May 22, 1962 E. LEVINE 3,035,541

APPARATUS FOR MAKING SEPARABLE BOTTOM STOPS FOR SLIDE FASTENERS

Original Filed April 29, 1957 2 Sheets-Sheet 1

Fig. 1

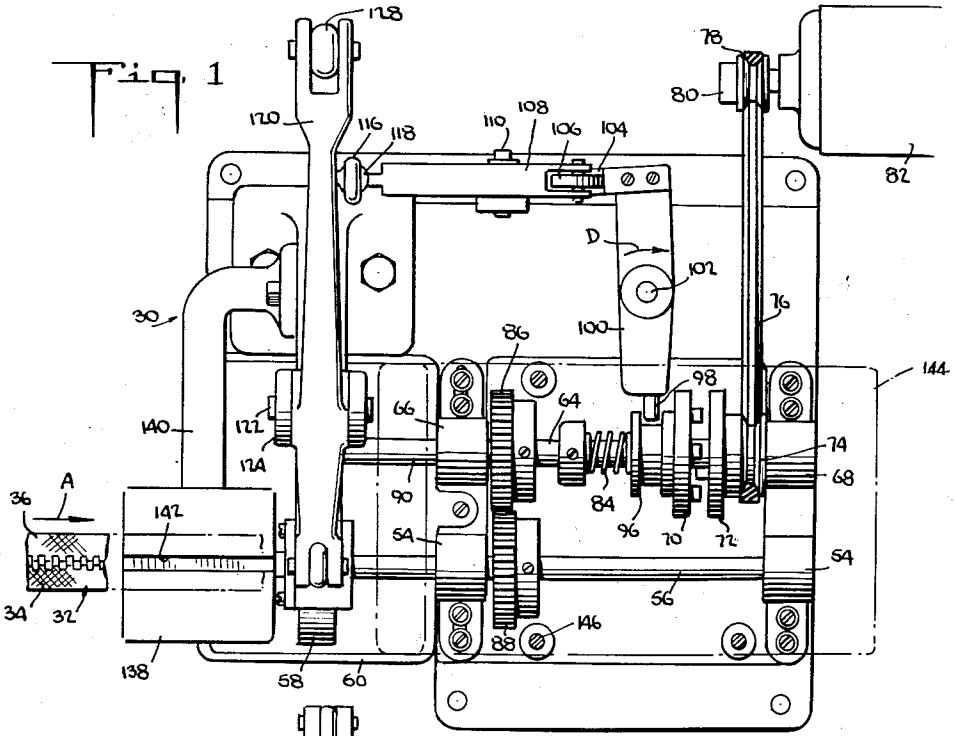

Fig. 2.

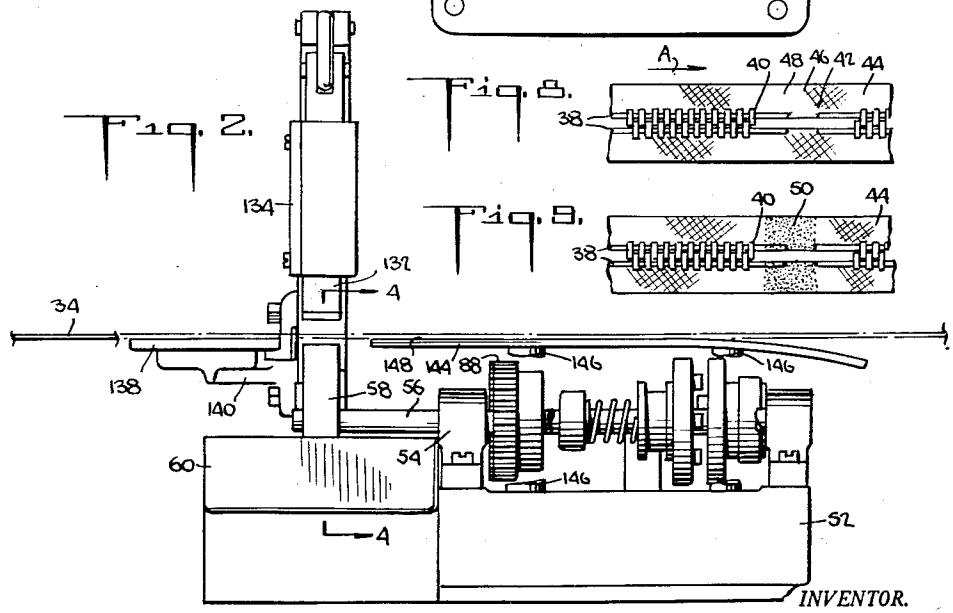

Fig. 3.

