Dec. 1, 1964 A. HEDEGAARD 3,159,122

APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

Filed April 3, 1961 8 Sheets-Sheet 1

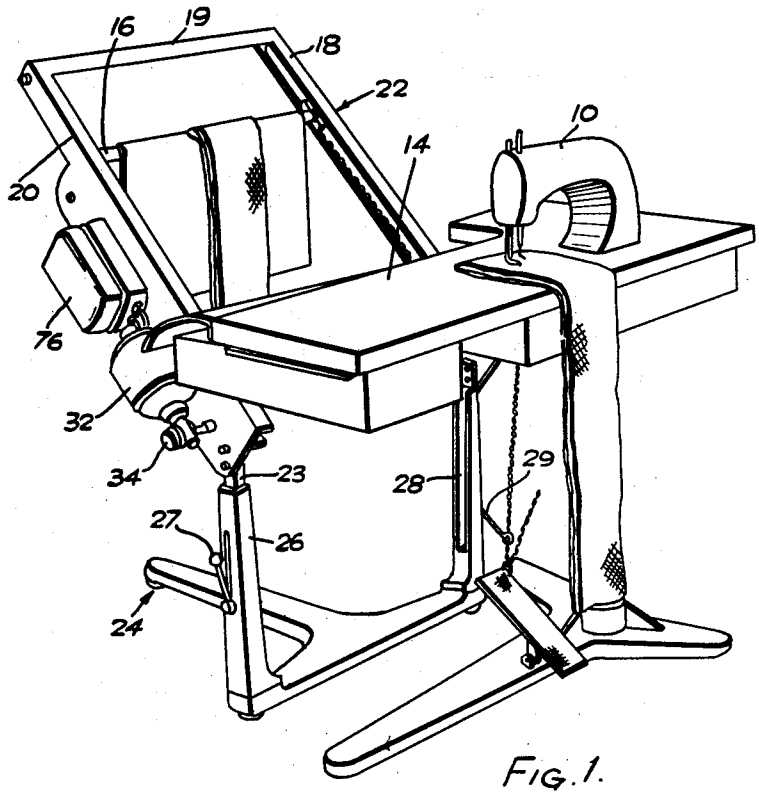


FIG. 1.

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APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

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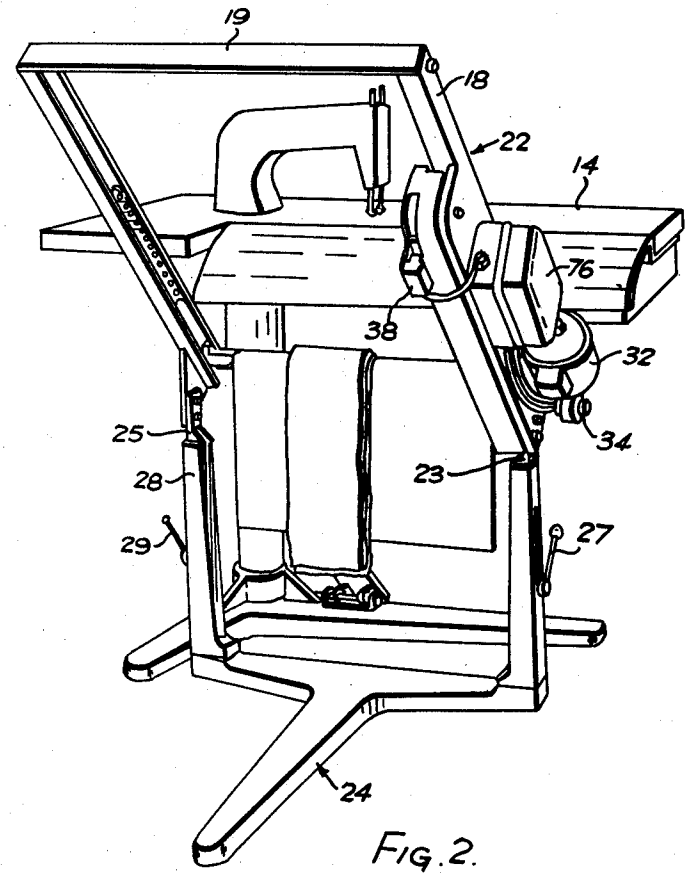


FIG. 2.

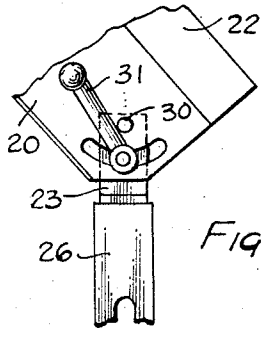


FIG. 4A

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APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

Filed April 3, 1961 8 Sheets-Sheet 3

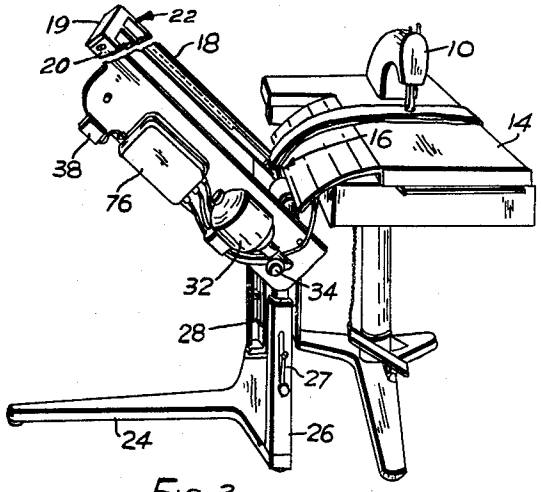


FIG. 3.

