

July 31, 1945.

H. H. BROWN

2,380,823

BANDAGE MAKING MACHINE

Filed Aug. 28, 1943

11 Sheets-Sheet 1

Fig. 1.

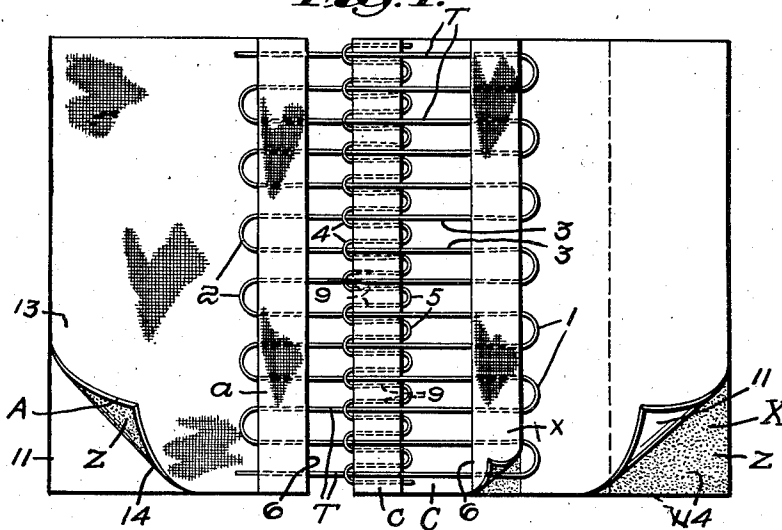
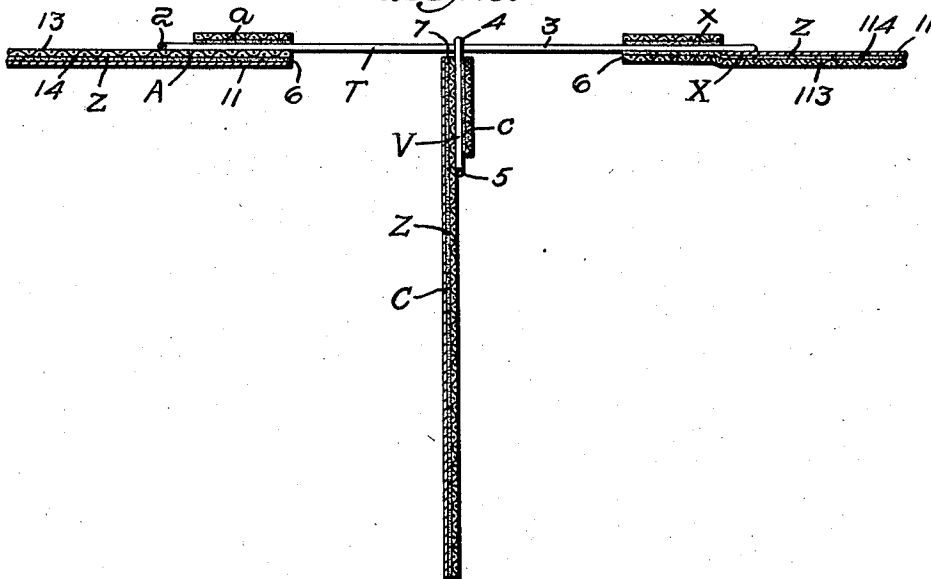


Fig. 2.



Inventor
Henson H. Brown
by *Harold W. Pearson*
Attorney

July 31, 1945.

