

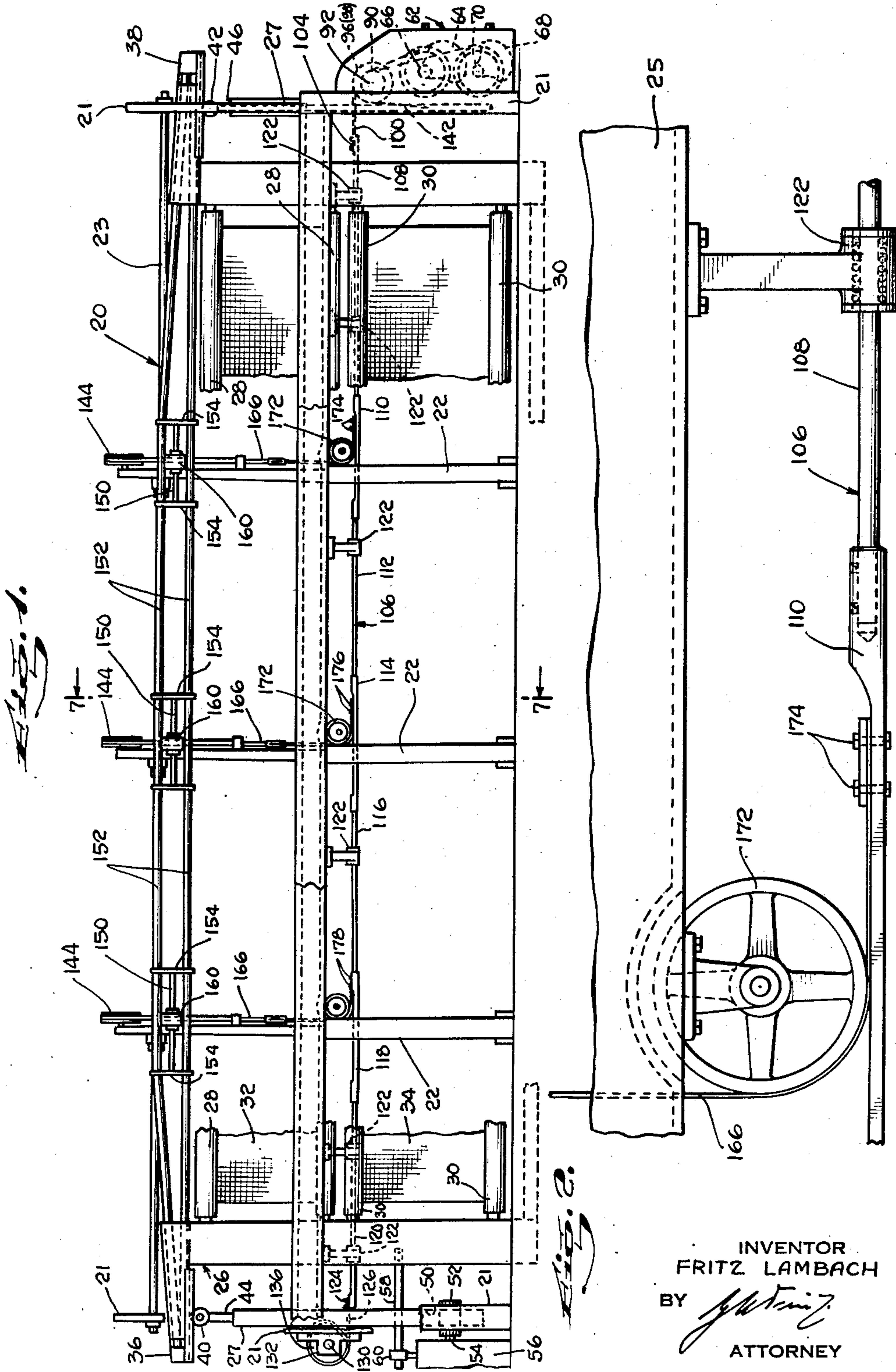
June 7, 1955

F. LAMBACH
EMBROIDERY MACHINE

2,709,976

Filed Sept. 4, 1953