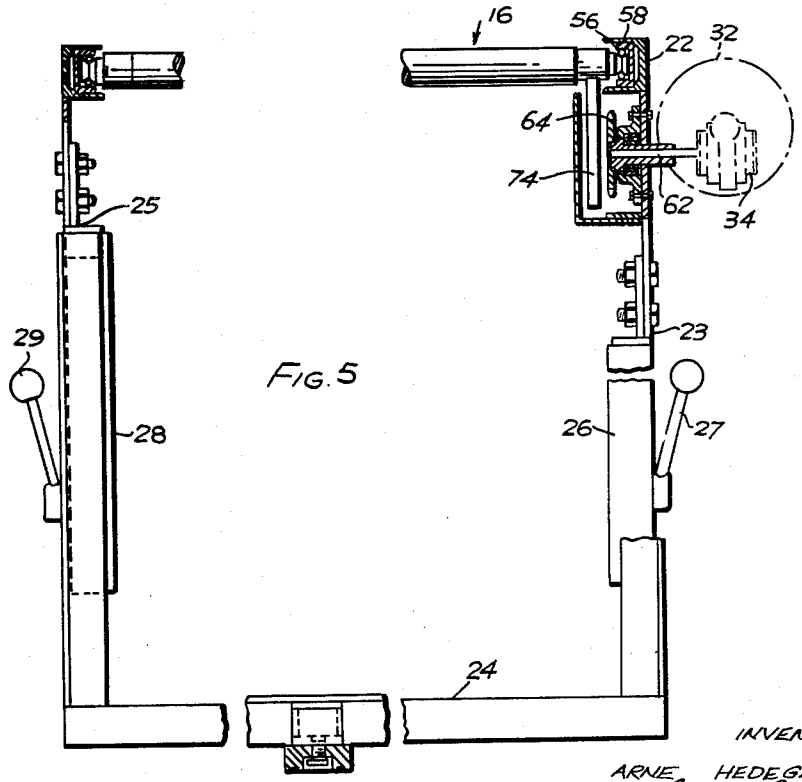


FIG. 5

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APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

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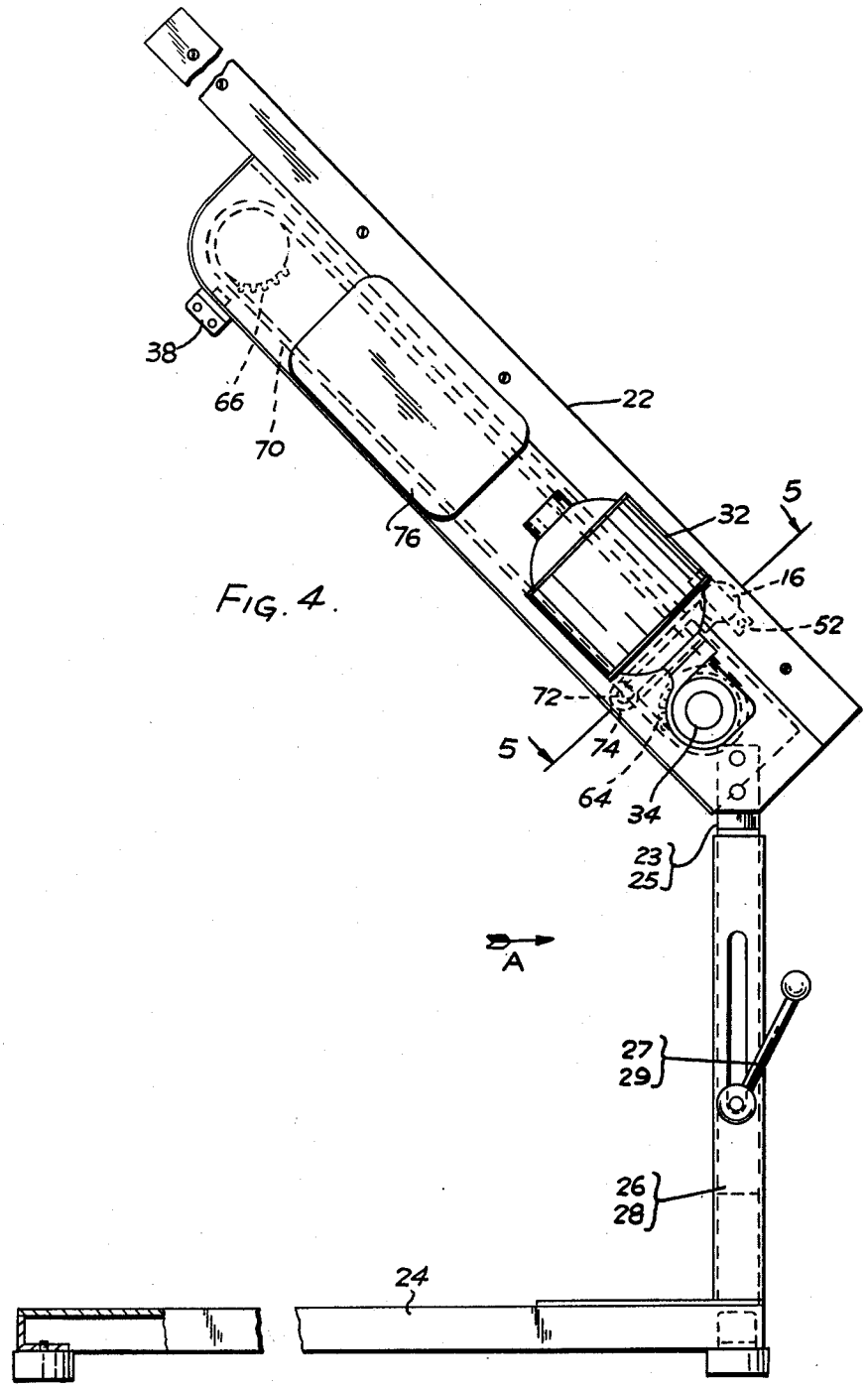


FIG. 4.

