April 8, 1947. R. S. EDWARDS 2,418,550

METHOD AND APPARATUS FOR STACKING AND TYING MEDICAL COMPRESSES OR THE LIKE

Filed Aug. 24, 1943 2 Sheets-Sheet 1

Fig. 1.

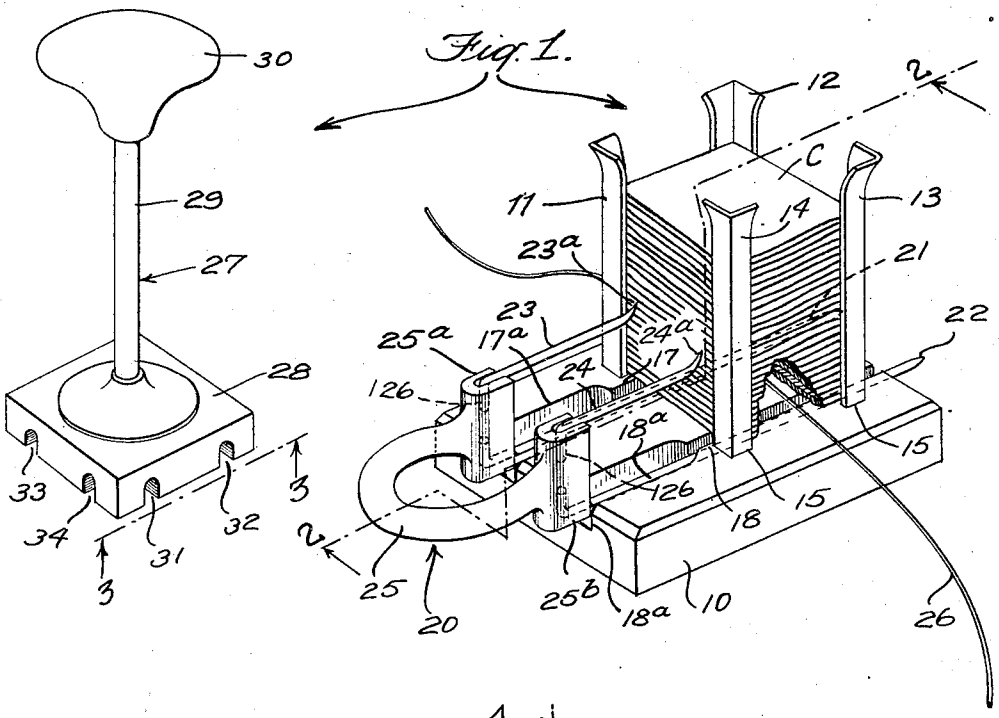


Fig. 3.

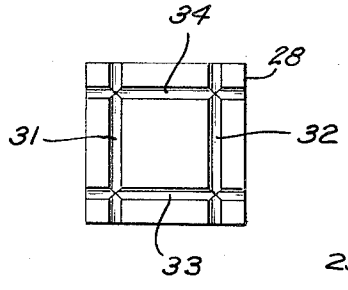


Fig. 2.

INVENTOR.
ROBERT S. EDWARDS
BY
William T. Kniesner
ATTORNEY.

April 8, 1947. R. S. EDWARDS 2,418,550

METHOD AND APPARATUS FOR STACKING AND TYING MEDICAL COMPRESSES OR THE LIKE

Filed Aug. 24, 1943 2 Sheets-Sheet 2

Fig. 4.

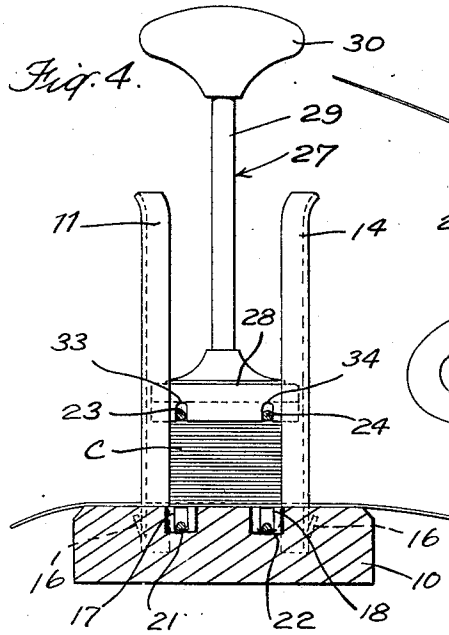
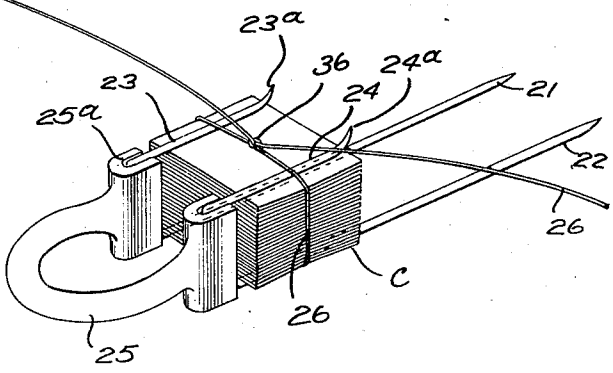