6 Sheets-Sheet 1



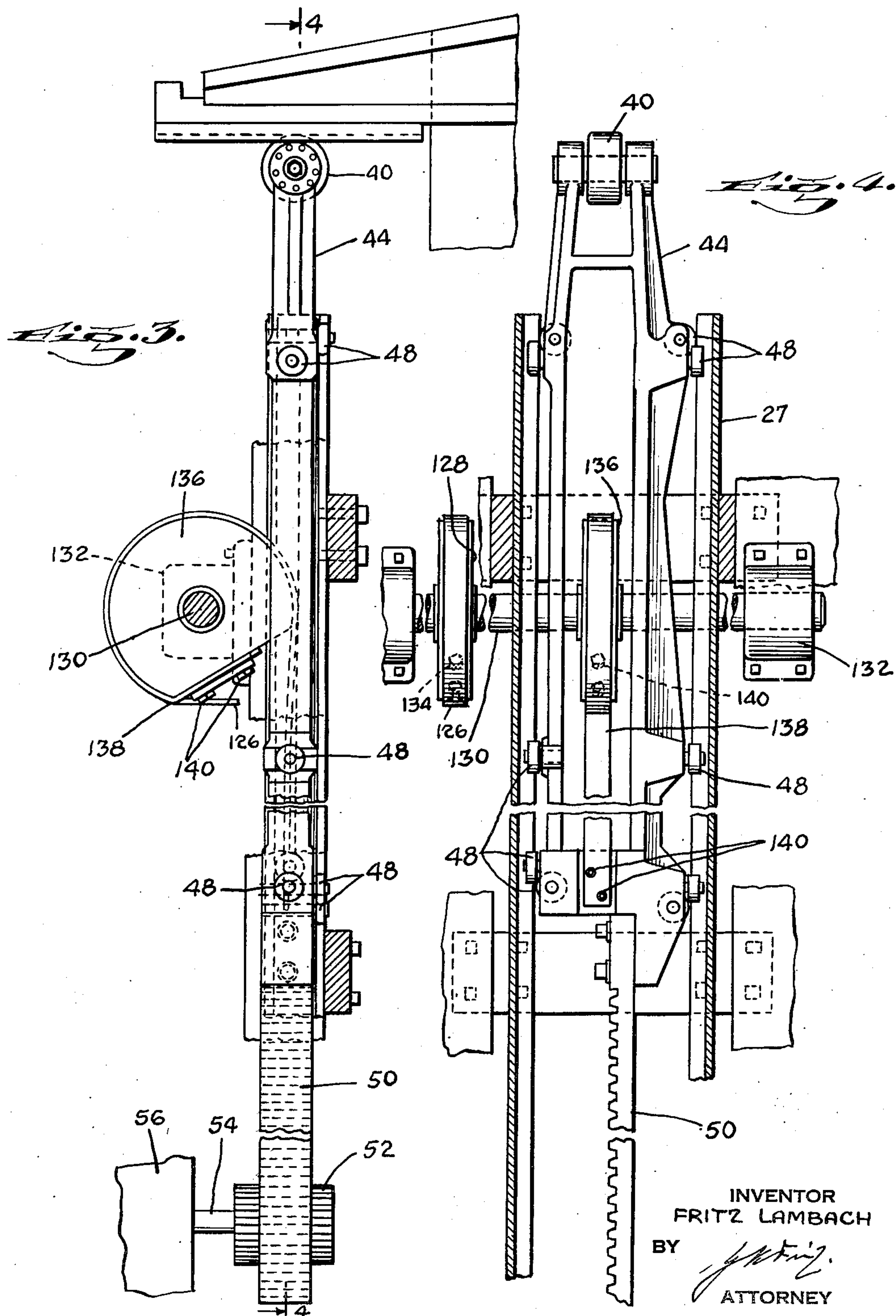
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6 Sheets-Sheet 2