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APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

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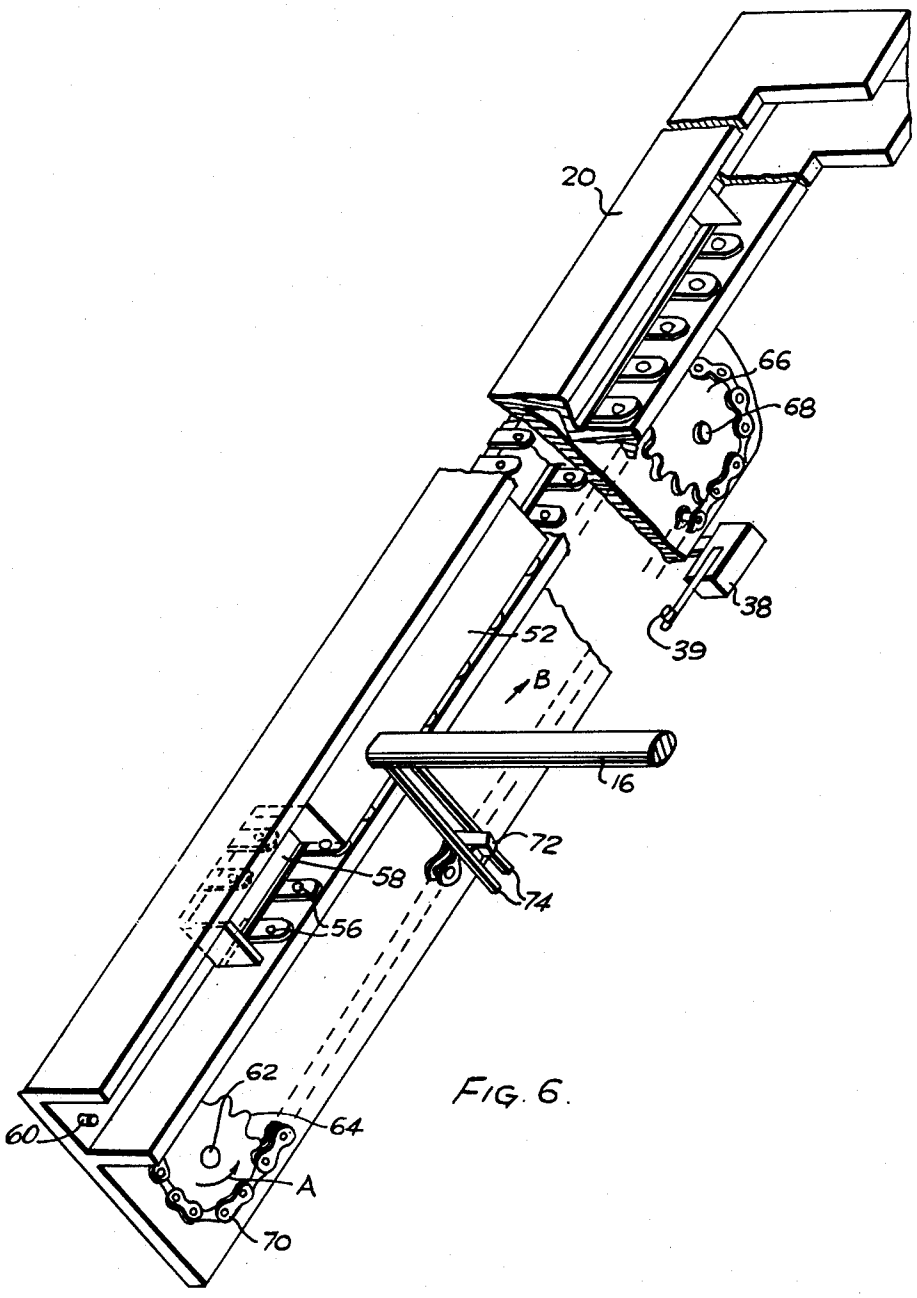


FIG. 6.

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APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