Fig. 5.



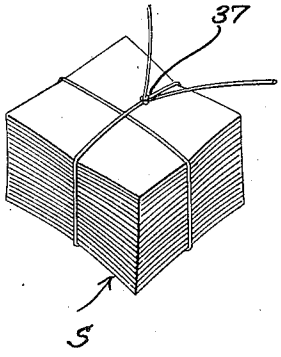


Fig. 6.

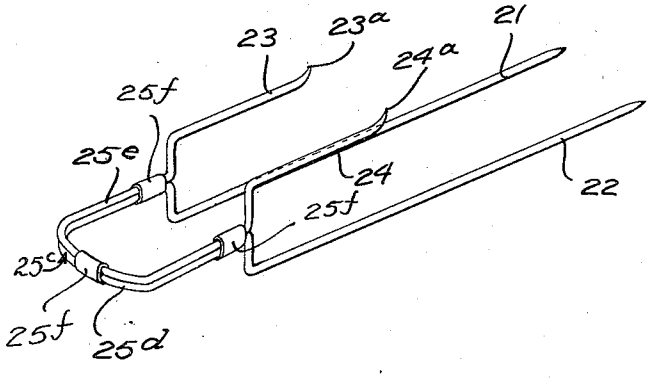


Fig. 7.

INVENTOR.
ROBERT S. EDWARDS.

BY William T. Kniesner
ATTORNEY.

Patented Apr. 8, 1947 2,418,550

UNITED STATES PATENT OFFICE

2,418,550

METHOD AND APPARATUS FOR STACKING AND TYING MEDICAL COMPRESSES OR THE LIKE

Robert S. Edwards, New Canaan, Conn., assignor to Edwards and Company, Inc., a corporation of New York

Application August 24, 1943, Serial No. 499,777

20 Claims. (Cl. 100—31)

1

This invention relates to a method and apparatus for effecting the stacking and compacting, for tying or packaging of compressible or yieldable sheet-like elements, such as medical compresses made up of several layers, usually by folding, of cloth, such as gauze.

One of the objects of this invention is to provide a simple, practical and efficient method and apparatus for stacking or grouping together and compacting sheet materials, like medical compresses of cloth or gauze, to facilitate tying or packaging, particularly for making up standard bundles or units thereof. Another object is to provide an apparatus that can be hand-actuated to facilitate, simplify and speed up the grouping and compacting together of materials of the above-mentioned character. Another object is to provide simple and easily handled or manipulated implements to make it possible speedily and efficiently to make up neatly compacted and aligned and stacked materials of the above-mentioned nature. Another object is to provide implements of the last-mentioned character which will be simple and inexpensive to construct, foolproof in handling or manipulation, free from complications mechanically, and capable of use for carrying out such objects as the above in a manner that will not require a high degree of skill. Another object is to provide an apparatus of the above-mentioned character that can be constructed in neat and compact form and which can be easily kept clean and sanitary. Another object is to provide implements of the above-mentioned character which are small and compact in construction and easily portable as well as operable in an easy and foolproof way, more particularly to facilitate the making up and bundling together, and tying or packaging, of medical compresses by hand and by the layman. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts and in the several steps and relation and order of each of the same to one or more of the others thereof, all as will be illustratively described herein, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which is shown a preferred embodiment of the mechanical features of my invention,

Figure 1 is a perspective view of the apparatus

2

or implements showing the latter in one stage of carrying out my method;

Figure 2 is a longitudinal vertical sectional view as seen along the line 2—2 of Figure 1, but showing the apparatus and implements and the materials operated upon in a subsequent stage of my method;