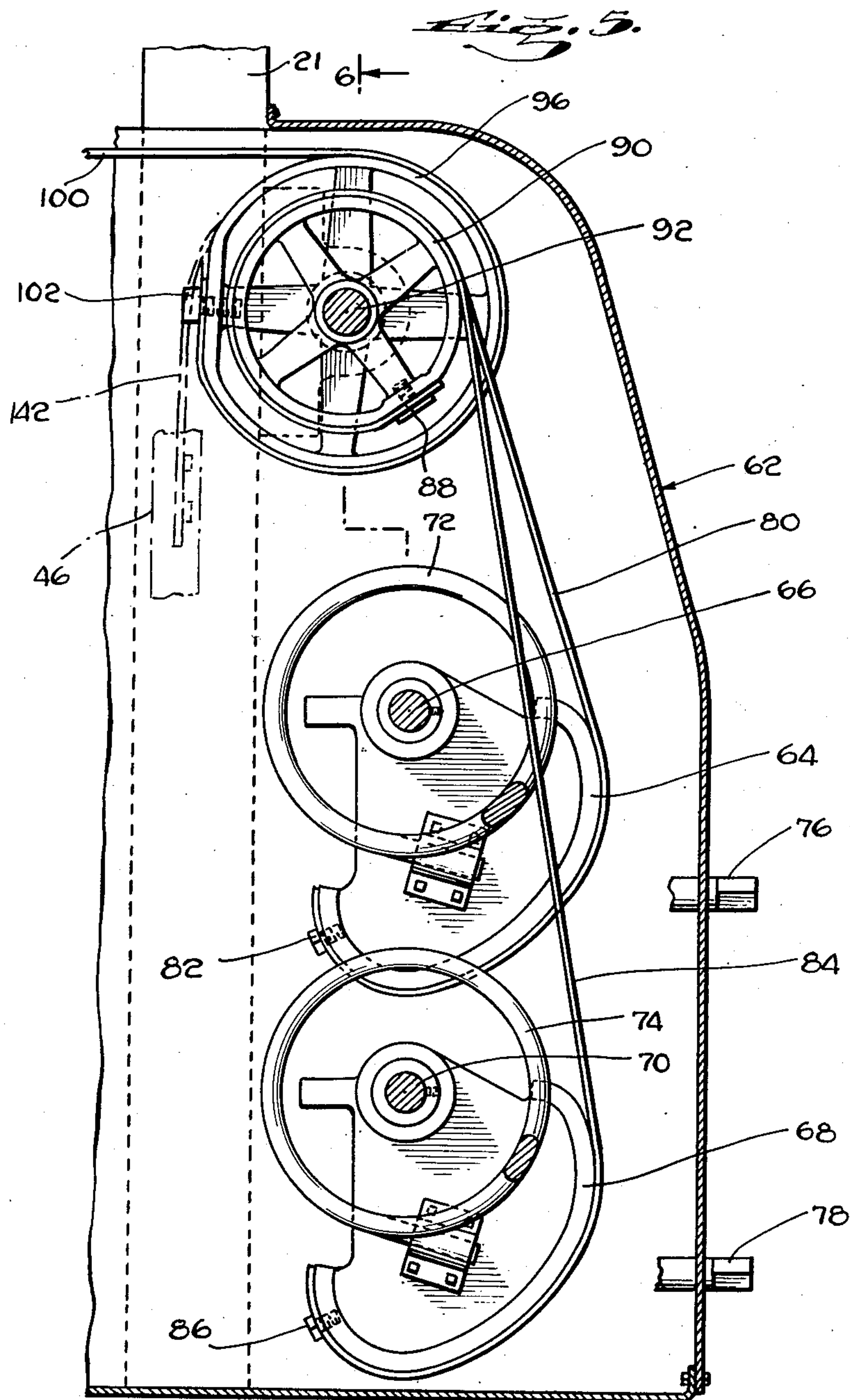
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6 Sheets-Sheet 3