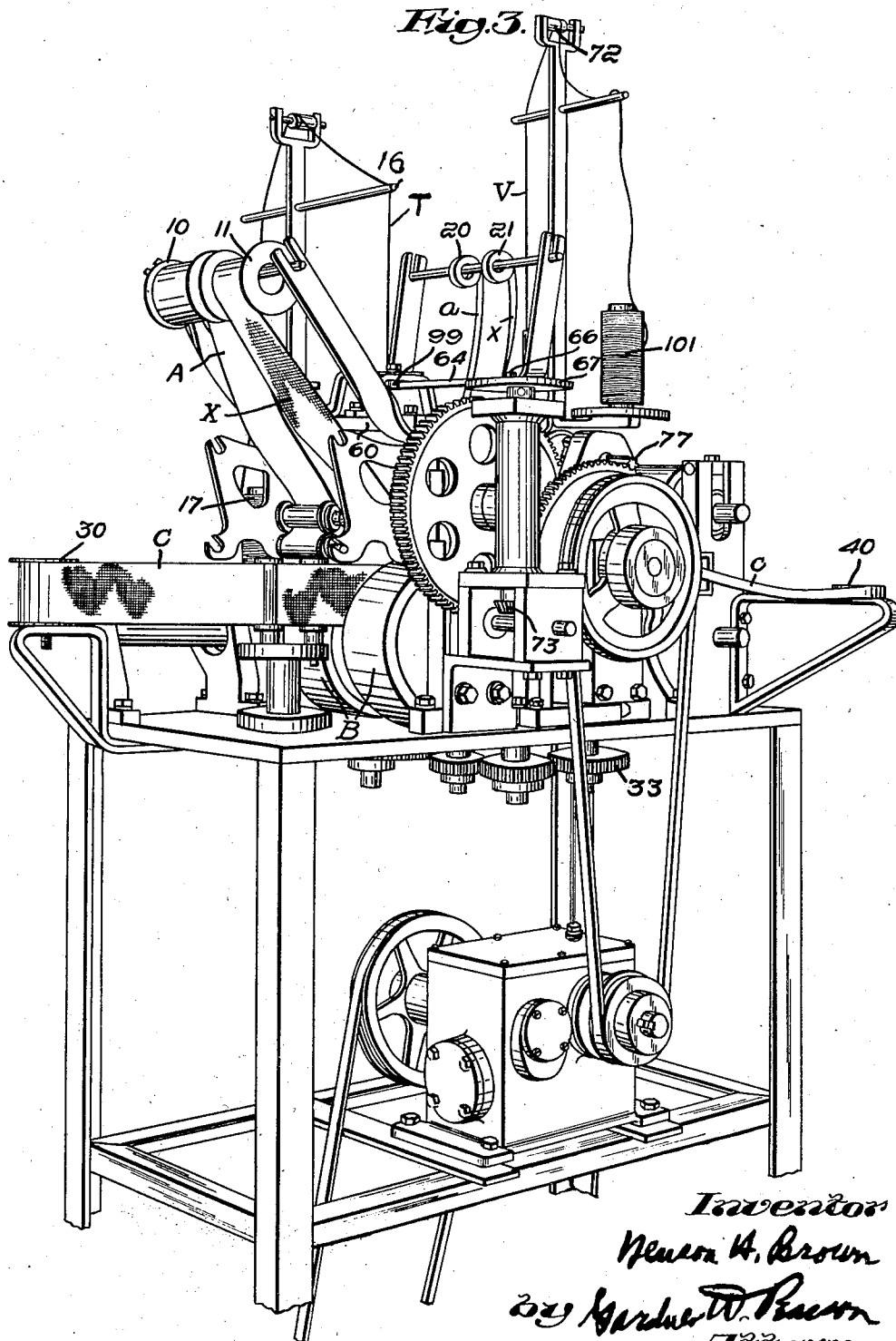
H. H. BROWN

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BANDAGE MAKING MACHINE

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H. H. BROWN

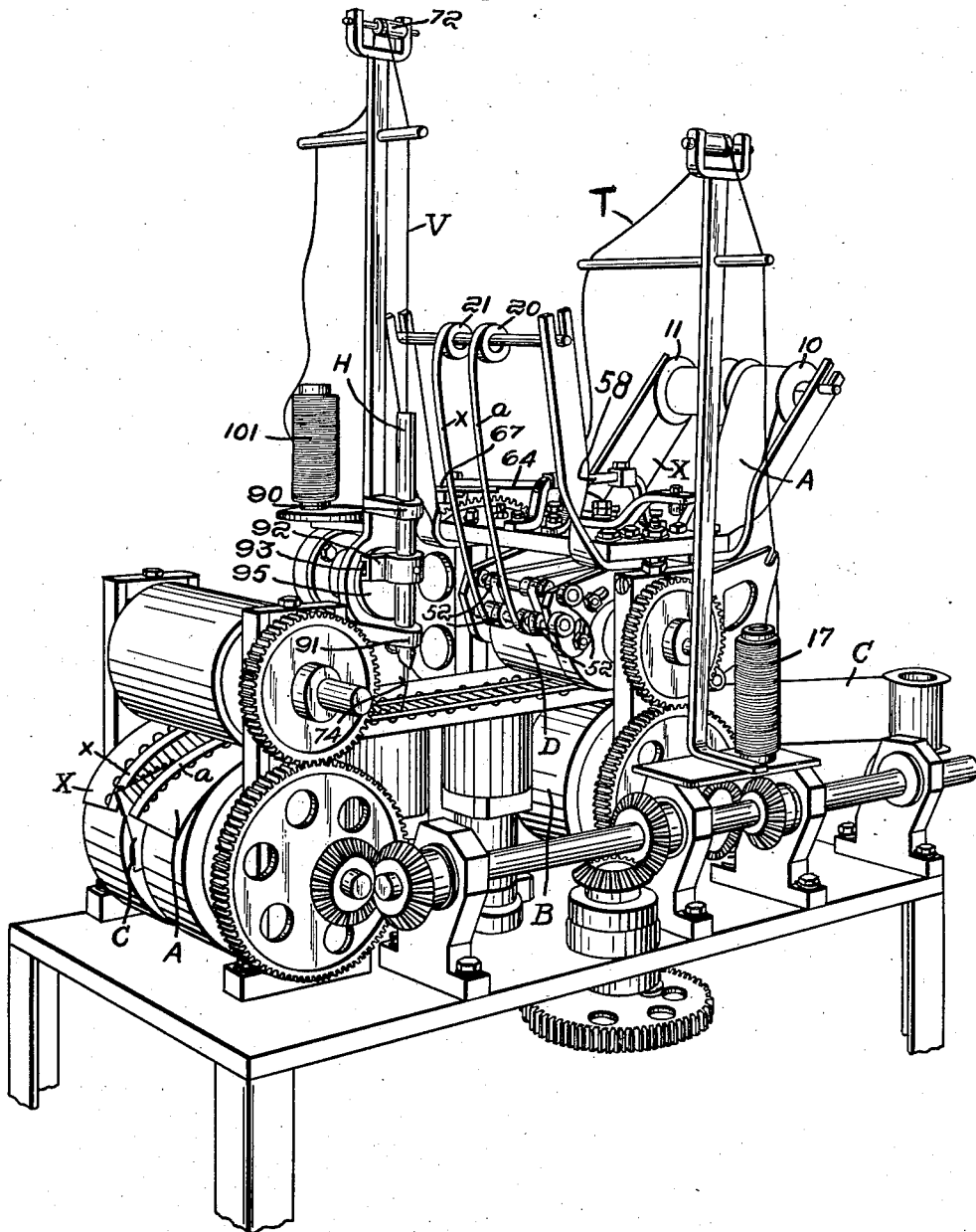
2,380,823

BANDAGE MAKING MACHINE

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Fig. 4.



Inventor:
Henson H. Brown
By Gardner W. Pearson
Attorney

July 31, 1945.

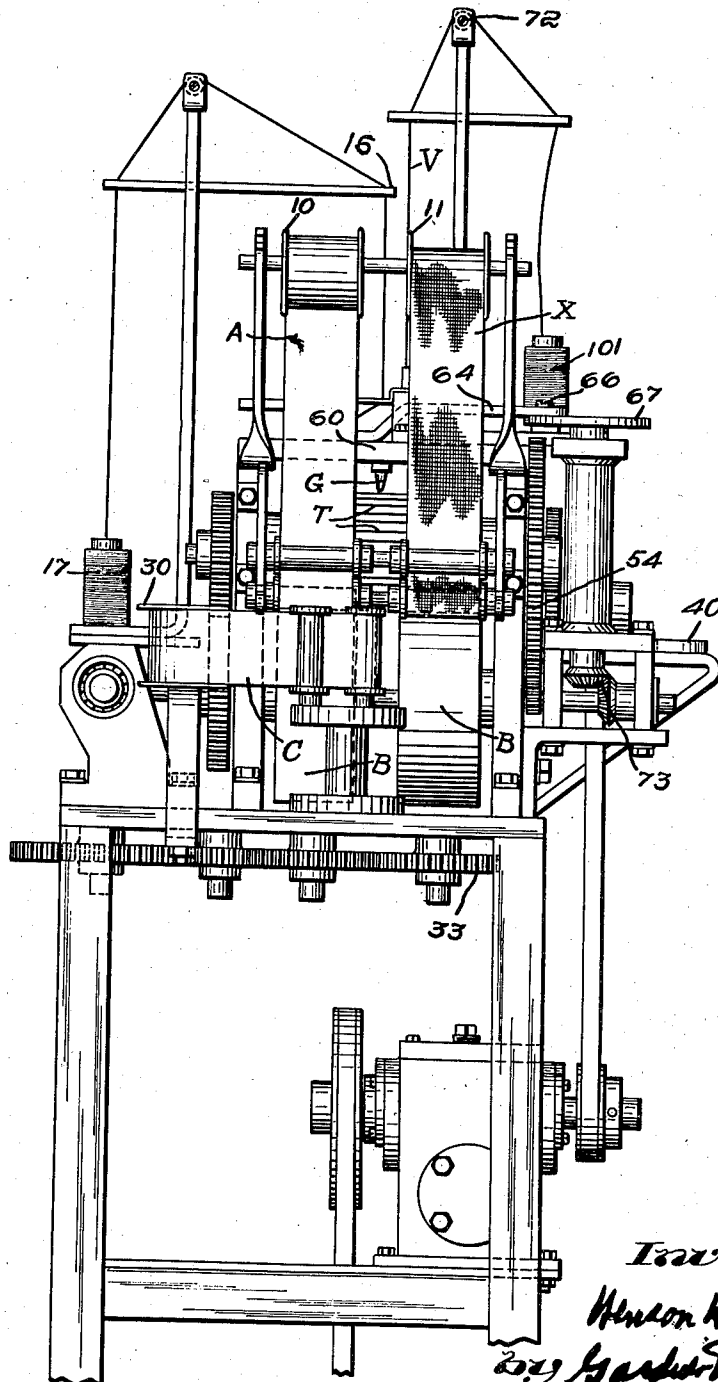
H. H. BROWN
BANDAGE MAKING MACHINE

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Fig. 5.



Inventor
Henson H. Brown
by Gardner Brown
Attorney

July 31, 1945.