Filed April 3, 1961 8 Sheets-Sheet 6

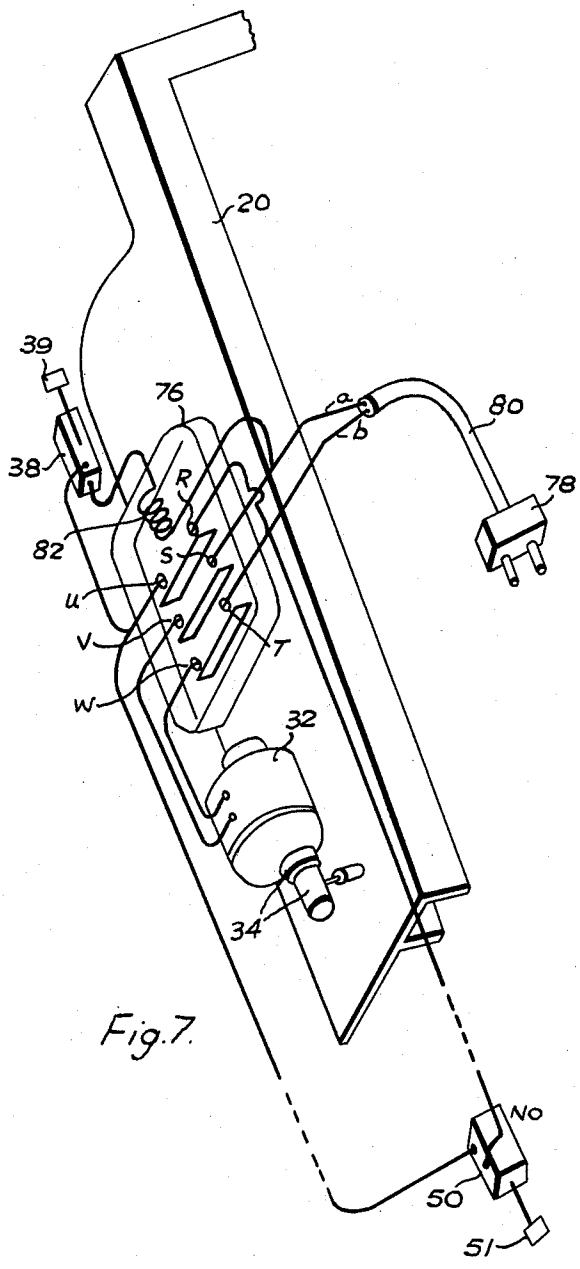


Fig. 7.

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Dec. 1, 1964 A. HEDEGAARD 3,159,122

APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

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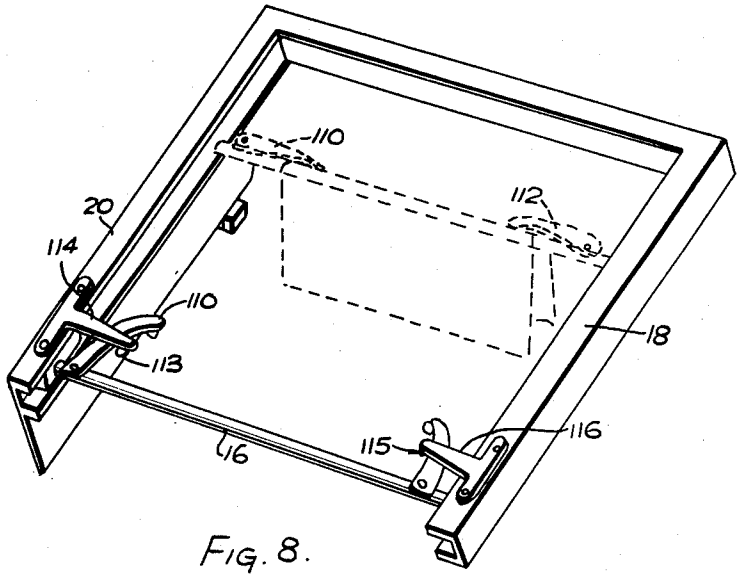


FIG. 8.

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Dec. 1, 1964 A. HEDEGAARD 3,159,122

APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

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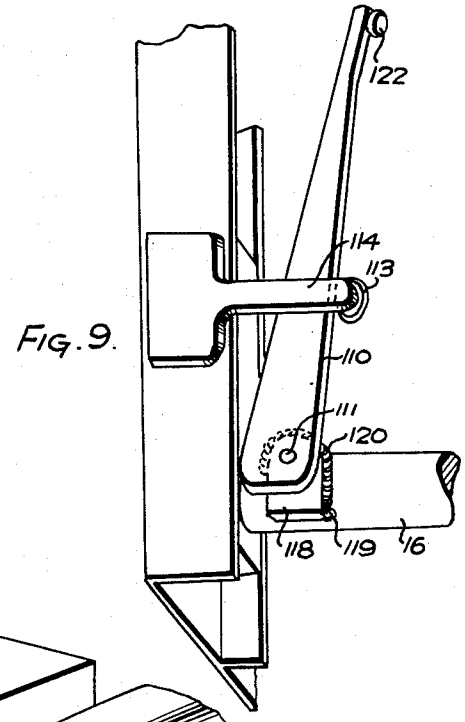


FIG. 9.

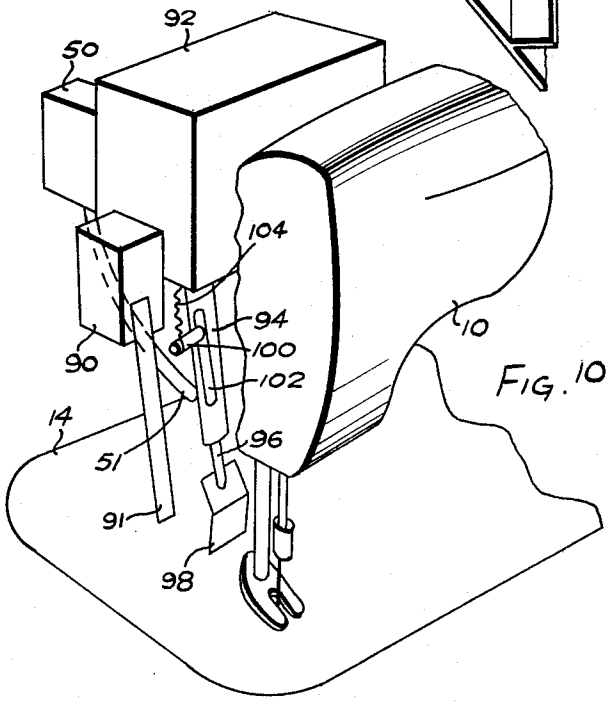


FIG. 10

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United States Patent Office 3,159,122 Patented Dec. 1, 1964

3,159,122

APPARATUS FOR STACKING ARTICLES PRODUCED ON A SEWING MACHINE

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Filed Apr. 3, 1961, Ser. No. 100,352
Claims priority, application Great Britain, Apr. 8, 1960, 12,498/60
5 Claims. (Cl. 112—2)

The present invention relates to apparatus for stacking articles produced on a sewing machine.