Fig. 4.

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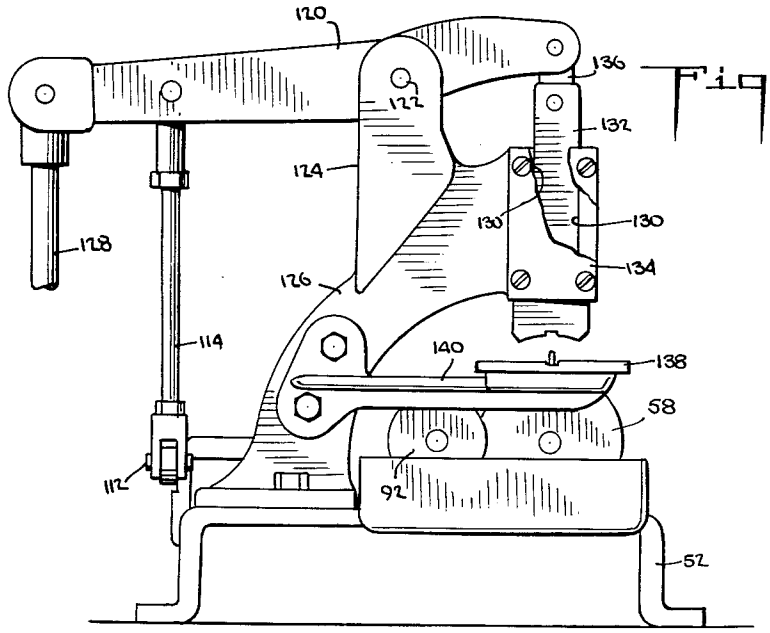

Fig. 3.

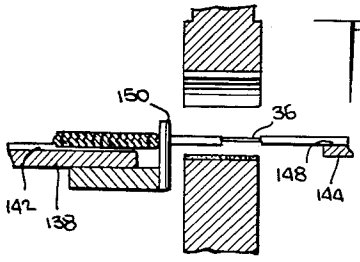

Fig. 5.

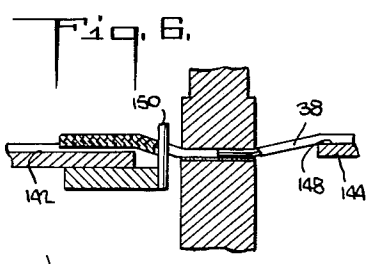

Fig. 6.

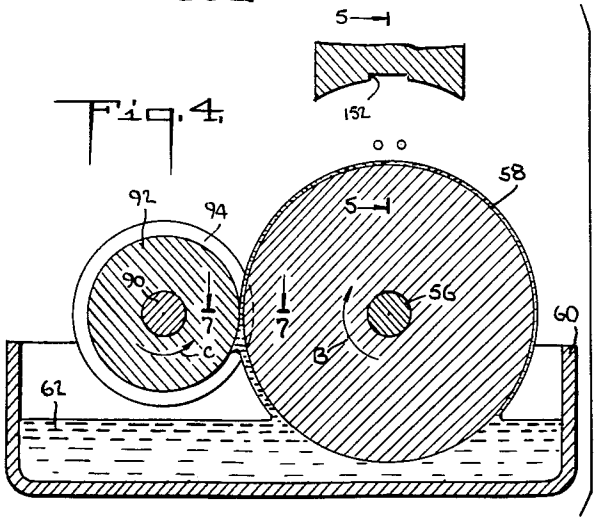

Fig. 4.