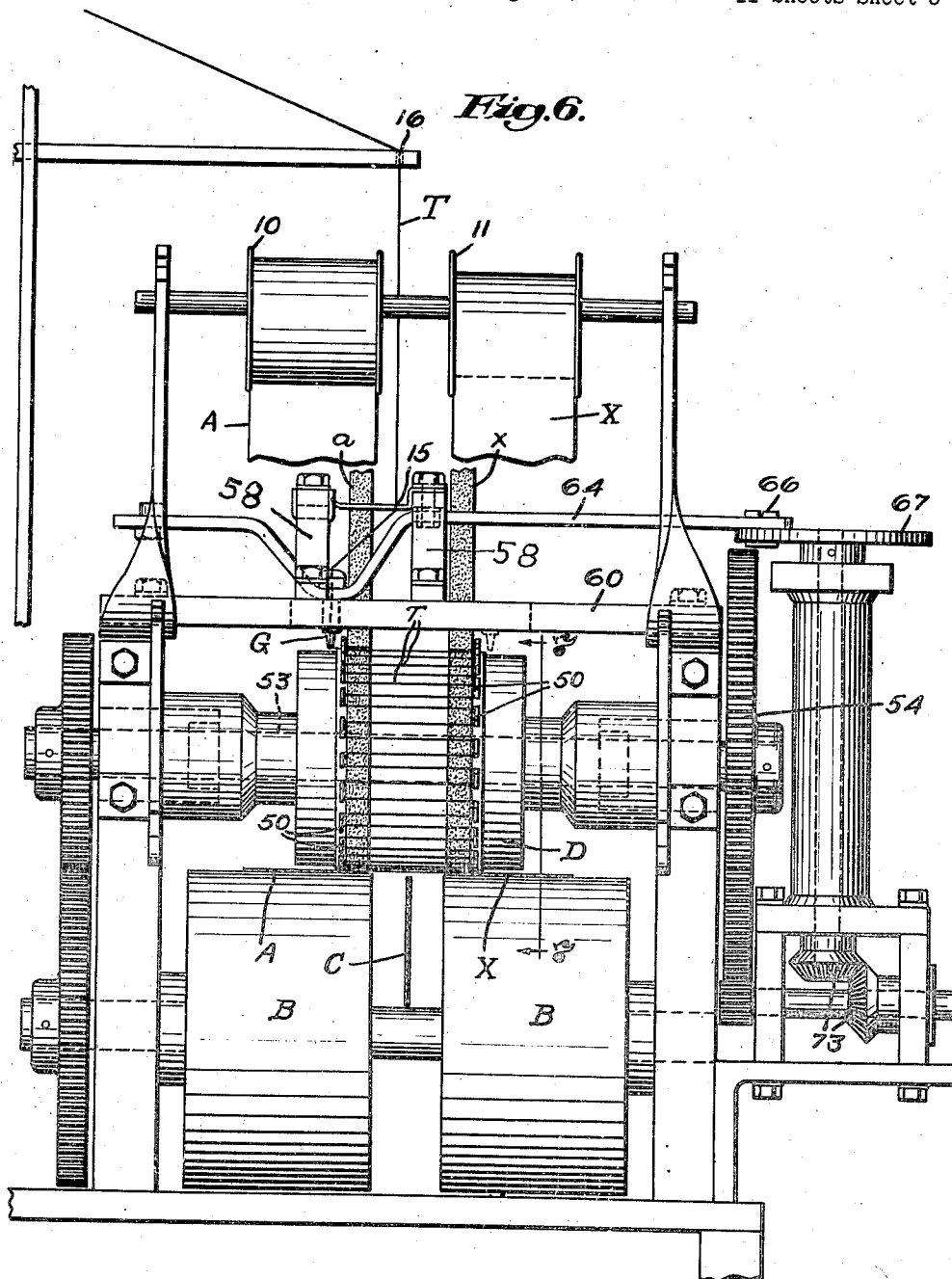
H. H. BROWN

2,380,823

BANDAGE MAKING MACHINE

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Inventor
Hanson & Brown
By Gardner T. Thorne
Attorney

July 31, 1945.

H. H. BROWN

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BANDAGE MAKING MACHINE

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Fig. 7.

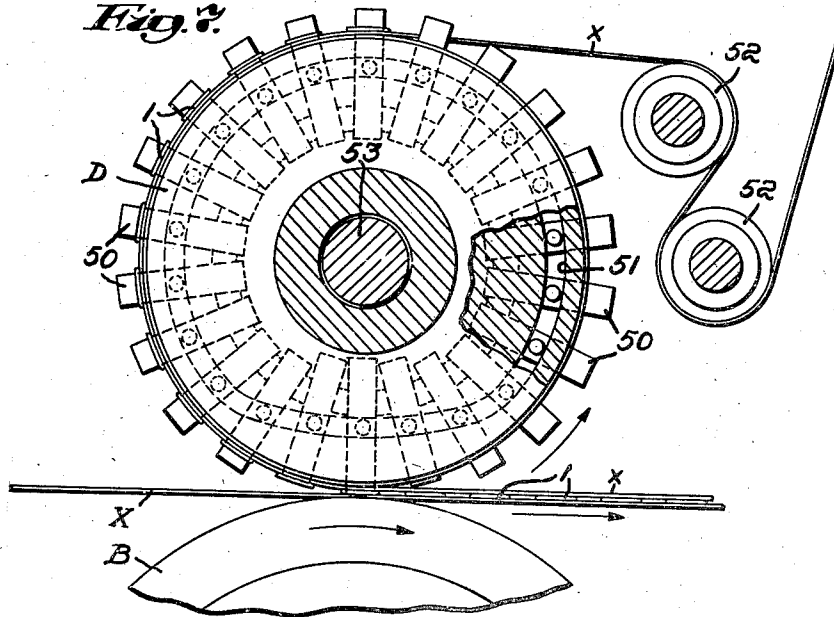


Fig. 8.

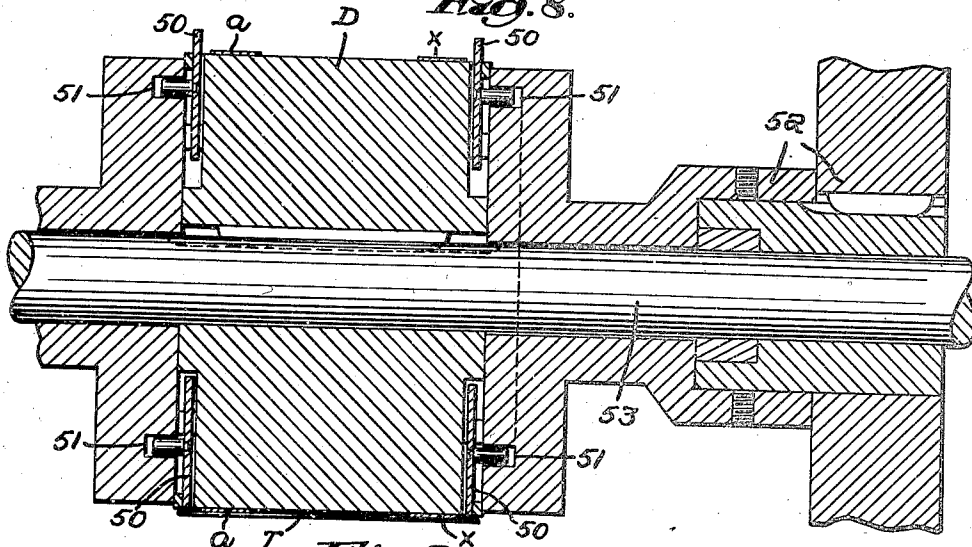
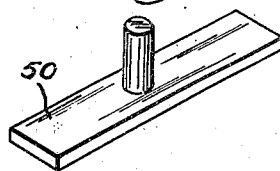


Fig. 9.



Inventor
H. H. Brown
By *John D. Brown*
Attorney

July 31, 1945.

H. H. BROWN

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BANDAGE MAKING MACHINE

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Fig. 10.

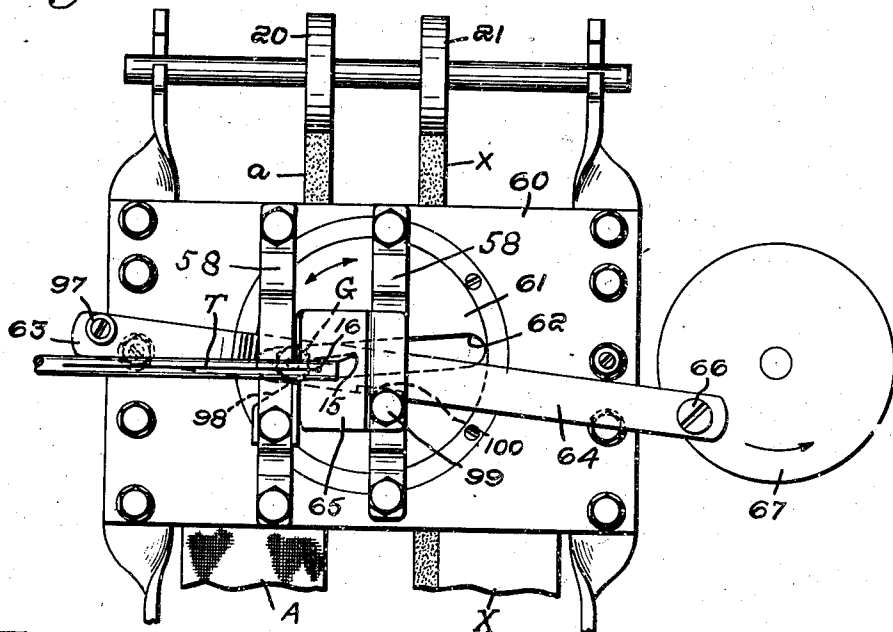


Fig. 11.