It is a purpose of the invention to provide a sewing aid equipment or apparatus for use with a sewing machine which is capable of stacking the articles coming from the sewing machine upon each other so that the articles can be removed in bundles.

It is a further purpose of the invention to provide a stacking apparatus having a movable stacking member or rack capable of engaging the articles in sequence as they come from the sewing machine so as to fold them on the stacking member hanging thereover and thereby produce a bundle or stack of said articles.

It is a further purpose of the invention to provide a stacking apparatus having a movable stacking member which is movable in such a direction relatively to the articles delivered from the sewing machine that it has a safe grip on the articles or workpieces.

Still a further purpose of the invention is to provide a stacking apparatus to be supported adjacent a sewing machine table which will only occupy a limited floor-space.

Still a further purpose of the invention is to provide a stacking apparatus having a movable stacking member or rack capable of being moved through a stacking stroke to engage an article or workpiece coming from the sewing machine and by such engagement during the movement through its stacking stroke to fold the article over the stacking member in which the direction of the stacking stroke can be adjusted.

Still a further purpose of the invention is to provide a stacking apparatus for one or more of the purposes stated hereabove which includes a frame structure comprising different frame parts which can easily be assembled and disassembled without requiring any large amount of space.

Still a further purpose of the invention is to provide a stacking apparatus having a movable stacking member and drive means therefor which will not cause any undue amount of noise and/or vibrations of the stacking apparatus.

Further purposes and advantages of the invention will appear from the following description of the accompanying drawings, in which

FIGURE 1 is a general perspective view of a stacking apparatus supported behind a sewing machine table with the stacking member adjacent the end of its stacking stroke,

FIGURE 2 is a similar perspective view showing the stacking apparatus from the rear side with the stacking member in the position before its stacking stroke,

FIGURE 3 is a perspective sideview showing the sewing machine table and the stacking apparatus in which the stacking member is in the same position as in FIGURE 2,

FIGURE 4 is a sideview of the stacking apparatus,

FIGURE 4A is a detail view of a modified support for the stacking member permitting angular adjustment thereof,

FIGURE 5 is an endview of the stacking apparatus

seen in the direction of the arrow A in FIGURE 4 and partly in section along the line 5—5 in FIGURE 4,

FIGURE 6 is a perspective view of the part of the stacking apparatus illustrating a part of the driving arrangement for the stacking member,

FIGURE 7 is an electrical circuit of the driving arrangement for the stacking member,

FIGURE 8 is a perspective view of the part of the stacking apparatus illustrating a convenient auxiliary device to be mounted on the stacking member,

FIGURE 9 is a perspective view of the part of the arrangement shown in FIGURE 8, and

FIGURE 10 is a perspective view of the part of the sewing machine showing in some greater detail a severing device for separating the articles produced on the sewing machine before they are folded on the stacking member.

In broad terms the invention provides for use with a sewing machine having a sewing machine table 14, a stacking apparatus comprising a frame structure 22 supported adjacent the sewing machine table 14, and a stacking member 16 slidably mounted on said frame structure to move through a stacking stroke between an article-receiving position such as shown in FIGURES 2 and 3 and a position remote therefrom such as shown in FIGURE 1. In the article-receiving position the article or workpiece produced on the sewing machine is able to pass over the stacking member and during the movement of the stacking member through the stacking stroke the article will be removed from the sewing machine table and folded over the stacking member hanging on each side thereof as clearly illustrated in FIGURES 1 and 2. The stacking apparatus further includes driving means 32 for moving the stacking member through its stacking stroke, and control means associated with said driving means.

In more detail the frame structure 22 has a pair of spaced guideways for the stacking member which may be in the form of a rack or bar, if necessary as shown in FIGURES 1 and 2 provided with a depending apron. Preferably the driving means for moving the stacking member through its stacking stroke is as illustrated in the form of an electrical motor 32 which through a reduction gear 34 and an endless driving member to be more fully described in the following with reference to FIGURE 6 which is mounted in the frame structure by means of a suitable driving connection moves the stacking member through its stacking stroke. The electrical motor 32 is included in a circuit with two switches one of which is referred to by 38 in FIGURES 2 and 3, and the other one of which as will be described in more detail with reference to FIGURE 9 directly or indirectly may be operable at will to energize the driving motor to initiate the movement of the stacking member. This energizer switch may in the event that the stacking apparatus is used in combination with a severing device on the sewing machine be arranged for automatically being actuated by such severing device. Inasfar as the severing device is usually operable at will by the operator of the sewing machine upon completion of each workpiece, it will be understood that also the actuating switch is indirectly operable at will. The stacking member has as will be more fully described with reference to FIGURE 6 means operable to actuate the switch 38 and this switch deenergizes the driving motor when the stacking member arrives at the end of the stacking stroke. The frame structure 22 including the guideways for the stacking member 16 has associated therewith a frame structure or pedestal 24 which includes means for adjustably mounting the frame structure 22 with respect to height and preferably also with respect to inclination of the frame structure 22 relatively to the surface of the

sewing machine table. It has been found that when the path of the stacking stroke is inclined not only the necessary floor space occupied by the stacking apparatus can be decreased but by providing a lifting simultaneously with a movement in a direction away from the rear edge of the sewing machine table the stacking member has a surer grip on the workpiece which results in a neater stacking arrangement.