Figure 3 is a bottom plan view of the platen of a compressing element shown in Figure 1, more particularly as seen substantially along the line 3—3 of Figure 1;

Figure 4 is a transverse vertical sectional view as seen along the line 4—4 of Figure 2;

Figure 5 is a perspective view of a part of the apparatus showing it and the materials operated upon in a subsequent stage or step of my method;

Figure 6 is a perspective view of the stacked and tied materials as they appear in a later step of my method and

Figure 7 is a perspective view of a modified form of a part of the apparatus.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to the drawings and more particularly to Figures 1, 2 and 4, I provide a suitable base 10 preferably of substantial thickness and of generally rectangular shape and at one end thereof, such as at the right hand end thereof, as seen in Figure 1, I provide upstanding guiding elements 11, 12, 13 and 14, illustratively four in number, where the sheet materials such as medical compresses C comprising folded gauze are square or rectangular in shape so that there is one upright guiding member for each corner portion; the spacings of the uprights, which are angular in cross-section to correspond with the angles (90° in the illustration) of the corners of the compresses are such that their internal faces fall in a geometric square or rectangle corresponding to the shape of the compresses. The upright guides are of any desired height and as many compresses C, usually a fixed number where standard packages thereof are to be made up, are stacked one by one in between the uprights, the bottom compress C resting upon the base 10.

To facilitate such stacking, the upper ends of the angle-cross-section upright guides are flared outwardly and away from the geometric square or rectangle, thus also facilitating the speedy and easy assembly to the apparatus of certain other parts later described.

Any suitable materials may be employed in making up the uprights and the base and illus-

tratively and preferably the base 10 is made of any moldable plastic composition, and in such case the uprights 11, 12, 13 and 14 may have their lower ends, as indicated in Figure 4, projecting into the material of the base 10 which in the course of molding can be molded about the lower ends of the uprights so that upon setting of the plastic the uprights are secured in place and held in proper alignment to each other. Or the material of base 10 can have formed in it, as during molding, recesses 15, one for each upright, so that the uprights, which are preferably of sheet metal, can be subsequently assembled to the base by simply thrusting their lower ends into the recesses 15, to be held therein by any suitable means. Preferably, they are held in place frictionally to permit disassembly as for packaging or carrying of the devices and a convenient way of achieving that object is to mold or shape the angularly related arms or sections of each recess 15 to make a slightly different angle than is made by the two angular parts of each upright; thus where the latter parts are at 90°, as in the illustration, the two parts of each recess 15 can be made to have an angle somewhat greater or somewhat less than 90°, the spring of the metal of the uprights, when the latter are pushed into the slots, letting the lower portions of the uprights yield and thereafter exert a sufficient frictional grip to hold the uprights adequately assembled to the base.

Or, in either case, that is, whether molded in place or to be subsequently assembled to the base 10, I may provide in the lower ends of the uprights suitable projecting portions as indicated in exaggeration at 16 in Figure 4, formed as by striking small portions or tongue-like parts out of the plane of the sheet metal. In such case, if the material of base 10 is molded thereabout, a secure inter-locking insuring permanency of assembly results while such outwardly struck parts 16 may also be used to provide a ratchet tooth effect, preferably springy or yielding, to hold the uprights in the recesses 15 for subsequent assembly to the base 10 and also permitting disassembly if desired.

In the upper face of the base 10, I provide two longitudinally-extending slots 17 and 18 that extend in between and into relatively close proximity respectively to the upright guides 11—12 at one side of the base 10 and the uprights 13—14 at the other side of the base as is better shown in Figures 1 and 4; these slots or grooves 17—18 are preferably of substantial depth and preferably are open at their ends in the end edge faces of the block 10 as appears better from Figure 2 and, if desired, those portions of the two grooves 17—18 that are in the left-hand half of the base 10 and hence outside of the area encompassed by the upright guides may be flared or widened out in cross-section as indicated at 17^a and 18^a in Figures 1 and 2.