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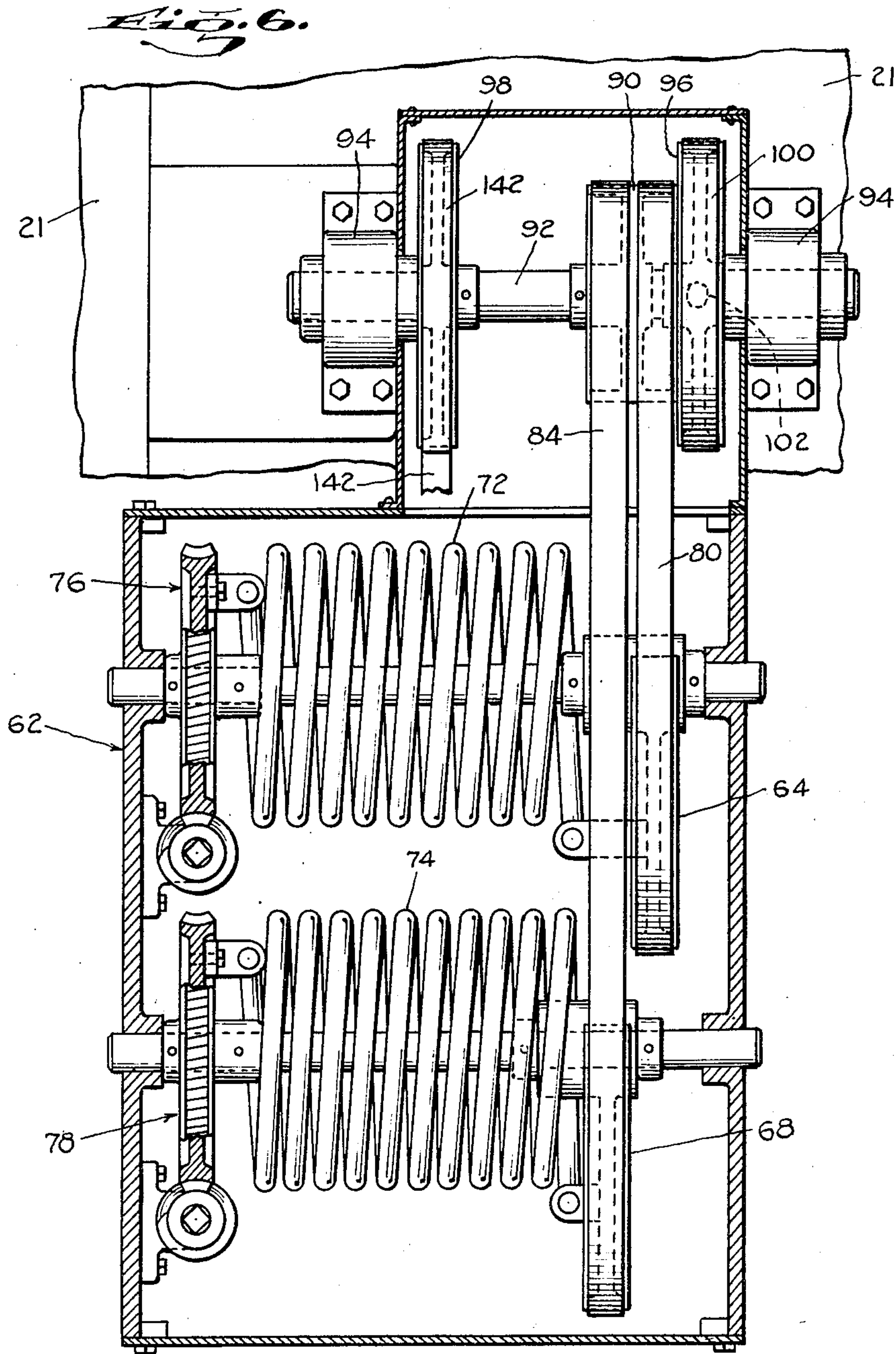
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6 Sheets-Sheet 4