Though, within the scope of the invention any other driving arrangement for reciprocating the stacking member 16 can be used, such as for example a solenoid, an electrical motor as driving member has been found convenient, because it eliminates the necessity of having linkage systems between the driving solenoid and the stacking member. The driving motor, therefore, provides for a less bulky and more compact structure which reduces the requirement for floor-space. In addition, a driving motor also has the advantage of being silent, whereby undue amount of noise and vibrations of the machine as would be caused by a solenoid drive is avoided.

Now, with more specific reference to FIGURES 1–5 of the drawing, the stacking machine or apparatus comprises associated with the foot-portion, generally referred to by 24, a pair of spaced, substantially vertical frame members 26 and 28. The members 26 and 28 are in the form of telescope tubes for telescopically receiving a pair of telescope members such as rods or bars 23 and 25. The tubular members 26 and 28 have elongated slots for the passage of tightening members associated with the telescope bars 23 and 25 so that the telescope bars can be adjusted in height, the tightening being effectuated by means of a pair of handles or the like, 27 and 29.

The frame structure generally referred to by 22 comprises a pair of guideways 18 and 20 which at their lower ends are supported on the top ends of the rails or bars 23 and 25. The rails 18 and 20 extend in parallel spaced relationship and are at their top ends connected by means of a transverse rail or bar 19. The connection between the lower ends of the guideways 18 and 22 and the rods 23 and 25 may as shown in FIGURE 4 be in the form of a rigid connection such as by means of grooves or bolts, and the connection may be so designed that the frame structure 22 forms a suitable angle, for example 45° with the horizontal plane, which has been found convenient for the purpose of obtaining the desired lifting of the articles during the stacking thereof, as well as to reduce the floor space occupied by the stacking machine. It will be understood, however, that it is possible within the scope of the invention to connect the frame structure 22 with the supporting frame structure 24 by means of pivots so as to enable an adjustment of the inclination of the path of the stacking member through which it moves during its stacking stroke. As will appear from the description of the mode of operation the stacking of the articles on the stacking member 16 is caused by the stacking stroke of the member 16 at such a moment that it grips or catches the articles during a part of its travel which would otherwise result in dropping the article on the floor or for example in a basket. Since the travel of the articles after having been completed and severed from the next article takes place at different speeds depending on the character of the article, for example whether it is a woollen article providing a relatively large friction with the surface of the sewing machine table, or a silk article which has a very smooth surface, it is convenient that not only the lower position of rest of the stacking member relatively to the edge of the sewing machine table can be adjusted, but also that the inclination of the frame structure can be adjusted. A pivot connection 30 between the frame structure 22, and the frame structure 24 can be designed in any convenient way, one of which being illustrated in FIGURE 4A, and the adjustment made by tightening of handles 31 like the handles 27 and 29.

The guideways 18 and 20 are U-shaped and provide guideways for the stacking member 16 which is slidably supported in each of the guideways by means of movable roller- or ball-rails, as most clearly seen in the perspective view of FIGURE 6. On the end of the stacking member an elongated rod 52 of general rectangular cross-section is secured. The rod 52 runs on balls 56 of a ball-rail 58 which in its turn is able to slide in the guideway 18 supported on the balls. Sliding structures of this kind are well known, for example in office drawers or the like, or for sliding doors and the structure will therefore not be described in any further detail.

In the rest position the ball rail 58 as well as the rod 52 secured to the end of the stacking member 16 is located at the lower end of the guideway in engagement with a stop 60 such as a pin which preferably is coated with a resilient material to decrease the noise.

In order to move the stacking member from its lower article-receiving position through its stacking stroke the electrical motor 32 is secured to the exterior side of the frame member 20. The motor 32 is connected through a reduction gear 34 with a driving shaft 62 which extends through the frame member 20. On the inner side of the frame member 20 a pinion 64 is secured on the shaft 62 and adjacent the other end of the frame member 20 a second pinion 66 is mounted on a pin or shaft 68. An endless driving member such as a chain 70 as illustrated passes over the pinions 64 and 66. As clearly shown in FIGURE 6 a pin 72 is secured on the chain and extends between a pair of forks 74 secured to the stacking member 16. As will be understood the rotation of the pinion 64 in the direction of the arrow A in FIGURE 6 will result in movement of the chain in the direction of the arrow B and thereby movement of the elongated stacking bar 16 through its stacking stroke.

In order to enable the stacking member to return to its lower rest position the switch 38 is located adjacent the end of the stacking stroke. The switch is provided with an actuating member 39 to be engaged by one of the fork members 74 when the stacking member arrives at the end of its stroke whereby the motor is deenergized and the stacking member returns to its lower position by means of its own weight under influence of gravity.