These grooves are to coact with a device generally indicated by the reference character 20 in Figures 1 and 5, the device comprising two lower and parallel bar or rod elements 21 and 22, conveniently made of relatively heavy wire and spaced apart to be received in the grooves 17 and 18, respectively; in length, they are preferably about the same length or a little greater than the length of the grooves 17—18. They are ultimately to coact with two upwardly spaced parallel bar or rod elements 23 and 24 and, conveniently, they are transversely spaced the same as are the

grooves 17 and 18. The vertical spacing between the lower pair of elements 21—22 and the upper pair of elements 23—24 is the same as the thickness to which it is desired to compact or compress the stacked compresses C. The upper pair 23—24 are preferably shorter than the lower pair so that, when the device 20 is assembled to the base 10 and the upright guides the forward end of the upper elements 23—24 do not project into the space between the upright guides and hence do not interfere with the one by one insertion in the guides of the compresses C. The forward portions of the lower elements 21—22 are accommodated in the grooves 17—18 and hence underlie the lowermost compress C of the stack and their greater length aids also in preventing counterclockwise tipping or tilting of the device 20 when the device 20 is first put in place to receive compresses, particularly where the base 10 is short and the handle portion 25 of the device in the position shown in Figure 1 overhangs the front end of the base 10. When so initially assembled, a string, cord or other tying device, such as a tape, generally indicated by the reference character 26, is first laid across the upper face of the base 10, extending between opposite pairs of the upright guides, illustratively and preferably between the pairs 11—14 and 12—13. Depending upon the size of the compresses, more than one string may thus be laid in place, but for illustration I have assumed that the compresses are relatively small so that one turn around the ultimate stack will suffice and in that case the cord or string is, of course, preferably centered and it is so shown in Figures 1 and 2. The cord 26 preferably overlies the prong-like elements 21—22, if the implement 20 is initially assembled to the base 10 before stacking of compresser commences; as later pointed out, this assemblage of the device 20 may take place at a later stage.

The elements 21—22—23—24 of the implement 20 are as above indicated preferably made of metal, such as relatively heavy wire and at their forward ends is the handle 25 which in the illustrative embodiment of Figures 1 and 5 may be conveniently U-shaped and provided with enlargements 25^a—25^b to which the wiring elements are secured or in which they are anchored. The handle 25 may conveniently be molded of a plastic settable material like the material of which the base 10 may be made and the wire elements are preferably secured and anchored thereto during the molding of the handle 25 itself, the ends of the wire elements being shaped in any suitable way or upset or knurled or roughened as indicated at 126 in Figure 1 so that a secure anchorage and mounting of the wire elements in the material of handle 25 results.

Or the handle may be formed out of extensions of the wire elements 21—22—23—24 themselves as indicated at 25^c in Figure 7; in such case, it is preferred that the wire elements 21 and 22 are made out of the same piece of wire which is looped as at 25^d and wire elements 23 and 24 may be made out of a single piece of wire looped at an intermediate portion as at 25^e, the two loops, due to intermediate bends as shown, forming together a handle and the two thus conformed pieces of wire being joined together as at 25^f in any suitable way as by clamping them together by means of a suitable number of suitably heavy pieces of sheet metal compacted about them. The wire handle elements 25^d and 25^e in the form of Figure 7 form thus a U-shaped handle like the part 25 of Figures 1 and 5, so as to provide space,

analogous to the space within the U-shaped handle of Figures 1 and 5 and for similar purposes, as will later appear.

After the required number of compresses C has been stacked as indicated in Figure 1, the individual compresses being neatly guided into alignment with each other by the upright guides, I now insert into the upright guides an implement like that generally indicated at 27 in Figures 1, 2 and 4, comprising a platen 28 which may be of molded material and preferably relatively thick with an upright shank or stem 29 that terminates in its upper end in a convenient knob or handle 30. The platen 28 is of a length and breadth the same as the compresses C and with the outwardly flared ends of the upright guides the platen 28 is easily entered therein and its underface brought to rest upon the uppermost compress of the loose stack of compresses C.

In the underface of the platen 28 are formed two pairs of parallel grooves or slots 31—32 and 33—34 of a depth adequate to accommodate the upper parallel elements 23—24 of the implement, the slots opening at both ends in the end edge faces of the platen 28, the latter elements being preferably pointed and curved upwardly as at 23^a and 24^a and being correspondingly spaced.

Accordingly, it is unnecessary to take pains how the implement 27 of Figure 1 is inserted into the upright guides for either the pair of grooves 31—32 or the pair of grooves 33—34 becomes positioned into parallelism with the direction of subsequent movement toward the right of the implement 20 as seen in Figures 1 and 2.