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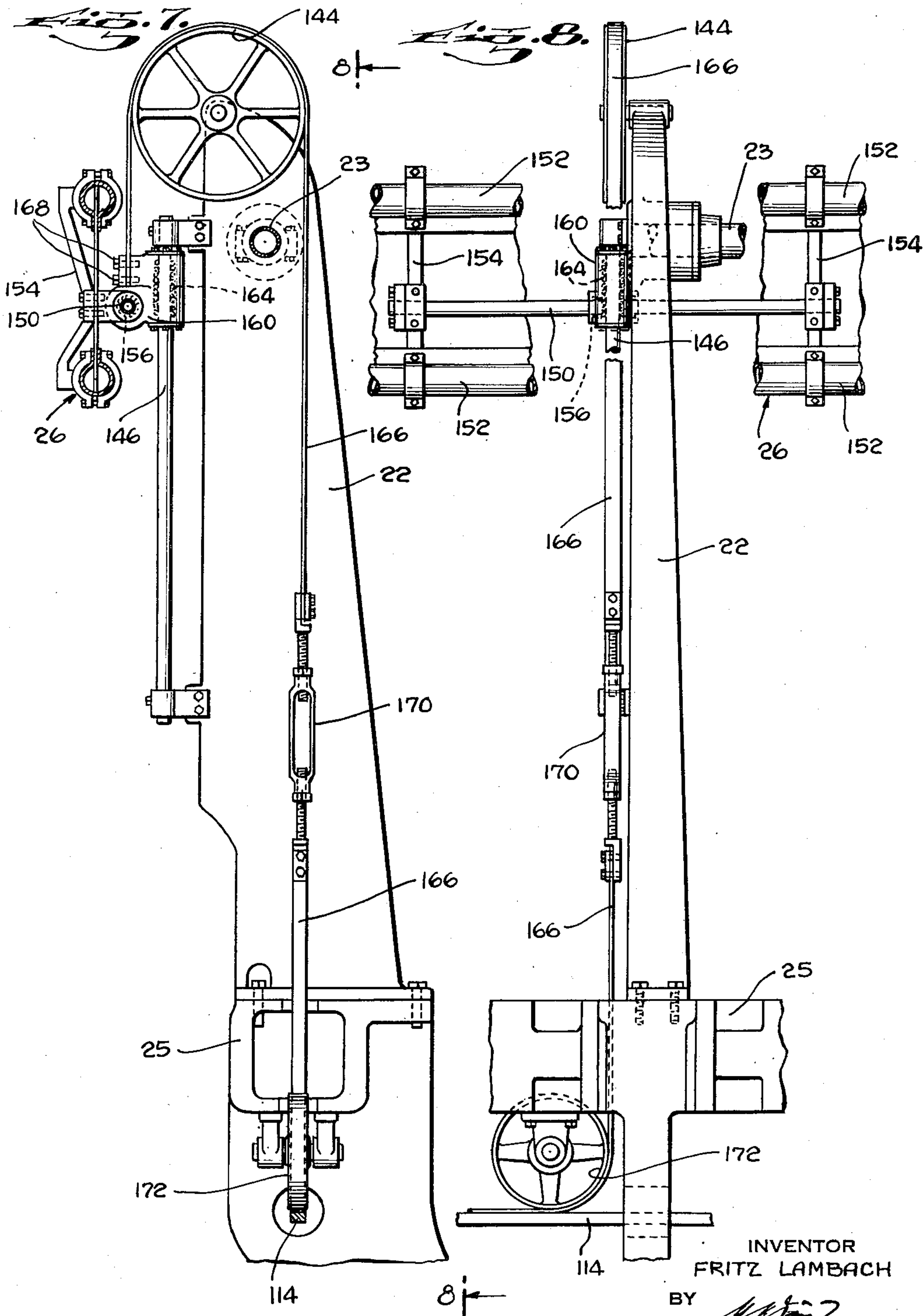
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6 Sheets-Sheet 5