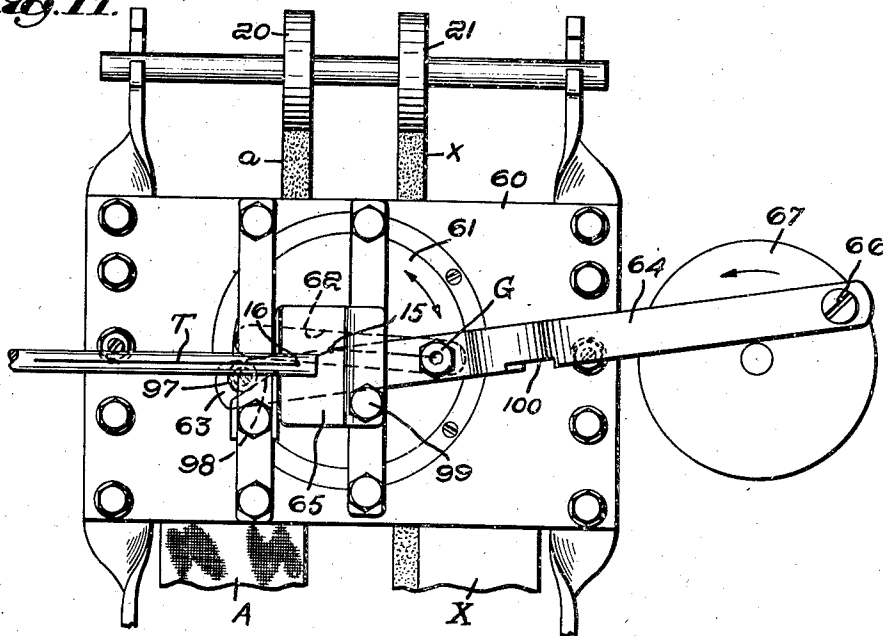
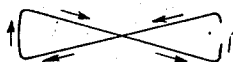


Fig. 12.



Inventor

Henson H. Brown

by George W. Pearson
Attorney

July 31, 1945.

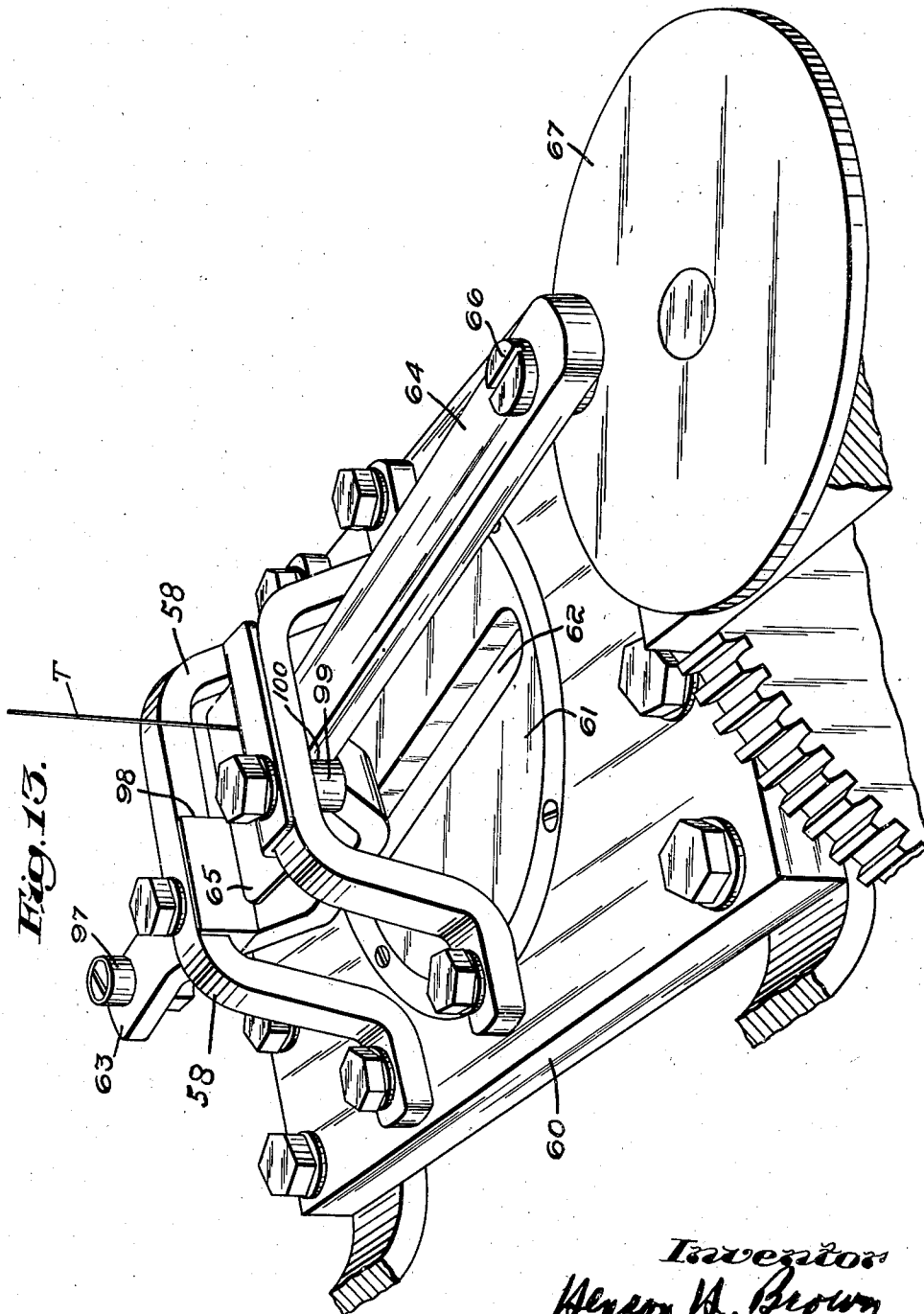
H. H. BROWN

2,380,823

BANDAGE MAKING MACHINE

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11 Sheets-Sheet 8



Inventor
Henson H. Brown
by *Frederic W. Plummer*
Attorney

July 31, 1945.