Pressure is now applied to the platen 28 by way of the handle 30 to compress the stack to a point where the open ends of the slots, illustratively slots 33—34 in the underface of the platen 28, are brought into juxtaposition to the upwardly bowed and somewhat pointed ends 23^a and 24^a of the implement 20; that would be to a downward position of the platen 28 substantially as indicated in Figure 2, and that can be controlled and done by one hand of the operator; with the other hand the operator grasps the implement 20 by its handle 25 and, if it has not already been assembled to the base 10 as was above described and placed in the relationship shown in Figure 1, the operator now enters the forward ends of the lower wire elements 21—22, respectively, into the upwardly flared slots or grooves 17^a—18^a, respectively, and pushes the implement 20 toward the right to enter the forwardly extending portions of the elements 21—22 into those portions of the slots underlying the stack C. Subsequent movement of the implement 20 toward the right, in etiher mode of operation, enters the front ends of the upper elements 23—24 into the grooves 33—34, respectively, in the platen 28 and hence moves them across and over the upper surface of the uppermost of the compressed stack of compresses, the upward curvature of the ends 23^a—24^a insuring that the ends of the elements 23—24 do not catch in the material underlying the platen 28 and some of which might bulge upwardly into the slots, continuing the movement until the front ends of elements 23—24 project somewhat beyond the platen 28 as shown in Figure 2. Here, conveniently, the parts 25^a—25^b of the handle 25 can function as stops either in coaction with the front guides 11 and 14 or in coaction with the inner ends of the widened or flared slot portions 17^a—18^a into which the lower ends of the handle parts 25^a—25^b may enter and be guided and to which they may be conformed for these purposes.

The upper and lower pairs of wire elements can now hold the compressed stack C (Figures 2 and 4) against expansion, the platen implement 27 is now removed, the string 26 has its two ends taken up and brought up over the sides of the compressed stack C and over the holding wire elements 23—24 whence a knot may be made or the cord crossed as at 36 in Figure 5, but preferably a knot is tied. The implement 20 with the compressed stack of compresses C and the string thereabout may now be lifted out of the device by upward movement to slide the stack out of the upright guides, leaving an entity or assemblage like that shown in Figure 5. The free ends of the string may now be looped around at right angles to the already existing loop, the space between the elements 21—22 providing adequate space for bringing one string end around one side of the stack and the U-shape of the handle 25 gives adequate room to get the other string end down through whence the now shortened and remaining ends of the string are tied in a suitable knot as at 37 in Figure 6. The implement 20 is then removed by simply sliding the tied stack and the implement 25 apart, the upper wire elements 23—24 sliding out from in under the first loop of string that was tied over them as shown in Figure 5. There results a compact, standard-sized package or stack, indicated at S in Figure 6, comprising the given number of compresses.

Of course, variations in the steps may be resorted to, as will now be clear in view of the foregoing. For example, the implement 20 may be removed from the stack upon completion of the stage shown in Figure 5, if at 36 a knot is tied, for thereafter the completion of a second loop and tying about the stack C may be completed without having the implement 25 still assembled to the compressed stack C.

It will thus be seen that there has been provided in this invention an apparatus or implements and a method in which the various objects above noted together with many thoroughly practical advantages are successfully achieved. It will be seen that the apparatus is simple, compact, easy to manipulate, foolproof and greatly speeds up the work of making up standard packages of materials, like compresses.

As many possible embodiments may be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinabove set forth, or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In apparatus of the character described, in combination, a base having a plurality of spaced grooves and having upstanding therefrom vertical guiding means for guiding and aligning the edges of superimposed stacked sheet material which as a stack is compressible, said grooves extending through that portion of said base upon which the stack rests so as to underlie the latter, a platen element receivable in said guiding means for compressing the stack therein, said platen having in its underface a plurality of grooves, and a device having upper and lower spaced elements enterable, respectively, in the grooves of said platen and the grooves of said base upon compression of the stack by said platen, to hold the compressed stack against expansion.

2. An apparatus as claimed in claim 1 in which said base is of greater length in the direction

of the grooves therein than the portion of the base upon which the stack rests, the lower elements of said device being longer than the upper elements of said device whereby the former may underlie said stack with the ends of the upper elements terminating short of a side of said stack and thereby positioned in readiness for entry into the grooves of the platen upon corresponding descent of the latter in compressing the stack.