On the exterior side of the frame member 20 adjacent the motor a box 76 is shown in FIGURES 1, 2 and 3. This box is a relay box enclosing the necessary relay arrangement diagrammatically illustrated in FIGURE 7. In FIGURE 7 78 is an electrical plug adapted to connect the electrical circuits with supply mains. A cable 80 extends from the plug with its two leads to relay contacts S and T. The lead *a* is further connected to one end of a relay winding 82. The other end of the relay winding is connected to one end of the switch 38. Relay contacts V and W opposite the contacts S and T are connected to the motor 32. A pair of further relay contacts R and U are provided. The contact R is connected to the lead *b* as well as to one end of an actuating switch 50, the other end of which is connected to the relay contact U as well as to the other end of the switch 38. The switches 38 and 50 may be microswitches of the well-known type. The switch 50 is of the N–O type while the switch 38 is of the N–C type.

The switch 50 which actuates the motor in a manner to be more fully described in connection with the description of the mode of operation may be arranged entirely independent of the sewing machine to be actuated at will by the operator upon completion of the work on each article.

In many cases it is convenient, however, in order to speed up the production on the sewing machine to allow the work to run continuously through the machine and having an automatic or semi-automatic severing device separating the workpieces or articles upon completion of each article by cutting the thread or other connection between the articles, such as ribbons or the like. Such

severing devices are well-known and can be purchased on the market.

FIGURE 10 shows a detail of an arrangement including such severing device which has a suitable energizing member such as a solenoid included in a box 92 mounted on the rear side of the sewing machine. A tubular member 94 extends downwardy from the box 94 and in this tubular member a reciprocable rod 96 is mounted the lower end of which is provided with a guillotine 98. A pin 100 on the reciprocable rod 96 extends through a slot 102, and a spring 104 returns the guillotine to its inoperative top position. This severing device is manually actuated by means of a switch 90 having an actuating member 91, such as for example a leaf spring or the like which as shown in FIGURE 10 is mounted in such a manner that it extends to near the top side of the sewing machine table 14 so that the operator can keep both hands on the workpiece and upon completion of each workpiece with the left hand can engage the actuating member 91 and thereby actuate the switch 90 which in its turn renders the guillotine operative to separate the completed workpiece from the next workpiece to be run through the machine.

In order to actuate the switch 50 automatically in response to the actuation of the severing device the switch 50 is mounted in association with the severing device and has an actuating member 51 which for example as shown in FIGURE 10 is engaged by the pin 100 when the guillotine moves down.

In order to prevent articles having a smooth surface from slipping on the stacking member during its stacking stroke an auxiliary device as illustrated in FIGURES 8 and 9 may be associated with the stacking member. This auxiliary device comprises, as shown in FIGURE 8, a pair of swingingly arranged arms 110 and 112 mounted on the stacking member 16 movable under influence of springs from a lower inoperative position shown in full lines to an upper operative position shown in dotted lines in engagement with the workpiece. These members thereby provide clamping members in engagement with the workpiece during the stacking stroke. In order to move these clamping members 110 and 112 to the inoperative position when the stacking member is in its lower article-receiving position a pair of arms 114 and 116 is secured to the frame members 18 and 20 and provided with abutments 113 and 115 respectively for engagement with the arms 110 and 112 to swing them upwards when the stacking member comes near to its lower position.

In more detail with reference to FIGURE 9 which shows the left-hand side of the arrangement illustrated in FIGURE 8 the arm 110 is pivotally secured on a pin 111 on a bracket 118 secured on the stacking member 16. The top side of the bracket 118 is curved and forms a guide for a coil spring 120 which at one end is connected to a hook 119 on the bracket 118 and at the other end is connected to a hook on the underside of arm 110 so as to cause the arm to swing down with a friction knob or the like 122 in engagement with the top side of the stacking member 16 when the stacking member moves through the initial part of its stacking stroke. In order to reduce the noise preferably also the abutment 113 is of resilient material.

Mode of Operation

When the sewing operation on a workpiece has been completed, the operator engages, following the workpiece on the sewing machine table, the actuating member 91 for the switch 90 of the guillotine whereby the knife 98 moves down and cuts the thread or any other connection between the completed workpiece and the next workpiece to be run through the sewing machine.

As will be understood from FIGURE 1 the free end of the workpiece completed will be overlying the stacking member 16 having passed behind the edge of the sewing machine table. During the downward movement of the guillotine knife the pin 100 engages the actuating member 51 for the actuating switch 50 of the stacking machine. With reference to FIGURE 7 the closing of the switch 50 which as mentioned is of the N–O type closes an energizing circuit through the relay coil 82, and the N–C type switch 38. Hereby the relay coil is energized and the relay closes contacts R, U as well as the contacts S, V and T, W. The closing of the last two pairs of contacts closes the circuit to the motor 32. The closing of the pair of contacts R, U provides a holding circuit for the relay coil so that the motor will remain energized even when the switch 50 is opened immediately after having been actuated.

The stacking member therefore will start to move immediately through its stacking stroke due to the movement of the chain drive in the direction of the arrow B shown in FIGURE 6. Hereby the stacking member will engage the workpiece overlying the stacking member and pull it away from the rear edge of the sewing machine table so as to assume the position shown in FIGURE 1 with the workpiece hanging on both sides of the stacking member. To prevent the workpiece from slipping on the stacking member or the apron associated therewith it may be provided with a suitable frictional material on its surface.

Furthermore, in the event that the stacking member is provided with an auxiliary clamping device as shown in FIGURES 8 and 9 it will be understood that during the first part of the movement of the stacking member through its stacking stroke the clamping arms 110 and 112 will move down under influence of their appertaining springs to engage with the workpiece and prevent it from slipping on the stacking member.

When the stacking member reaches adjacent the end of the stacking stroke the switch 38 will be actuated and as will appear from the circuit, FIGURES 8 and 7, the relay coil 82 is thereby deenergized whereby the stacking member will return to its lower position under influence of gravity.