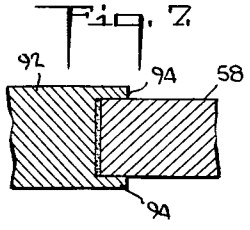

Fig. 7.

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APPARATUS FOR MAKING SEPARABLE BOTTOM STOPS FOR SLIDE FASTENERS

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Original application Apr. 29, 1957, Ser. No. 655,883, now Patent No. 2,949,211, dated Aug. 16, 1960. Divided and this application Oct. 26, 1959, Ser. No. 848,674

7 Claims. (Cl. 118—211)

This invention relates to an apparatus for making bottom stops for separable slide fasteners. More particularly, the invention pertains to a machine for preparing stringers for reception of bottom stop pins. The term "pins" as used in this art denotes both the so-called "male" pin which is adapted to be detachably coupled with a socket and the so-called "female" pin which is adapted to support the socket.

It is an object of the present invention to provide an apparatus of the character described which will simplify and render less expensive the manufacture of separable bottom stops for slide fasteners.

It is another object of the invention to provide an apparatus of the character described which are considerably less complex and therefore easier to operate and practice than the machines and processes heretofore employed for the same purpose whereby less skilled labor can be employed.

It is another object of the invention to provide an apparatus of the character described, which automate one of the steps in the manufacture of stops of the type here under consideration.

Other objects of the invention in part will be obvious and in part will be pointed out hereinafter.

The invention, accordingly, consists in the features of construction, combinations of elements, arrangements of parts and series of steps which will be exemplified in the machine hereinafter described and of which the scope of application will be indicated in the appended claims.

In the accompanying drawings, in which is shown one of the various possible embodiments of the invention,

FIG. 1 is a top view of the machine embodying the present invention for applying a cementitious substance as a stripe extending transversely across a pair of coupled stringers;

FIG. 2 is a front view of the machine shown in FIG. 1;

FIG. 3 is a side view of said machine;

FIG. 4 is an enlarged sectional view taken substantially along the line 4—4 of FIG. 2, the same illustrating the cementing and doctor drums and the applicator pressure pad;

FIG. 5 is a sectional view taken substantially along the line 5—5 of FIG. 4 and showing the machine as it appears prior to the application of cement to the stringer tapes.

FIG. 6 is a view similar to FIG. 5, but showing the machine during application of the cement stripe;

FIG. 7 is a sectional view taken substantially along the line 7—7 of FIG. 4; and

FIGS. 8 and 9 are plan views of a pair of coupled stringers before and after, respectively, the application of the lateral cement stripe.

In general the present invention deals with the treatment of coupled slide fastener stringers in the form in which they usually are fabricated in gap type chain machines, this constituting long strips of separate consecutive pairs of coupled stringers. More particularly, I provide a machine which applies a stripe of cement across the ends of successive pairs of coupled stringers while the stringers still are connected to one another in the form of long strips.

Referring now in detail to the drawings, the reference

numeral 30 denotes the machine for cementitiously transversely striping long strips of coupled stringers at specific locations in the gaps thereof. As is well known, a conventional gap type chain machine will form a very long strip consisting of a tape having closely spaced slide fastener elements secured to a beaded edge thereof in groups which are spaced apart by gaps. It is usual to couple matched groups of slide fastener elements of two such long strips of stringers and to suitably arrange the coupled long strips in such a fashion as to form a source of supply of connected coupled stringers. These tapes may, for example, be arranged in a roll or laid in regular fashion in a large container.

The reference numeral 32 denotes a pair of long strips such as described above, the same including a pair of long tapes 34, 36 each having a beaded edge 38 on which one or a pair of cords are suitably secured, as by stitching. Groups of slide fastener elements 40 are clinched on the beaded edges of the strips and matched groups on the two tapes are coupled as shown, for example, in FIG. 8. Each strip consists of a very large number of such groups. Successive groups of coupled slide fastener elements are separated from one another by gaps 42 on which no elements are secured to the tapes.