3. An apparatus as claimed in claim 1 in which said guiding means comprises a plurality of vertical guiding elements spaced transversely of said base and the grooves in the latter extending between said guiding elements whereby said device with a compressed stack between its upper and lower elements may be removed from said guiding means.

4. An apparatus as claimed in claim 1 in which said guiding means is shaped to accommodate and guide sheet material of equilateral shape and in which said platen is of corresponding equilateral shape, the plurality of grooves in said platen comprising sets of intersecting grooves opening at both ends in opposed side faces of the platen, whereby said upper elements of said device enter grooves in the platen regardless of which edge face of the platen is, upon entry thereof into said guiding means, faced toward said upper elements.

5. An apparatus as claimed in claim 1 in which the ends of the upper elements of said device are curved upwardly so as not to catch in the material of the uppermost member of the stack as said elements enter the grooves in said platen.

6. An apparatus as claimed in claim 1 in which the lower elements of said device and the upper elements thereof are respectively spaced transversely to provide spaces therebetween for passing about the compressed stack a tying element, such as a string.

7. In apparatus of the character described, in combination, stacking means comprising vertically-extending guiding means for guiding and aligning the edges of elements of sheet material superimposed upon one another and which as a stack are compressible, a device movably related to said stacking means for movement in a direction transversely of the stack and having means underlying the stack in said guiding means and having, spaced upwardly from said underlying means, means responsive to movement of said device in transverse direction relative to said stack and adapted to take over the uppermost sheet element in the stack when the latter is compressed sufficiently to thereby prevent expansion of the stack when relieved of the pressure of compression thereof, said vertically-extending guiding means and said means of said device having respective configurations and relative spacings for the one to by-pass the other during the aforesaid movement of said device in a direction transversely of the stack.

8. In apparatus of the character described, in combination, stacking means comprising vertically-extending guiding means for guiding and aligning the edges of elements of sheet material superimposed upon one another and which as a stack are compressible, a device movably related to said stacking means for movement in a direction transversely of the stack and having means underlying the stack in said guiding means and having, spaced upwardly from said underlying means, means to take over the uppermost sheet element in the stack when the latter is compressed sufficiently, a platen related to said guiding means for compressing said superimposed elements to an extent to bring the uppermost of said elements in line with said last-mentioned means of said device, said platen and said last-mentioned means having coacting configurations for entering said last-mentioned means of said device over the uppermost element of said compressed stack, whereby the latter is, upon removal of said platen, held against expansion.

9. In apparatus of the character described, in combination, means for receiving an uncompressed stack of sheet-like elements which when stacked are yielding and compressible, means for compressing said stack to the desired extent, and means operable upon the two ends of the stack and brought into coaction therewith during the application of the force of compression to the stack for holding the latter against expansion and to thereby permit removal of the force of compression on the stack, said holding means and said compressing means having relative configurations to provide for bringing said holding means into holding coaction with the two ends of the stack during the application by said compressing means of the stack-compressing force.

10. In apparatus of the character described, in combination, two opposed elements between which, upon relative movement therebetween, compression of a stack of sheet elements which as a stack are compressible may be effected, a device having two means spaced apart by the distance to which it is desired to compress said stack, said two elements having configurations on the sides that engage said stack to accommodate entry therein and hence extension over the ends of said stack of said two means, respectively, to thereby hold the stack against expansion upon subsequent relative movement of said elements away from each other.

11. An apparatus as claimed in claim 10 in which said device has a handle for manually entering said two means across the ends of said stack, each of said means comprising a plurality of transversely spaced members to provide space therebetween for taking a binding element, such as a cord, around the compressed stack.

12. An apparatus as claimed in claim 10 in which said first-mentioned two elements comprise respectively a base and a manually operated platen whereby compression of the stack may be effected manually with one hand, and said device may be manually put into position as aforesaid with the other hand before the first-mentioned hand relieves the pressure of compression on the stack.

13. A base having upstanding therefrom transversely spaced guiding elements for receiving therebetween sheet elements stacked one upon another and which as a stack are compressible, a manually operated platen movable downwardly along said guiding means to effect compression of the stack, and a device having vertically spaced means of which one means underlies said stack in said guiding means and of which the other means is movable upon actuation of said device in a direction between said spaced guiding means and crosswise of said stack, said platen having a configuration in its underface to provide a space for the entry thereinunder and above the uppermost sheet element of the stack of the upper means of said device, whereby said two means of said device hold the stack against expansion.