H. H. BROWN

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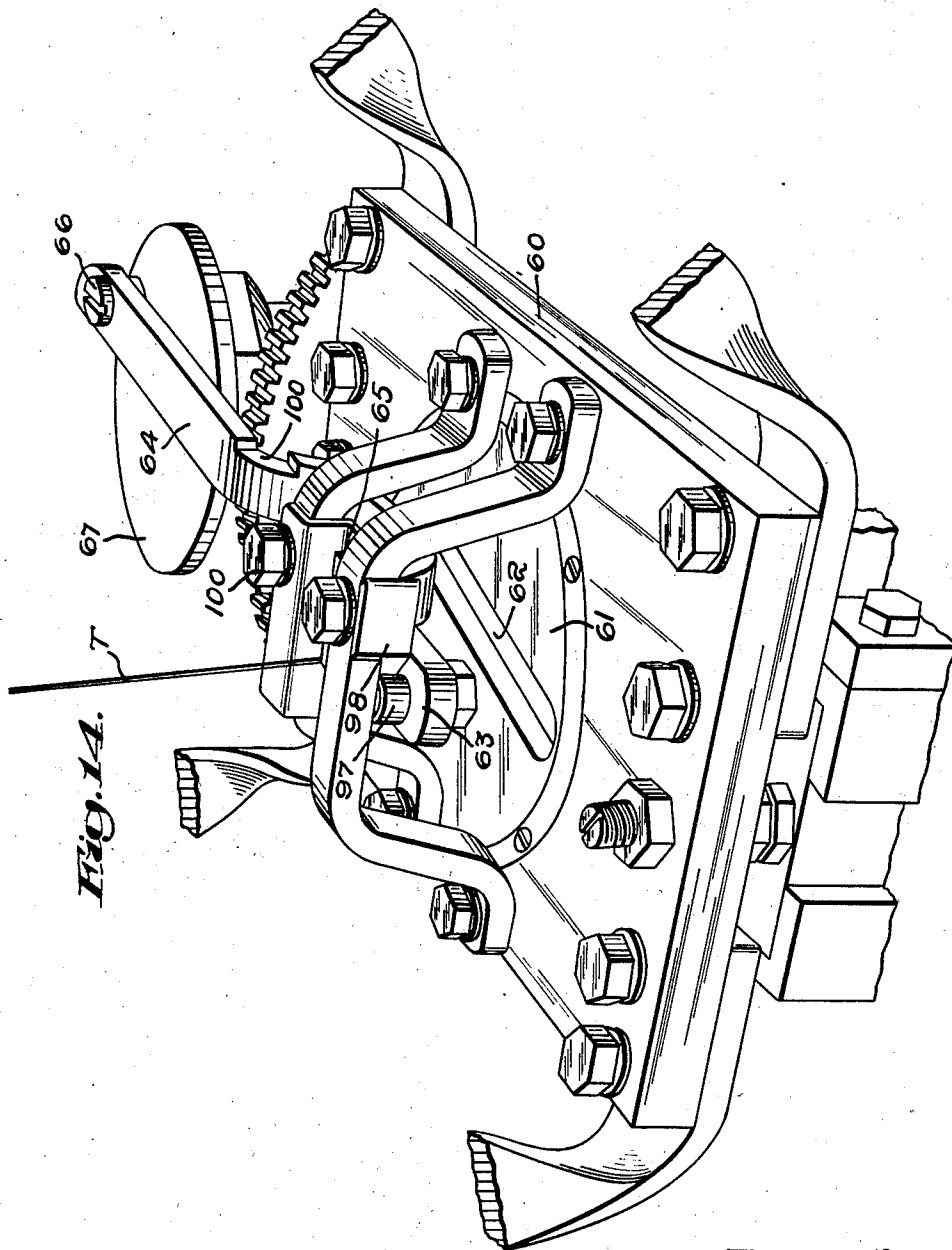


Fig. 14.

Inventor
H. H. Brown
by *Harold W. Brown*
Attorney

July 31, 1945.

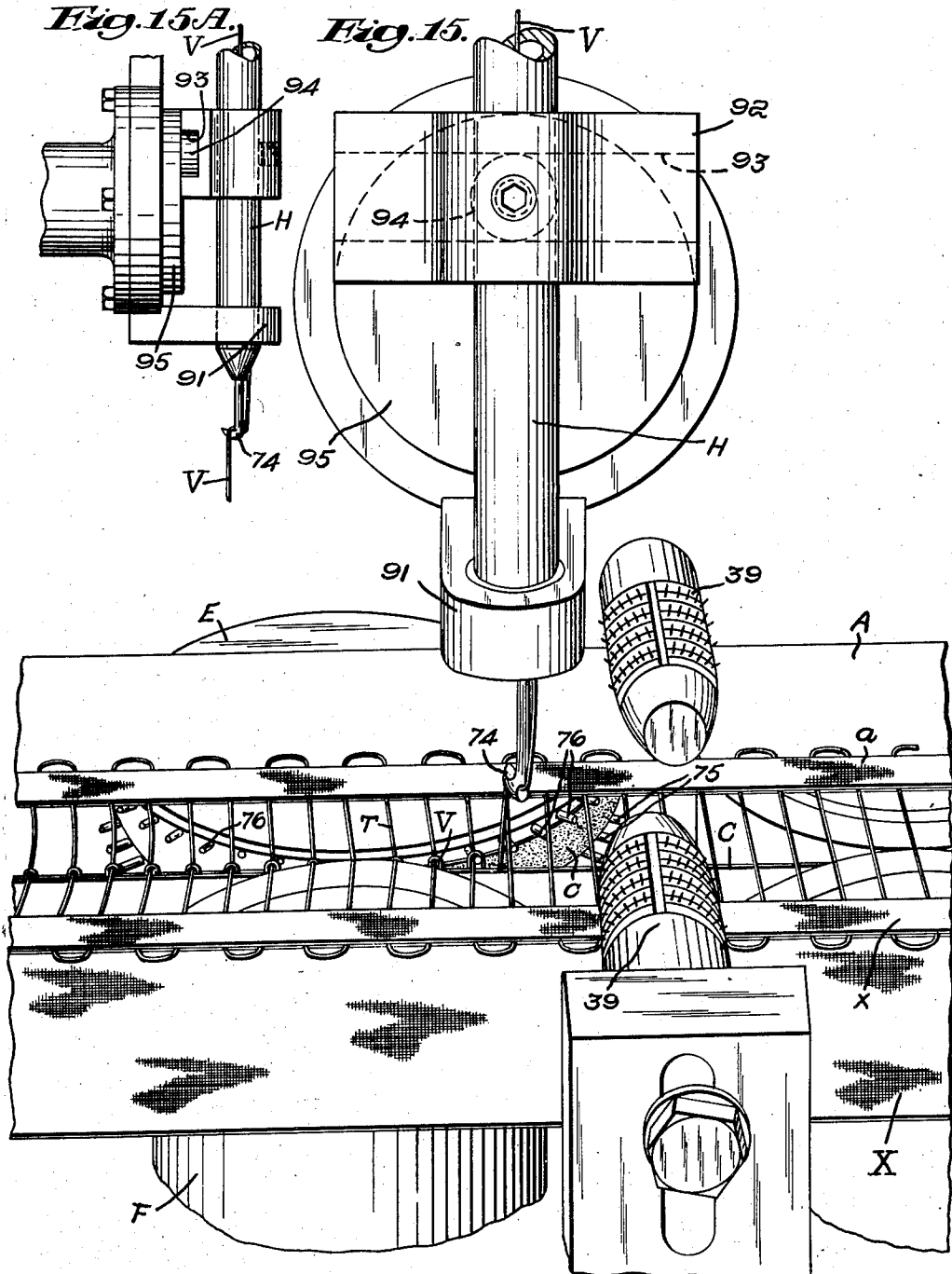
H. H. BROWN

2,380,823

BANDAGE MAKING MACHINE

Filed Aug. 28, 1943

11 Sheets-Sheet 10



Inventor
H. H. Brown
by *Harold W. Brown*
Attorney

July 31, 1945.