Prior to treatment by the machine 30 the coupled stringers have had a portion of the cords removed from their beaded edges in the gaps 42. Said gaps 42 constitute in part one end of one pair of coupled stringers and in part the opposite end of the adjacent pair of coupled stringers.

More particularly referring to FIG. 8, in which the arrow "A" indicates the direction in which the stringers are fed into the machine 30, the gap 42 may be considered to consist of three sections. These include a section 44 which constitutes the top end of a pair of coupled stringers adapted to be connected at their other end by a separable bottom stop, a section 46 and a section 48. The sections 46 and 48 jointly constitute that end of a pair of coupled stringers which is adapted to receive, after suitable treatment, a separable bottom stop. The section 48 is immediately adjacent the groups of slide fastener elements on the stringers while the section 46 is more remote therefrom. The section 46 is designed to be folded back over the section 48 and to this end, in order to prevent undue thickening of the beaded edges, it is desirable for the cords to be removed from said section 46. This cord removing operation is performed before the coupled stringers are fed into the machine 30.

The function of the machine 30 is to apply transversely across the coupled stringers a wide stripe 50 (see FIG. 9) of cementitious material, preferably of the pressure sensitive type as, for example, rubber cement, the same consisting of natural latex in an organic volatile solvent and optionally including a tackifying agent. The stripe extends across the width of the coupled stringers from one lateral edge to the other thereof with one side of the stripe at the end of the section 46 remote from its groups of coupled slide fastener elements and the other side of the stripe in section 48 whereby when the section 44 later is separated from the section 46 and the section 46 folded over on to the section 48 these latter two sections will adhere to one another.

The machine 30 constitutes a base 52 which desirably is mounted on the top of a table or workbench. Bearings 54 secured to the base rotatably journal a shaft 56 which carries a cementing drum 58. The drum end of the shaft overhangs a cement reservoir 60 in which there is contained a supply of liquid cement 62 such as, for instance, rubber cement. The drum has a lower portion thereof submerged in the supply of cement whereby when the drum is turned it will carry a film of cement up on its periphery.

A shaft **64** parallel to the shaft **56** is journaled in bearings **66, 68** alongside the bearings **54**. Said shaft **64** carries a pair of clutch halves **70, 72**. The driving half **72** is free to rotate on the shaft **64**. A sheave **74** is connected to the driving half **72** and has trained about it a belt **76** that engages a pulley **78** mounted on the output shaft **80** of an electric motor **82** that is secured on the table top whereby the driving half of the clutch constantly rotates.

The driven half **70** of the clutch is axially slidable on a splined section of the shaft **64** and is urged by a spring **84** into engagement with the driving half **72** whereby as long as the motor **82** is energized and the machine is not manipulated the shaft **64** will be continuously turned.

Power is transmitted from the shaft **64** to the shaft **56** by a pair of meshing gears **86, 88** fast on the shafts **64, 56** respectively. Desirably, the two gears are of substantially the same diameter and have the same number of teeth so that these two shafts will rotate at the same angular rate of speed.

The shaft **64** includes a portion **90** which overhangs the cement reservoir **60**. This portion carries a doctor drum **92**, which turns with the shaft **64** and is located immediately adjacent the cementing drum **58** with their axes of rotation at the same horizontal level. The space between the two drums is closely controlled and is regulated so that the film of liquid cement carried up from the reservoir by the cementing drum and past the doctor drum is of the proper thickness to apply the desired amount of liquid cement in the area of the stripe **50** to a pair of coupled stringers.

The doctor blade is provided with flanges **94** (see particularly FIG. 7) which rub against the opposite flat faces of the cementing drum so as to wipe clean the sides of the drum and thereby prevent the application of too great an amount of cement at the sides of the stripe **50**.

It will be observed that the shaft **56** turns the cementing drum in the direction of the arrow "B" so as to raise a peripheral film of cement above the level of the cement in the reservoir and so that the doctor blade is turned by its shaft **90** in the direction of the arrow "C." But since the two shafts **56, 90** turn at the same angular rate of speed and since the cementing drum is considerably larger than the doctor drum, the periphery of the cementing drum will move faster than that of the doctor drum, sweeping past the doctor drum and leaving the excess of cement on the doctor drum so as to reduce the thickness of the film of cement to the desired amount.