14. A base having upstanding therefrom transversely spaced guiding elements for receiv-

ing therebetween sheet elements stacked one upon another and which as a stack are compressible, a manually operated platen movable downwardly along said guiding means to effect compression of the stack, and a device having two means spaced vertically by a distance equal to the height of the compressed stack, said platen and said base being configured in their respective stack-engaging faces to provide a space for entry therein of said two vertically spaced means of said device whereby the latter holds the stack compressed and said platen may be released.

15. In a method of tying articles like compresses in a stack, the steps which comprise stacking the elements onto a tying element like a cord, compressing the stack of articles to the desired extent, maintaining the force of compression while applying over the ends of the compressed stack a device having spaced means of a given spacing capable of holding the stack against expansion, relieving the compress stack of the force of compression to thereby transfer to said device the burden of holding the stack compressed, bringing the tying element around the compressed stack and tying it, and removing the device to relieve the stack from the holding effect thereon of said device and thereby transfer to the tied tying element the burden of holding the stack compressed.

16. In a method of tying articles like compresses in a stack, the steps which comprise supporting a stack of articles between two relatively movable platen-like members, effecting relative approaching movement between the platen-like members to thereby apply a force of compression to the stack, during said compression of the stack making effective upon the endmost articles of the stack a device capable of resisting relative movement between said endmost articles in stack-expanding direction, effecting relative movement of separation between said platen-like members to thereby relieve the stack of the force of compression applied thereto by said platen-like members, applying a tying element about the stack while said device is effective upon endmost articles to thereby effect tying of the stack in compressed condition, and effecting separation between the tied stack and said device to transfer the burden of holding the stack compressed from said device to the tied tying element.

17. In a method of tying articles like compresses in a stack, the steps which comprise holding a compressed stack of articles against expansion by applying thereto a U-shaped device each arm of which has U-shaped two-pronged thin forks each fork being in a plane at right angles to the plane of the U-shape of the device with the stack received between the prongs of each fork to hold the compressed stack against expansion, applying a cord-like tying element about the stack so held in two directions at right angles to each other by passing the cord about the stack and said prongs in one direction and by passing the cord about only the stack in a plane intermediate of the planes of the two forks and within the U-shape of the device, and

then separating the device from the tied stack by relative movement of separation to slide the fork prongs out from in under that portion of the tying element that encompasses them and the stack.

18. A device for temporarily holding against expansion a compressed stack of sheet material, such as compresses, and for facilitating tying of the compressed stack as with a cord, string, or the like, said device comprising a U-shaped handle-like end means supporting from its two arms two pronged fork means respectively, the planes of said two fork means being substantially parallel and at substantially right angles to the plane of said U-shaped end means for jointly holding a stack of articles between the prongs of said two fork means, said U-shaped end means providing a space for the passage therethrough and about the portion of the stack intermediate of the two fork means of a tying element and the prongs of said fork means being of relatively small dimension in the direction of the axis of the stack for the reception of a tying element about them and the stack held thereby, said prongs being thereby freely removable from in under the tying element upon completion of its application.

19. A device as claimed in claim 18 in which said U-shaped handle-like end means has at the ends of its arms enlargements, said enlargements and the prongs of said two fork means having means securing them together whereby said enlargements and the prongs respectively secured thereto form together said two two-pronged fork means.

20. A device as claimed in claim 18 made up of at least two pieces of rod-like material of which each piece is at its central portion conformed to the shape of said U-shaped handle-like end means, with means securing the two conformed U-shaped portions together, end portions of said two rod-like members being bent to provide said two two-pronged fork means.

ROBERT S. EDWARDS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
233,625	Jones	Oct. 26, 1880
1,246,923	Horrigan	Nov. 20, 1917
283,049	White	Aug. 14, 1883
956,387	Magson	Apr. 26, 1910
797,121	Keller	Aug. 15, 1905
934,196	Manbeck	Sept. 14, 1909
1,365,227	Clark	Jan. 11, 1921
1,047,209	Hall	Dec. 17, 1912
965,458	Hitt	July 26, 1910
300,994	Massie	June 24, 1884

FOREIGN PATENTS

Number	Country	Date
192,826	England	Feb. 15, 1923
318,286	England	Sept. 2, 1929