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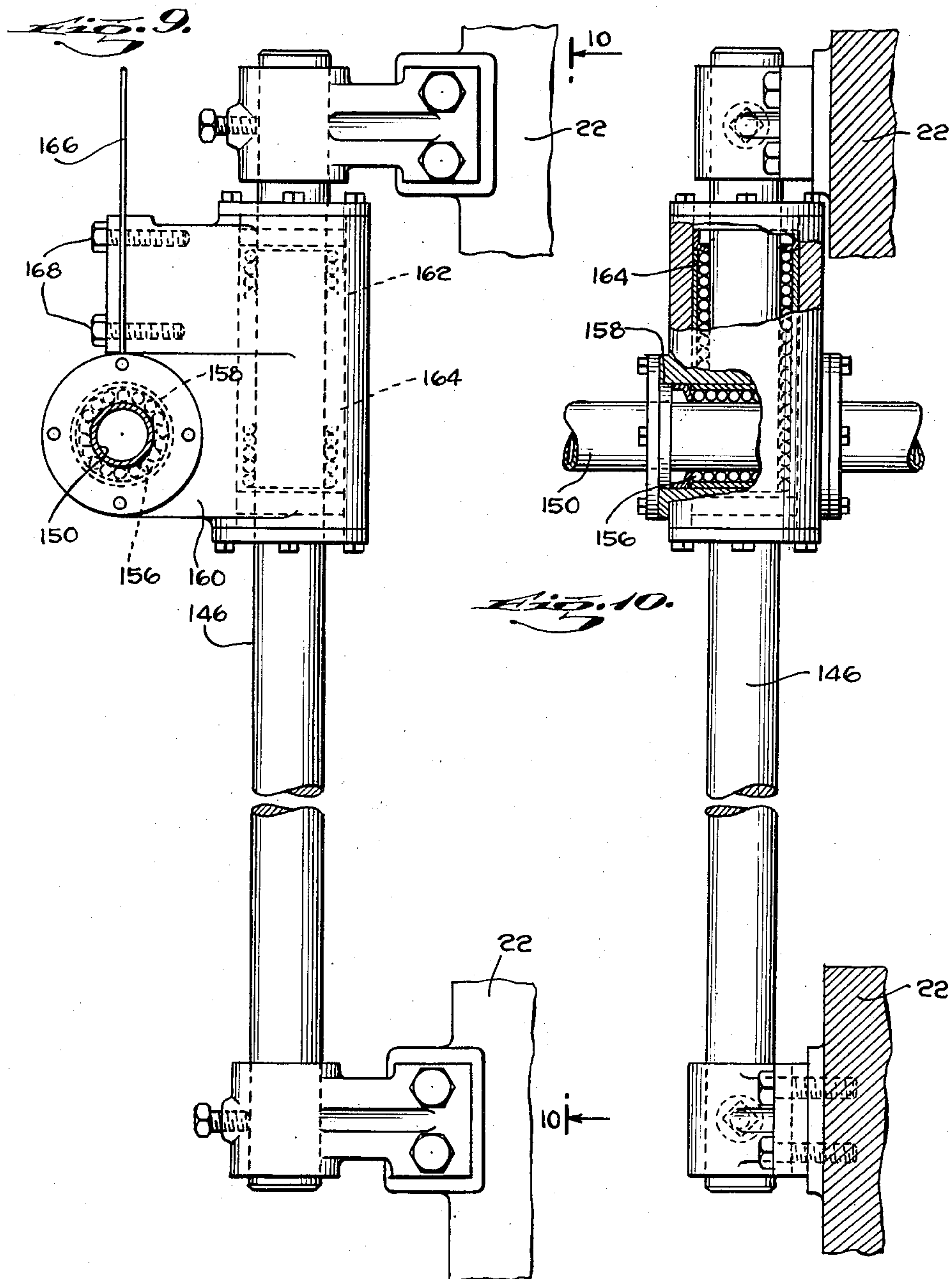
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6 Sheets-Sheet 6



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2,709,976

EMBROIDERY MACHINE

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3 Claims. (Cl. 112—90)

This invention relates to textile machines, and more particularly to embroidery machines.

An object of the invention is to improve on the arrangement of the movable embroidery frame holding the fabric to be embroidered and of the means connecting said embroidery frame with the balancing mechanism.

Another object of the invention is to improve the lengthwise support of the embroidery frame suspended in the frame work of the machine.

A further object of the invention is to provide for a more compact construction of the embroidery frame and its connection with the straps connecting same with the balancing mechanism.

Another object of the invention is to improve on the art of embroidery machines as now customarily made.