Inasmuch as the clutch normally is coupled, the foregoing action will be carried on continuously so that fresh liquid cement always is present as a uniform thin film on the top of the cementing drum ready to be applied, as needed, to a pair of coupled stringers.

During the actual application of cement to a pair of coupled tapes the cementing drum must be stationary, and for this purpose there is provided suitable means to interrupt the drive of the shaft **56**, as by opening the clutch above described. More particularly, the driven half **70** of the clutch is formed with an annular track **96** in which a pin **98** is located. The pin is carried at one end of a lever **100** vertically pivoted to turn about an upstanding shaft **102** erect on the base **52**. The other end of the lever **100** has secured thereto a cam face **104** in the shape of a vertically inclined flat surface on which a roller follower **106** rides. Said follower is journalled at one end of a rocking bar **108** fulcrumed to turn about a horizontal pin **110**. The bar is pivotally joined as at **112** (see FIG. 3) at the end thereof opposite the follower **106** to a vertical link **114**, the upper end of which terminates in a yoke **116** swivelled on a ball **118** extending laterally from a walking beam **120**. Said beam is pivoted for horizontal rotation on a pin **122** mounted between a pair of uprights **124** carried by an arm **126** extending forwardly and upwardly extending from the base **52**.

The rear end of the beam is actuated through a link **128** from a foot treadle (not shown) through a reversing lever of the usual type so that when an operator steps on said treadle the link **128** will rise and the rear end of the beam **120** accordingly will be elevated. This will lift the link **114** and raise the adjacent end of the bar **108** thereby depressing the follower **106** and oscillating the lever **100** about its fulcrum shaft **102** in a clockwise direction, indicated by the arrow "D," as viewed in FIG. 1. Thereby, the pin **98** will shift the driven half **70** of the clutch away from the driving half **72** to uncouple the clutch and take power off the cementing drum **58**. Due to the friction between the meshing gears **86, 88** and the friction of the shafts **64, 56** in their bearings said drum will quickly stop.

At its forward end the arm **126** is provided with a pair of vertical gibs **130** between which a ram **132** is mounted for vertical reciprocation being held in the slot of which the gibs define the side walls by face plate **134**. The upper end of the ram is connected through a link **136** to the forward end of the beam **120** so that when the foot treadle is depressed the ram will be driven downwardly.

The ram is lined up directly over the cementing drum (see FIG. 2) and its lower end is concavely contoured to match the curvature of the periphery of said drum (see FIG. 4). Accordingly when the ram is lowered by depression of the foot treadle the bottom end of the ram ultimately will come to rest on the top of the cementing drum.

A feed plate **138** is provided at the end of a bracket **140** mounted on the arm **126**. The top of the feed plate is horizontal and is slightly above the level of the top of the cementing drum (see FIG. 2). Said feed plate provides a wide surface for support of the long tapes **34, 36**. The upper surface of the feed plate is provided with a slot **142** (see FIG. 1) perpendicular to the cementing drum and in line with the axis of rotation thereof. Said slot is included to accommodate the beaded edges **38** of said tapes and the slide fastener elements secured thereon, thereby allowing the tapes to lie flat on the feed plate while the elements slide along the bottom of the slot (see FIG. 5).

In addition to the feed plate **138** there further is provided for the support of the long coupled strips an elongated horizontal take-off plate **144** supported by pedestals **146** from the base **52**. The take-off plate likewise includes a long slot **148** slidably to pass the coupled slide fastener elements. It thus will be seen that when the long strips are supported on the two plates the tapes will cross over the top of the cementing drum (see FIG. 2).