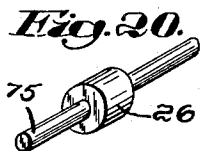
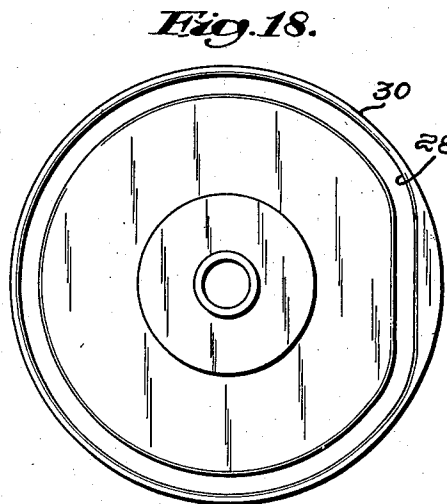
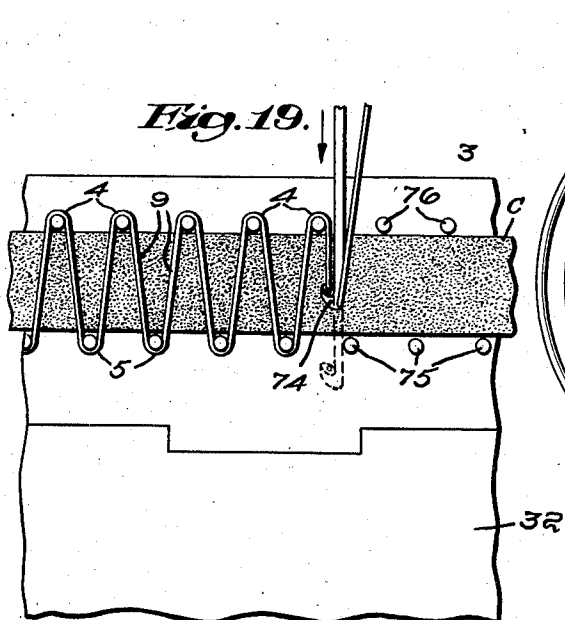
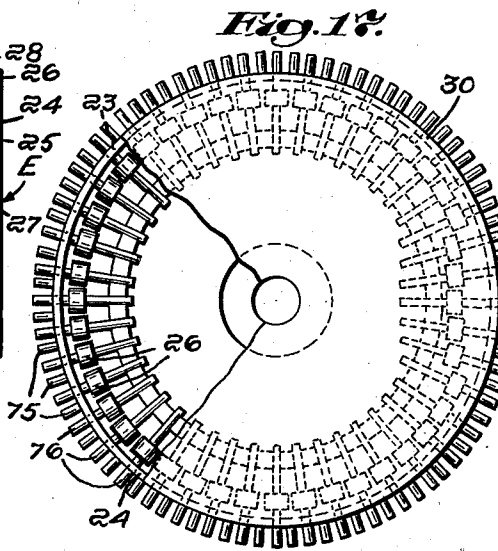
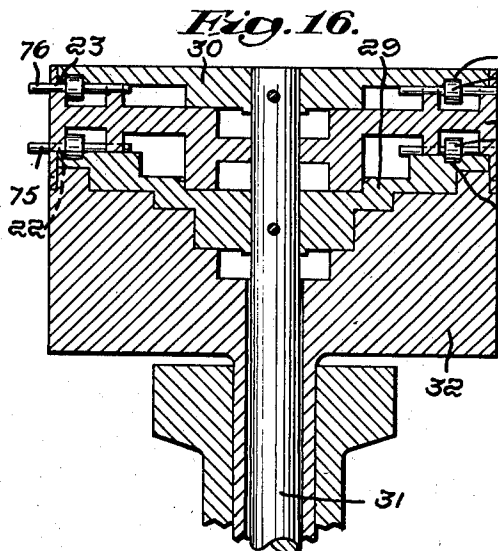
H. H. BROWN

2,380,823

BANDAGE MAKING MACHINE

Filed Aug. 28, 1943

11 Sheets-Sheet 11



Inventor
Heaton H. Brown
by Harold W. Brown
Attorney

UNITED STATES PATENT OFFICE

2,380,823

BANDAGE MAKING MACHINE

Henson H. Brown, Andover, Mass.

Application August 28, 1943, Serial No. 500,361

7 Claims. (Cl. 154—1)

This invention is a machine for making three part bandages such as are shown in patent to Owen S. Flynn, No. 2,196,296, of April 9, 1940. It also includes one embodiment of such a bandage which is embodied in and claimed as an improvement on the Flynn structure in a divisional application pending herewith.

The Flynn patent shows two tabs of adhesive connected by rows of parallel threads which are attached to the tabs by the adhesive thereof, ordinarily being covered with a removable cover which exposes the adhesive surface of each adhesive tab and also the parallel threads just before the tabs of surgeons' tape or similar material are applied to the skin before closing a cut.

The third tab as shown in the Flynn patent has loops which may be of thread or of wire or what he calls eyelet members each of which slidably engages one of the parallel threads.

Flynn shows a plurality of ways of making these loops or eyelets and these eyelets do not require that the thread or wire which forms them should be in parallel lines.

The particular embodiment of the Flynn idea which is produced by this machine uses the two parallel tabs of adhesive tape, the adhesive surface of which may be covered by some textile material or paper, but the parallel threads engage the non-adhesive surface but do not necessarily extend the entire width thereof and on the other parallel tab, they engage a part of the surface which may or may not be adhesive.

These parallel threads are formed with loops which originally are preferably about rectangular in form and are fastened in place by strips of narrow adhesive tape, which may be covered with various kinds of adhesive which sticks to the parallel threads and also to the adjoining non-adhesive surface of one of the parallel tabs thus fastening the two parallel tabs together with a ladder like effect such as shown by Flynn.

I form the loops or eyelets of thread for the third adhesive tab in a similar manner except that one of its sets of loops project beyond the edge of this third tab, each encircling one of the parallel threads between the first two tabs. Each loop or eyelet where it projects may be relatively short while the other loops extend far enough from the edge of the non-adhesive surfaces of the third tab so that a relatively narrow strip of adhesive tape can fasten the thread in place in a manner similar to the thread attached to the first two tabs. The threads between these two loops of the third tab need not be parallel.

It is important however that the parallel

threads between the parallel adhesive tapes and the loops on the third tab should not slip and that they should pull evenly.

For rapid production, it is desirable that my machine should run continuously rather than intermittently as stopping and starting slows up the production and while it might be satisfactory in laying the parallel threads, it would make complications in laying the thread for the loops for the third tab.

In the drawings,

Fig. 1 is a plan view of the two parallel tabs, the third tab being shown disposed at a little less than a right angle.

Fig. 2 is an enlarged end elevation as viewed from the bottom of Fig. 1.

Fig. 3 is an isometric view as from the right rear or feed end showing the entire machine with drive.

Fig. 4 is an isometric view as from the left front or delivery end of the head or top part of the machine.

Fig. 5 is an elevation from the rear or feed end showing the entire machine with the drive.

Fig. 6 is an elevation from the rear or feed end with parts broken away to show the pins, pin rolls, pressure rolls, and other parts.

Fig. 7 is a side elevation and Fig. 8 is a vertical sectional view of the pin roll and Fig. 9 is an isometric view of one of the pins.

Figs. 10 and 11 are plan views of the mechanism for moving the horizontal thread in parallel lines between the parallel tabs.

Fig. 12 is a diagrammatic view showing the course which the thread arm makes in each cycle.

Figs. 13 and 14 are isometric views from different angles showing the different positions of the mechanism shown in Figs. 10 and 11.

Fig. 15 is a diagrammatic isometric view of the pin roll, pressure roll, thread arm and other parts which operate the thread and adhesive tape for the third tab.

Fig. 15A is an elevation from the left of Fig. 15.

Fig. 16 is a vertical sectional view and Fig. 17 is a plan view with parts broken away to show the inside construction and Fig. 18 is a plan view of one of the channel cams which cause the horizontally movable pins to advance and recede.

Fig. 19 is a diagrammatic elevation showing the manner in which the vertical thread is carried around the pins for the vertical tab and Fig. 20 is an isometric view of one of these pins.

Fig. 1 shows what might be called the whole of the article to be produced. Following Flynn's description, we use the word tab or tabs to indicate

the relatively wide surgeons' tape or surgeons' plaster and for convenience, use this same term to describe the long lengths of this material which starts wound on spools and which after it leaves the machine can be cut into bandages of whatever length is required.

Referring to Fig. 1, A, X, represent parallel tabs of surgeons' tape or material which will adhere to the human flesh. The faces 13, 113, are not covered with adhesive but the other faces 14, 114 are covered with a suitable adhesive Z, Z which may be covered with a protecting paper 11 or other material in a well known manner if it becomes necessary or desirable.

A and X represent these tabs and C represents the third tab or what I will call the vertical tab as in manufacturing it, it is carried at right angles to the other two tabs.