Other objects and structural details of the invention will be apparent from the following description when read in conjunction with the accompanying drawings forming part of this specification, wherein:

Fig. 1 is a diagrammatical front elevational view of an embroidery machine according to the invention,

Fig. 2 is a fragmentary front elevational view of a detail of the machine shown in Fig. 1,

Fig. 3 is a front elevational view of the left-hand end portion of the machine shown in Fig. 1,

Fig. 4 is a vertical sectional view taken along line 4—4 of Fig. 3,

Fig. 5 is a fragmentary vertical sectional view of the right-hand end portion of the machine shown in Fig. 1,

Fig. 6 is a sectional view taken on line 6—6 of Fig. 5,

Fig. 7 is a vertical sectional view taken on line 7—7 of Fig. 1,

Fig. 8 is a rear end view of the detail shown in Fig. 7 as seen in the direction of the arrow 8—8 of Fig. 7,

Fig. 9 is an elevational view of a detail of Fig. 7 shown in an enlarged scale, and Fig. 10 is a rear end view, partly in section, of the detail shown in Fig. 9 as seen in the direction of the arrows 10—10 of Fig. 9.

In the drawings only those parts of an embroidery machine are shown, which are necessary for the understanding of the invention.

Referring now to Fig. 1, 20 generally indicates the frame work of the embroidery machine. Said frame work 20 comprises two end frames 21 and a plurality of pairs of front and rear pillars 22. Said end frames 21 and pillars 22 are connected with each other by rods 23 or the like. Furthermore, at the front and at the rear of the machine the ends of a longitudinally extending member or bar 25, preferably composed of a plurality of individual elements, are rigidly connected with the end frame 21. Each end frame 21 includes an upright 27 forming a vertical track for a sliding member 44.

An embroidery frame generally indicated by 26 and composed of a plurality of girders and connecting elements is movably arranged in the frame work of the machine. The arrangement is such, that the frame 26 may perform movements in upward and downward and in longitudinal directions. The embroidery frame 26 carries

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two pairs of rollers 28 and 30 for holding two lengths of fabrics 32 and 34 to be embroidered.

The left-hand end 36 of the embroidery frame 26 is in slidable engagement with a roller 40, rotatably arranged on the sliding means 44 slidably engaged with the upright 27 of the left-hand end frame 21. In a similar manner the right-hand end 38 of the embroidery frame 26 is slidably engaged with a roller 42 arranged on a sliding member 46 slidably engaged with the upright 27 of the right-hand end frame 21.

As best shown in Figs. 3 and 4, the sliding means 44 is slidably engaged with the tracks of the upright 27 by means of rollers 48. The lower end of said sliding means 44 is rigidly connected with a rack 50 meshing with a pinion 52 connected with a shaft 54 projecting from an automat 56.

In a similar manner the sliding means 46 arranged at the right-hand end of the machine is guided in the upright 27 of the right-hand end frame 21 by rollers engaging the tracks of said upright.

At the left-hand end of the machine a shifting element 58 is rigidly connected with the frame 26, said shifting element 58 being operatively engaged with a member 60 of the automat 56 for performing reciprocating movements in the direction of the longitudinal axis of the machine.

At the right-hand end frame 21 of the machine a balancing device generally indicated by 62 is attached to the end frame 21 in any suitable manner. As best shown in Figs. 5 and 6 said balancing device comprises a first cam member 64 rotatably mounted on a first shaft 66 and a second cam member 68 rotatably mounted on a second shaft 70. Each of said cam members 64 and 68 is subjected to the action of a helical spring 72 and 74, respectively. The action of the springs 72 and 74 may be adjusted by an adjusting mechanism generally indicated by 76 and 78, respectively. One end of a strap 80 engaged with the circumference of the cam member 64 is secured to said cam member 64 at 82. In a similar manner one end of a strap 84 engaged with the circumference of the cam member 68 is secured to the said cam member 68 at 86. The other ends of said straps 80 and 84 are secured at 88 to a pulley 90 keyed to a shaft 92 journaled in bearings 94. Furthermore, a pulley 96 and a pulley 98 are keyed to the shaft 92.

One end of a strap 100 engaged with a portion of the circumference 96 is secured to the latter at 102. The other end of said strap 100 is secured at 104 (see Fig. 1) with the right-hand end of a rigid member generally indicated by 106. Said rigid member 106 is composed of a plurality of individual rigid elements 108, 110, 112, 114, 116, 118, 120 rigidly connected with each other. The elements 108, 112, 116 and 120 are made of tubular material. Said last-mentioned elements are slidably engaged with a series of ball bushings 122 attached to the longitudinally extending bar 25 of the frame work. Thus, said rigid member 106 may be readily displaced back and forth in the direction of the longitudinal axis of the machine.

