazine.

From the foregoing, it will be readily evident that one-handed operation for applying a paper clip to a sheaf of material is readily accomplished merely by inserting the sheaf of material into the dispensing slot and subsequently withdrawing the sheaf from same.

It will be further readily evident that if it is desired to obtain a single clip for manual attachment or other use, the ejector member **66** can be manually moved from a retracted to an advanced position whereby teeth **63** urge a single clip out of the device.

We claim:

1. A clip dispensing and attaching device for clips of the type characterized by resilient leaves joined at one end and resiliently spreadable from each other at the other end to receive and resiliently grip sheet material therebetween, at least one of the leaves being formed at the last named end to diverge away from the plane of the clip and provide an open mouth adapted to receive a sheaf of sheet material, wherein the ends of the leaves at the mouth of the clip define the lips thereof, said dispensing and attaching device comprising means serving to define a clip dispensing and attaching station, means forming a magazine to contain and direct each of a plurality of clips to said station to be attached to a sheaf of sheet material thereat, means at said station serving to support in sheet receiving relaxed position that clip which is to be attached, and means to restrain the same from moving with the sheaf during entry of the sheaf between the leaves thereof, the penultimate named means serving to permit the leaves to yieldingly spread during entry of the sheaf so as to become resiliently attached to the sheaf, and means for retaining the clip which is next adjacent to the attached clip during withdrawal of the sheaf from the station while releasing said attached clip during removal of said sheaf from the station after the attached clip has engaged the sheaf.

2. Clip dispensing apparatus as defined in claim **1** wherein the penultimate named means includes a resiliently yielding, hinged jaw member pivoted adjacent the region of the joined end of that clip which is to be dispensed and disposed to abut said clip thereat in frictional engagement primarily at the region of the joined end thereof.

3. Clip dispensing apparatus as defined in claim **2** further including means directing a biasing force through said end region to feed the clips to said station, and to dispose the clips in position to receive a sheaf by passively holding the clips primarily at said end region.

4. Clip dispensing apparatus as defined in claim **1** wherein the last named means includes abutment means including a separating edge serving to retain that clip which is next adjacent to the clip to be dispensed from being withdrawn with the latter during removal of the sheaf from said station.

5. A clip dispensing and attaching device for clips of the type characterized by resilient leaves joined at one end and resiliently spreadable from each other at the other end to receive and resiliently grip sheet material therebetween, said dispensing and attaching device comprising means serving to define a clip dispensing and attaching station, means forming a magazine to contain and direct each of a plurality of clips to said station to be attached to a sheaf of sheet material thereat and to be withdrawn with the sheaf upon removal of same from the station, means serving to passively hold in sheaf receiving position for yielding entry of a sheaf between the leaves of that clip which is to be attached to the sheaf and to restrain said clip from moving with the sheaf during entry of the sheaf between the leaves thereof the last named means serving to permit the leaves to spread so as to resiliently engage the sheaf and further serving to release said attached clip during removal of said sheaf from the station after the clip has engaged the sheaf, and means for retaining that clip which is next adjacent to the attached clip during withdrawal of the sheaf from the station, said means for permitting the leaves of the clip being attached to spread including a resiliently yielding, hinged jaw member pivoted adjacent the joined end of that clip which is to be dispensed, and disposed to abut same thereat to frictionally engage same primarily at its joined end, said jaw member including a way defined therein, a clip ejector member slidably movable along said way between retracted and advanced positions, said ejector member including a portion extending beyond the jaw member and formed and adapted to be engaged by a finger of a person using the device to move the ejector member to its advanced position, said ejector member being formed to include clip engaging means extending into the plane of a clip to be dispensed and disposed to engage a portion of the clip as the ejection member moves to its advanced position and to carry the clip along with the engaging means, and resilient means connected to return the ejection member to its retracted position after release of said first named portion.

6. A clip dispensing device for clips of the type characterized by resilient leaves joined at one end and resiliently spreadable from each other at the other end to receive and resiliently grip sheet material therebetween, said dispensing device comprising means serving to define a clip dispensing station, means forming a magazine to contain and direct each of a plurality of clips to said station to be dispensed thereat, means for retaining that clip which is next adjacent to the clip being dispensed during withdrawal of the latter from the dispensing station, a resiliently yielding, hinged jaw member pivoted adjacent the joined end of that clip which is to be dispensed, and disposed to abut same thereat to frictionally engage same primarily at its joined end, said jaw member including a way defined therein, a clip ejector member slidably movable along said way between retracted and advanced positions, said ejector member including a portion extending beyond the jaw member and formed to be engaged by a finger of a person using the device to move the ejector

member to its advanced position, said ejector member being formed to include clip engaging means extending into the plane of a clip to be dispensed and disposed to engage a portion of the clip as the ejection member moves to its advanced position and to carry the clip along with the engaging means, and resilient means connected to return the ejection member to its retracted position after release of said first named portion.

7. A clip dispensing and attaching device for clips of the type characterized by resilient leaves joined at one end and resiliently spreadable from each other at the other end to receive sheet material to be engaged therebetween, at least one of the leaves being formed at the last named end to diverge away from the plane of the clip and provide an open mouth adapted to receive a sheaf of sheet material, wherein the ends of the leaves at the mouth serve as lips thereof, said dispensing and attaching device comprising means for feeding each one of a plurality of clips to a dispensing station, means for guiding a sheaf of sheet material into the mouth of the clip at said station while supporting said clip in relaxed condition, means serving to prevent the clip from moving with the sheaf during entry of the sheaf between the leaves of the clip, the last named means including a resiliently yielding surface engaging one side of the clip and permitting the leaves of the clip to resiliently spread apart to grip the sheaf, and frictionally engaging said clip at said station to tend to retain the clip thereat, the total friction so tending to retain the clip at said station being insufficient to overcome the grip of the clip with respect to the sheaf whereby withdrawal of the sheaf from the station carries the clip with it.

8. Clip dispensing apparatus according to claim 7 further including means urging the clips to said station, the last named means applying a biasing force acting along an axis substantially normal to the plane of the clip and passing through the plane thereof at the region of the end of the clips remote from the mouths thereof, and means for forming an abutment disposed to receive said biasing force and adapted to pinch the region of the joined end of that clip which is to be dispensed between the abutment and the joined end region of the clip disposed next adjacent to the clip to be dispensed.

9. Clip dispensing apparatus according to claim 7 further including means for urging the clips to said station, the last named means serving to apply a biasing force acting along an axis substantially normal to the plane of the clips and passing through the plane thereof at the end region of the clips remote from the mouths thereof, a resiliently yielding, hinged jaw member pivoted adjacent said end region and disposed to abut that clip thereat which is to be dispensed, the pivoted end of the jaw member being positioned transversely of said axis to yieldingly resist said applied biasing force thereat and pinch the end region of the clip to be dispensed between the pivoted end of the jaw member and said end region of that clip disposed next adjacent to the clip to be dispensed.

10. Clip dispensing apparatus according to claim 7 further including abutment means including a separating edge serving to retain that clip which is next adjacent to the clip to be dispensed to prevent withdrawal of the former upon withdrawal of the latter, said separating edge being disposed to abut one of the lips of the clip next adjacent to the one to be dispensed while permitting that clip which is to be dispensed to pass clear of said edge and thereby separate the latter from the former.

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