To use the machine **30**, an operator lays the coupled strips across the two plates in the position indicated in FIG. 2 and places the zones **46, 48** directly above the cementing drum so that the stripe **50** ultimately will be located thereon in the correct position. To ensure exact orientation of the tapes in the foregoing position the machine further includes a locating pin **150** carried by the feed plate **138** and extending vertically a short distance in front of the same as clearly indicated, for instance, in FIG. 5. The locating pin is disposed along the line of the slots **142, 148** so that it will lie between a pair of tapes carried by the two plates. The pin is so placed that when it is butted against by the endmost slide fastener element of a pair of coupled groups of such elements the area on which cement is to be imprinted will lie directly between the ram **132** and the cementing drum **58**.

After the operator has thus arranged the pair of long strips he steps on the foot treadle. The first consequence of this action is to disengage the clutch halves **70, 72** and stop the cementing drum. Further depression of the treadle presses the pair of tapes between the cementing drum and the lower end of the ram as indicated in FIG. 6 thereby depositing liquid cement in the desired area. To accommodate the beaded edges of the tape during the cementing operation the lower end of the ram is formed with a clearance slot **152**.

It will be appreciated that by continuously driving the cementing drum, except at the moment of application of cement as a band across the coupled strips, a fresh film of cement always is provided at the top of the cementing drum continuously ready for application to the strips.

The present application is a division of my copending application Serial No. 655,883 for Method and System for Making Separable Bottom Stops for Slide Fasteners, filed April 29, 1957, and now U.S. Patent No. 2,949,211, issued Aug. 16, 1960.

From the foregoing it will be appreciated that I have provided a machine which achieves the various objects of the invention and are well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the instant invention and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein described or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a machine for applying a stripe of adhesive transversely across long strips of spaced coupled stringers at specific locations intermediate the ends of said stringers, that improvement comprising the combination of: an open top reservoir for liquid adhesive, a cylindrical cementing drum mounted to rotate about a horizontal axis with a lower portion of the drum immersed in the adhesive and the top of the drum above the surface of the adhesive, means for rotating said drum whereby a film of adhesive is raised on the upper periphery of the drum as the drum turns, doctor means for limiting to a predetermined thickness the film of adhesive at the top of the drum, means for selectively interrupting rotation of the drum, support means for holding long strips of coupled stringers with the space between a pair of adjacent coupled stringers immediately above the top of the drum, a ram located directly above the top of the drum, means guiding the ram for vertical movement toward and away from the top of the drum, and means operative concurrently with the drum rotation interrupting means for moving the ram toward the drum so as to press against the periphery of the drum the coupled stringers overlying the drum whereby to deposit liquid adhesive on the undersurface of said stringers.

2. In a machine for applying a stripe of adhesive transversely across long strips of spaced coupled stringers at specific locations intermediate the ends of said stringers, that improvement comprising the combination of: an open top reservoir for liquid adhesive, a cylindrical cementing drum mounted to rotate about a horizontal axis with a lower portion of the drum immersed in the adhesive and the top of the drum above the surface of the adhesive, means for rotating said drum whereby a film of adhesive is raised on the upper periphery of the drum as the drum turns, means for selectively interrupting rotation of the drum, support means for holding long strips of coupled stringers with the space between a pair of adjacent coupled stringers immediately above the top of the drum, a ram located directly above the top of the drum, means guiding the ram for vertical movement toward and away from the top of the drum, and means operative concurrently with the drum rotation interrupting means for moving the ram toward the drum so as to press against the periphery of the drum the coupled stringers overlying the drum whereby to deposit liquid adhesive on the undersurface of said stringers.

3. In a machine for applying a stripe of adhesive transversely across long strips of spaced coupled stringers at specific locations intermediate the ends of said stringers, that improvement comprising the combination of: an open top reservoir for liquid adhesive, a cylindrical cementing drum mounted to rotate about a horizontal axis with a lower portion of the drum immersed in the adhesive and the top of the drum above the surface of the adhesive,

means for rotating said drum whereby a film of adhesive is raised on the upper periphery of the drum as the drum turns, means for selectively interrupting rotation of the drum, a ram located directly above the top of the drum, means guiding the ram for vertical movement toward and away from the top of the drum, and means operative concurrently with the drum rotation interrupting means for moving the ram toward the drum so as to press against the periphery of the drum the coupled stringers overlying the drum whereby to deposit liquid adhesive on the undersurface of said stringers.