T represents what I will call the horizontal thread or threads which are laid parallel at right angles to the tabs and with relatively wide loops 1 and 2, connecting the parallel parts 3, 3. These parallel parts 3, 3 run through eyelet loops 4, 4, formed from vertical thread V which is continuous and is also formed with the loops 5, 5.

To hold the threads in place as shown, the holding tapes *a*, *x*, pass over thread T in such a way that the loops 1 and 2 are exposed while the holding tape *c* passes over the vertical thread V between the loops 4 and 5. In every case, the holding tape adheres to the adjoining tab at a line near the respective edges 6, and 7, thereby holding the parts firmly in place.

On the machine the tabs A and X start on spools 10 and 11, while tab C starts on the spool 30.

The holding tapes *a*, *x*, start from spools 20 and 21 and the holding tape *c* starts from the spool 40.

Both the tapes *a*, *x* and the tabs A, X, are guided over pressure rolls B, B, and between them and a pin roll D while tab C is guided between rolls B, B, and under D at right angles to tabs A, X, as shown in Fig. 6. Pin roll D has radially slidable pins 50, 50 which are relatively wide and are caused to project and recede by the channel cams 51, 51, fixed to the frame at 52, 52 while the roll D is revolved by shaft 53 driven by suitable gearing indicated by 54, Fig. 6.

G is a vertical thread arm which receives what I will call the horizontal thread T from a suitable spool 17 and guides 15, 16 and is moved, by special devices to be described, in a path which is substantially a figure 8 with the ends flattened, its speed being so regulated with reference to the speed of pin roll D that the thread will be carried in an axial direction in front of a pin 50 on one side and while this pin is moving forward, the thread is laid around it and thence carried across to another pin 50 on roll D and then back to another pin 50 on the first side.

The holding tapes *a* and *x* are unrolled from the spools 20 and 21 and pass around suitable guides and over rolls 52, 52 to pin roll D.

While the loops 1 and 2 of thread T are still held by the pins 50, 50, on pin roll D, as shown in Figs. 7 and 8, and are approaching the contact point of bearing rolls B, B, with roll D, the holding tapes *a* and *x* have been travelling along with them but out of contact until the cams of the pin roll D retract the pins 50 releasing the thread at the contact point between pin roll D and bearing rolls B, B, the pressure between which causes the tapes *a* and *x* to adhere to the tabs A and X at a point just inside the loops 1 and 2 and over

the parallel parts 3, 3. The assembly passes on as shown at the right of Fig. 7, with the holding tapes holding the thread T in position on the adhesive tabs A and X.

To lay the parts 3, 3, of thread T parallel and at right angles to the continuously moving tabs A and X, it is desirable that the thread arm G should move substantially in the path of a figure 8 as in Fig. 12.

The mechanism for laying the horizontal thread T in parallel rows as 3, 3, on the tabs A and X so as to be held by the holding tapes *a* and *x* is shown in Figs. 6 to 14.

As shown in Figs. 5, 6, 10, 11, 13 and 14, there is a bridge 60 carried by suitable supports over the moving tabs A and X and over the pin roll D. As shown in Figs. 4, 5, 6, 10, 11, 13 and 14, two trusses 58, 58, extend up from bridge 60 parallel with the direction of travel of tapes A and X and there is a plate 65 extending down fairly close to the surface of bridge 60. Through this plate 65 is a guide hole 15 which with guide 16 shown in Figs. 5 and 6, guides the thread T from a spool 17 to the thread delivery arm G.

The trusses 58, 58 extend up from bridge 60 as shown in Figs. 13 and 14 while the plate 65 extends down close to the oscillatory disk 61 through which is a diametrical slot 62 through which the thread arm G passes.

These trusses 58, 58, carry the downwardly projecting roller bearing 99 and the downwardly projecting fixed diagonal bearing 98, as shown in Figs. 13 and 14.

Revoluble by any suitable driving mechanism 73 shown in Fig. 6, proximate bridge 60 is a revoluble driving disk 67. The connecting rod 64 is pivoted to this disk at 66. This rod 64 extends down close to disk 61 and then as shown is bent up and terminates in an end 63 as shown in Figs. 13 and 14.

62 is a diametrical slot cut through reciprocatory disk 61 and arm G passes through this slot. The sides of arm G which pass through the slot are smooth so that as arm G is moved by the connecting rod 64, it will shift back and forth easily in slot 62.

Connecting rod 64 has at its end 63 an upwardly extending roller bearing 97 in position to engage the fixed diagonal bearing 98 shown in Figs. 10, 11 and 14.

As shown in Fig. 13, there is also a downwardly extending roller bearing 99 which at certain times is engaged by the side of rod 64, there preferably being a depression indicated at 100 which in the position shown in Fig. 10 engages bearing 99. Referring to Fig. 10, when pivot 66 on driving disk 67 is moving in the direction of the arrow, rod 64 and arm G are being pulled to the right in a diagonal direction across the tabs A and X and, as shown in Fig. 11, when pivot 66 is moving away along the arc which might be dead center, arm G first serves as a pivot or fulcrum until roller bearing 97 engages diagonal bearing 98, Fig. 11, whereupon this causes the fulcrum or pivot point to shift to the bearing 97, allowing 97 to ride on diagonal fixed bearing 98, the result being that arm G being near the end of slot 62 moves with that slot and disk 61 away from the observer.

As the movement of disk 67 continues, arm G is pushed back diagonally by rod 64 through slot 62 until it is near the other end whereupon the part 100 of rod 64 engages the roller bearing 99 which, serving as a pivot or fulcrum, causes arm G at the end of the slot 62 shown in Fig. 10 to

shift disk 61 back to the other side so that on the return stroke G will travel through the diagonally positioned slot 62 whereupon the cycle will be repeated.

The speed of the driving disk 67, of the pin roll D and bearing rolls B, B, tabs A and X and the adhesive tapes *a* and *x* and the size of pins 50 can be so regulated that all the parts will synchronize.

The parts 3, 3, of thread T should be parallel but the parts 9, 9 of thread V between loops 4 and 5 need not be parallel as the purpose of the loops 4, 4, is to project enough to allow the parts 3, 3 of thread T to slip evenly through them after the adhesive Z on side 14 of tab A and the adhesive Z of tab C have been stuck on each side of a wound, while the loops, 5, 5 are merely incidental in forming guide loops 4, 4.

After tabs A and C have been stuck on each side of a cut or wound, tab X is lifted up and over with thread T slipping through loops 4, 4, thus drawing tabs A and C together.

The adhesive side 14 of tab X is then pressed down on the flesh or on the non-adhesive side 13 of tab A thus holding tabs A and C and thereby the sides of the wound firmly together.

To assist in causing the tapes *a*, *x*, and *c* to stick to the thread and tabs and to keep them parallel and to guide them, porcupine rolls 39, 39, or temples can be used.

Meanwhile the vertical tab C has been traveling under, between and below tabs A, X, beyond vertical thread arm G, and between pressure roll F and a pin roll E past a vertical thread arm H which carries the vertical thread V, from a spool 101 and suitable guides 72, and is reciprocated vertically by suitable gearing 77 and disk 95. Figs. 3 and 13.

As shown in Figs. 15, 15A and 19, arm H is so timed with reference to the vertical pin roll E that it will pass down in back of one of the parallel threads T behind a top pin 76 and, as its thread V is directed towards the pin roll E by projecting finger 74, a bottom pin 75 catches it and carries it along so that arm H with its finger 74 can be raised carrying the thread in front of another pin 76 which carries the thread along. The process is repeated thereby laying the thread in a zig-zag course held respectively by top pins 76 and bottom pins 75 while the holding tape *c* is being directed over the thread between the loops at top and bottom and is caused to adhere to them and to vertical tab C by rolls F and E, while these pins still hold, the pins being retracted after adhesion is complete.