It will be understood that the invention is not limited to the embodiment shown and described. It has been found that with a length of the stacking member 16 up to nearly three feet it is with the arrangement shown and described sufficient to provide a drive adjacent one end of the stacking member.

By a construction of a stacker capable of handling larger workpieces or heavy workpieces it may be advantageous to provide a drive at both ends of the stacking member in which event the driving shaft 62 will be extended and a similar chain drive will be associated with the opposite frame member 22.

It will also be understood that any other convenient type of severing device can be used, or it is possible within the scope of the invention to use a stacker with manual actuation without the use of a severing device.

I claim:

1. Apparatus for stacking articles produced on a sewing machine comprising, a frame structure having one end supported adjacent the sewing machine table and below the upper edge thereof, stacking means including an elongated stacking member slidably mounted on said frame structure, moving means for moving said stacking member through a stacking stroke between an article-receiving position adjacent the edge of said sewing machine and below the workpieces passing from said table edge and a stack-forming position remote from said sewing machine table edge, and clamping means movably supported on said elongated stacking member between an inoperative position providing unobstructed engagement between said elongated stacking member and the underside of an article and an operative position wherein said clamping means is in engagement with the top side of said article to clamp said article on said elongated stacking member, means associated with said frame structure for holding said clamping means in said inoperative

position in said article-receiving position of said stacking member, means for moving said clamping means to said operative position during the movement of said stacking member away from said article-receiving position, and control means for said moving means for moving said stacking member through said stacking stroke.

2. Apparatus for stacking articles produced on a sewing machine comprising a frame structure supported adjacent the sewing machine table, stacking means including an elongated stacking member slidably mounted on said frame structure, a pair of swingingly arranged arms supported on said stacking member adjacent each end thereof, and moving means for moving said stacking member through a stacking stroke between an article-receiving position adjacent the edge of said sewing machine table in which the articles are able to pass over said stacking member and a stack forming position remote from said sewing machine table edge wherein said stacking member is operable to support said articles hanging on each side thereof, control means for said moving means for moving said stacking member through said stacking stroke, means associated with said frame structure operable in said article-receiving position to swing said arms outside the orbit of said articles, and means associated with said arms for engaging them with the top of the work-piece hanging on said elongated stacking member during a substantial part of said stacking stroke.

3. Apparatus for stacking articles produced on a sewing machine comprising a frame structure supported adjacent the sewing machine table, stacking means including an elongated stacking member slidably mounted on said frame structure, a pair of swingingly arranged arms pivotally supported on said stacking member adjacent each end thereof, and moving means for moving said stacking member through a stacking stroke between an article-receiving position adjacent the edge of said sewing machine table in which the articles are able to pass over said stacking member and a position remote from said sewing machine table edge, control means for said moving means for moving said stacking member through said stacking stroke, a pair of abutments supported on said frame structure operable to engage with said arms in said article-receiving position of said elongated stacking member for holding said arms in an inoperative position in which the articles are able to pass unobstructed over said stacking member, and resilient means associated with said stacking means operable to move said arms to an operative position to clamp an article supported on said stacking member thereagainst when said stacking means moves through its stacking stroke beyond said abutments.

4. Apparatus for stacking articles produced on a sewing machine comprising a frame structure having a pair of spaced guideways, an elongated member movable through a stacking stroke slidably supported in said guideways adjacent its ends, driving means for moving said stacking member through its stacking stroke comprising a dynamo electrical motor and an energizing circuit therefor including a first switch and a second switch, a reduction gear and an endless driving member mounted in said frame structure, a driving connection between said endless driving member and said stacking member for moving said stacking member through its stacking stroke, means operable at will for actuating said first switch to energize said driving motor to initiate the movement of said stacking member through its stacking stroke, means operable to actuate said second switch to de-energize said driving motor in response to the arrival of said stacking member at the end of said stacking stroke, means associated with said frame structure for adjustably supporting said guideway adjacent a sewing machine table at an inclined angle up to approximately 45° to said table with said stacking member in its normal rest position adjacent the delivery edge of said sewing machine table and below the same to enable said articles to pass over said stacking member whereby said articles are folded over said stacking member by lifting during the movement of said stacking member through its stacking stroke.

5. In the combination of a sewing machine arranged on a sewing machine table, a severing device on said sewing machine operable to separate each article produced on said sewing machine from the next article to be produced and including actuating means for said severing device operable at will, and an apparatus for stacking articles produced on said sewing machine, the improvement consisting of a stacking device comprising a frame structure having a pair of spaced guideways, a stacking member movably supported in said guideways, driving means for moving said stacking member in said guideways through a stacking stroke comprising a dynamo electrical motor and an energizing circuit therefor including a first switch and a second switch, a reduction gear and an endless driving member mounted in said frame structure, a driving connection between said endless driving member and said reciprocable stacking member for moving said stacking member through its stacking stroke, means associated with said frame structure for adjustably supporting said guideway adjacent a sewing machine table at an inclined angle up to approximately 45° to said table with said stacking member in its normal rest position adjacent the delivery edge of said sewing machine table to enable said articles to pass over said stacking member whereby said articles are folded over said stacking member by lifting thereof during the movement of said stacking member through its stacking stroke, means operable in response to the operation of said severing device for actuating said first switch to energize said driving motor to initiate the movement of said stacking member through its stacking stroke, and means associated with said stacking member operable to actuate said second switch to de-energize said driving motor in response to the arrival of said stacking member at the end of said stacking stroke.

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