4. In a machine for applying adhesive, that improvement comprising the combination of: an open top reservoir for liquid adhesive, a cylindrical cementing drum mounted to rotate about a horizontal axis with a lower portion of the drum immersed in the adhesive and the top of the drum above the surface of the adhesive, means for rotating said drum whereby a film of adhesive is raised on the upper periphery of the drum as the drum turns, doctor means for limiting to a predetermined thickness the film of adhesive at the top of the drum, means for selectively interrupting rotation of the drum, a ram located directly above the top of the drum, means guiding the ram for vertical movement toward and away from the top of the drum, and means operative concurrently with the drum rotation interrupting means for moving the ram toward the drum.

5. In a machine for applying a stripe of adhesive transversely across long strips of spaced coupled stringers at specific locations intermediate the ends of said stringers, that improvement comprising the combination of: an open top reservoir for liquid adhesive, a cylindrical cementing drum mounted to rotate about a horizontal axis with a lower portion of the drum immersed in the adhesive and the top of the drum above the surface of the adhesive, means for rotating said drum whereby a film of adhesive is raised on the upper periphery of the drum as the drum turns, doctor drum means for limiting to a predetermined thickness the film of adhesive at the top of the drum and for removing adhesive from the sides of the drum, means for selectively interrupting rotation of the drum, support means for holding long strips of coupled stringers with the space between a pair of adjacent coupled stringers immediately above the top of the drum, a ram located directly above the top of the drum, means guiding the ram for vertical movement toward and away from the top of the drum, and means operative concurrently with the drum rotation interrupting means for moving the ram toward the drum so as to press against the periphery of the drum the coupled stringers overlying the drum whereby to deposit liquid adhesive on the undersurface of said stringers.

6. In a machine for applying a stripe of adhesive transversely across long strips of spaced coupled stringers at specific locations intermediate the ends of said stringers, that improvement comprising the combination of: an open top reservoir for liquid adhesive, a cylindrical cementing drum mounted to rotate about a horizontal axis with a lower portion of the drum immersed in the adhesive and the top of the drum above the surface of the adhesive, means for rotating said drum whereby a film of adhesive is raised on the upper periphery of the drum as the drum turns, doctor means for limiting to a predetermined thickness the film of adhesive at the top of the drum, clutch means for selectively interrupting rotation of the drum, support means for holding long strips of coupled stringers with the space between a pair of adjacent coupled stringers immediately above the top of the drum, a ram located directly above the top of the drum, means guiding the ram for vertical movement toward and away from the top of the drum, and means linked to the drum rotation interrupting means for moving the ram toward the drum so as to press against the periphery of the drum the coupled stringers overlying the drum whereby to deposit liquid adhesive on the undersurface of said stringers.

7. In a machine for applying a stripe of adhesive

transversely across long strips of spaced coupled stringers at specific locations intermediate the ends of said stringers, that improvement comprising the combination of: an open top reservoir for liquid adhesive, a cylindrical cementing drum mounted to rotate about a horizontal axis with a lower portion of the drum immersed in the adhesive and the top of the drum above the surface of the adhesive, means for rotating said drum whereby a film of adhesive is raised on the upper periphery of the drum as the drum turns, doctor drum means mounted to rotate about a horizontal axis in the same horizontal plane as the axis of rotation of the cementing drum, said doctor drum means being smaller than the cementing drum and being clear of the adhesive in the reservoir, said doctor drum means having flanges adjacent the sides of the cementing drum, gear means coupling said drums for simultaneous rotation with the doctor drum turning at a peripheral speed less than that of the cementing drum so as to limit to a predetermined peripheral thickness the film of adhesive at

the top of the cementing drum, clutch means to turn the doctor drum and through the gear means the cementing drum, means to couple and uncouple the clutch means, a ram located directly above the top of the cementing drum, means guiding the ram for vertical movement toward and away from the top of the drum, and means linked to the clutch coupling and uncoupling means for moving the ram toward the drum so as to press the tapes of coupled stringers against the periphery of the drum when the latter is stopped.

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