As shown in Figs. 16 to 20, the pins such as 75 and 76 are caused to reciprocate radially through suitable holes 22 and 23 in the part 24 of the curved surface of pin roll E as shown in Figs. 16 and 17, as their respective cam followers 25 and 26 travel in the channel cams 27 and 28, such as shown in Fig. 18, carried by the stationary parts 29 and 30 which are fixed to the stationary shaft 31 on which pin roll E with its neck 32 is caused to revolve by a gear 33 shown in Fig. 5.

The pressure roll F engages the cylindrical surface of pin roll E at the flat part of each channel cam 27 and 28 since cams 27 and 28 are then so positioned that the pins 75 and 76 will be retracted thus releasing thread V after the holding tape *c* has been caused to adhere by the pressure of rollers F and E, that is after the thread V has been laid and stuck in place.

To make the tapes *a*, *x*, *c*, stick to the thread T and V and to the tabs A, X and C, pressure rolls B, B, and F can be heated or the tapes or

tabs can be heated in any other way as by keeping the room temperature at a high point and keeping rolls B, B and F cool so as to harden the adhesive.

As shown, the vertical thread arm H for thread V with its finger 74 is a hollow tube through which the thread V passes to finger 74. Figs. 4, 15 and 15A.

Arm H is slidable vertically in guides 90 and 91 attached to any part of the frame and carries at the back a cross piece 92 with a horizontal slot 93 in which travels a pin or roller 94 which projects from a revolvable disk 95 carried by a shaft, not shown, which also carries and is driven by the small gear 77 shown in Fig. 3.

I claim:

1. In a machine for manufacturing bandages formed with two parallel adhesive tabs connected by parallel threads and a third adhesive tab provided with eyelet loops extending from one edge, each eyelet loop encircling one of said parallel threads; means to continuously feed two parallel adhesive tabs; means to continuously feed two narrow parallel adhesive holding tapes each to engage one of said tabs near its edge; a vertical arm for laying thread between adjoining tabs and beyond the tapes, the arm extending through a radial slot in an oscillatory disk and being carried by a connecting rod pivoted at one end to a revolvable driving disk to lay a thread back and forth in position between and beyond the outside edges of the holding tapes on the face of each tab just before the holding tapes engage the adhesive tabs; retractable pins carried radially in two parallel planes by a pin roll revolvable between cams for retracting and advancing the pins in each plane in synchronized order to hold each loop of thread in place until the holding tapes and the adhesive tabs engage; means to continuously feed a third adhesive tab at an angle to the parallel adhesive tabs; means beyond the line of contact of the two narrow holding tapes and of the two parallel adhesive tabs to lay a thread vertically over and between the parallel threads and back and forth near the surface of the third adhesive tab and beyond its edge to form eyelet loops, said means including a vertically reciprocating arm having a finger extending down and with a projection through which the thread is fed to holding pins and means to cause the arm to reciprocate; means to feed a third narrow holding tape to engage said third adhesive tab along one edge and over part of the thread; and retractable holding pin means, including a pin roll having two sets of radially movable holding pins and two cams for retracting and advancing said pins to engage and hold such thread until the third holding tape has fastened it to the third adhesive tab.

2. In a machine for manufacturing bandages formed with two parallel adhesive tabs connected by parallel threads and a third adhesive tab provided with eyelet loops extending from one edge, each eyelet loop encircling one of said parallel threads; means to continuously feed two parallel adhesive tabs; means to continuously feed two narrow parallel adhesive holding tapes each to engage one of said tabs near its edge; means to lay a thread back and forth in position between and beyond the edges of the holding tapes on the face of each tab just before the holding tapes engage the adhesive tabs; retractable pins to hold each loop of thread in place until the holding tapes and the adhesive tabs engage; means to continuously feed a third adhesive tab at an angle to the parallel adhesive tabs; means beyond the line

of contact of the two narrow holding tapes and of the two parallel adhesive tabs to lay a thread vertically over and between the parallel threads and back and forth near the surface of the third adhesive tab and beyond its edge to form eyelet loops; means to feed a third narrow holding tape to engage said third adhesive tab along one edge and over part of the thread; and retractable pin means to engage and hold such thread until the third holding tape has fastened it to the third adhesive tab.

3. In a machine for manufacturing bandages formed with two parallel adhesive tabs connected by parallel threads and a third adhesive tab provided with eyelet loops extending from one edge, each eyelet loop encircling one of said parallel threads; means to continuously feed two parallel adhesive tabs; means to continuously feed two narrow parallel adhesive holding tapes each to engage one of said tabs near its edge; means to lay a thread back and forth in position between and beyond the edges of the holding tapes on the face of each tab just before the holding tapes engage the adhesive tabs; retractable pins to hold each loop of thread in place until the holding tapes and the adhesive tabs engage; means to continuously feed a third adhesive tab at an angle to the parallel adhesive tabs; means beyond the line of contact of the two narrow holding tapes and of the two parallel adhesive tabs to lay a thread vertically over and between the parallel threads and back and forth near the surface of the third adhesive tab and beyond its edge to form eyelet loops, said means including a vertically reciprocating arm having a finger extending down and with a projection through which the thread is fed to holding pins and means to cause the arm to reciprocate; means to feed a third narrow holding tape to engage said third adhesive tab along one edge and over part of the thread; and retractable holding pin means including a pin roll having two sets of radially movable holding pins and two cams for retracting and advancing said pins to engage and hold such thread until the third holding tape has fastened it to the third adhesive tab.

4. In a machine for manufacturing bandages formed with two parallel adhesive tabs connected by parallel threads and a third adhesive tab provided with eyelet loops extending from one edge, each eyelet loop encircling one of said parallel threads; means to continuously feed two parallel adhesive tabs; means to continuously feed two narrow parallel adhesive holding tapes each to engage one of said tabs near its edge; a vertical arm for laying thread between adjoining tabs and beyond the tapes, the arm extending through a radial slot in an oscillatory disk and being carried by a connecting rod pivoted at one end to a rev-

oluble driving disk to lay a thread back and forth in position between and beyond the outside edges of the holding tapes on the face of each tab just before the holding tapes engage the adhesive tabs; retractable pins carried radially in two parallel planes by a pin roll revoluble between cams for retracting and advancing the pins in each plane in synchronized order to hold each loop of thread in place until the holding tapes and the adhesive tabs engage; means to feed the third adhesive tab under and between the parallel tabs; and means to form loops at the top edge of said third tab each loop encircling one of said parallel threads.

5. In a machine for manufacturing bandages formed with two parallel adhesive tabs connected by parallel threads; means to continuously feed two parallel adhesive tabs; means to continuously feed two narrow parallel adhesive holding tapes each to engage one of said tabs near its edge; a vertical arm for laying thread between adjoining tabs and beyond the tapes, the arm extending through a radial slot in an oscillatory disk and being carried by a connecting rod pivoted at one end to a revoluble driving disk to lay a thread back and forth in position between and beyond the outside edges of the holding tapes on the face of each tab just before the holding tapes engage the adhesive tabs; retractable pins carried radially in two parallel planes by a pin roll revoluble between cams for retracting and advancing the pins in each plane in synchronized order to hold each loop of thread in place until the holding tapes and the adhesive tabs engage.

6. In a machine for laying parallel threads between two continuously moving tabs, including a frame, one driving disk revolubly movable and another disk having a diametrically disposed slot and being oscillatory in the frame, a vertical arm for laying thread extending through said slot in the oscillatory disk, said arm being carried medially by a connecting rod pivoted at one end to the revoluble driving disk, the arm being slidable back and forth in said slot, there being two guides in position on the frame each to act as a fulcrum for the connecting rod to cause the arm near an end of the slot and that part of the disk to move across a line between the centers of the disks.

7. In a machine for laying parallel threads between two continuously moving tabs, including a frame, a revolubly movable driving member and a disk having a diametrically disposed slot and being oscillatory in the frame, a vertical arm for laying thread extending through said slot in the oscillatory disk, said arm being carried by a connecting rod pivoted at one end to the revoluble driving member, the arm being slidable back and forth in said slot.

HENSON H. BROWN.