The left-hand end of the rigid member 106 is connected at 124 with a strap 126 wound around a portion of the circumference of a pulley 128 secured to a shaft 130 journaled in bearings 132 mounted on the left-hand end frame 21. The other end of said strap 126 is attached to said pulley 128 at 134.

As best shown in Figs. 3 and 4 a second pulley 136 is secured to the shaft 130. One end of strap 138 engaging the circumference of the pulley 136 is secured to the latter at 140. The other end of said strap 138 is attached to the sliding member 44 at 140.

At the right-hand end of the machine a strap 142 wound around a portion of the circumference of the pulley

98 and attached to the latter at one of its ends is rigidly connected at its other end with the sliding member 46 (see Figs. 1, 5 and 6).

As best shown in Figs. 1, 7 and 8, each of the three pillars 22 at the rear of the machine carries a pulley 144 rotatably mounted at the upper end of said pillar. Furthermore, each of said rear pillars 22 carries a vertical guiding rod 146 attached thereto.

According to Figs. 1, 7 and 8 three pieces 150 of tubular material are rigidly connected with the upper girders 152 of the embroidery frame 26 by means of brackets 154. The pieces 150 of tubular material extend horizontally in the direction of the longitudinal axis of the machine.

Each tube 150 is slidably engaged with a ball bushing 156 (see Figs. 7-9) inserted into a horizontal bore 158 of a bearing element 160. Furthermore, each bearing element 160 has a vertical bore 162 wherein another ball bushing 164 is inserted. Said ball bushing 164 is slidably engaged with the vertical guiding element 146 attached to the pillar 22 of the machine. It will be readily understood, that the horizontal ball bushing 156 permits of horizontal reciprocating movements of the embroidery frame 26, while the vertical ball bushing 164 permits of vertical reciprocating movements of said embroidery frame.

As best shown in Figs. 7-9, each bearing element 160 is rigidly connected with one end of a flexible strap 166 at 168. Each strap 166 including a tensioning device 170 is wound around one of said pulleys 144 and an idling pulley 172 journaled in bearings attached to the longitudinal bar 25. The other end of each strap 166 is attached to the rigid member 106 at 174, 176 and 178, respectively (see Figs. 1 and 2). Thus the weight of the embroidery frame 26 acts through the three straps 166 and the rigid member 106 against the action of the springs 72 and 74 of the balancing device 62. The action of the springs 72, 74 may be readily adjusted by means of the adjusting devices 76 and 78 for holding the embroidery frame 26 in balanced condition.

When during the operation of the machine the embroidery frame 26 is displaced upwardly or downwardly by means of the automat 56 causing an actuation of the sliding element 44, such a displacement may readily take place by the arrangement of the ball bushings 122 and 164 slidably engaged with the horizontal member 106 and the vertical guiding rods 146, respectively. When, during the operation of the machine the embroidery frame 26 is displaced horizontally by the automat 56 through the displacing element 58, the engagement of the horizontal tubes 150 with the horizontal ball bushings 156 permit an easy shifting of the embroidery frame.

Furthermore, the bearing elements 160 comprising in one and the same casing the horizontal ball bushing 156 and the vertical ball bushing 164 contribute to a perfect lengthwise support of the embroidery frame 26 suspended in the frame work 20 of the machine from the straps 166.

I have described a preferred embodiment of my invention, but it is understood that this disclosure is for the purpose of illustration and that various omissions or changes in shape, proportion and arrangement of parts, as well as the substitution of equivalent elements for those, herein shown and described may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. In an embroidery machine, the combination of:

a frame work, an embroidery frame for holding fabric to be embroidered, said embroidery frame being in a vertical plane and being movably arranged in said frame work for the performance of upward, downward and longitudinal movements, a series of idling pulleys arranged on said frame work, balancing means, connecting means including rigid means extending longitudinally of the machine and a series of flexible means attached to said rigid means at one of their ends, said flexible means being engaged with said idling pulleys and being connected with the upper portion of said embroidery frame at their other ends, said rigid means being connected with said balancing means, a series of ball bushings attached to said frame work, said rigid means of the connecting means being slidably engaged with said ball bushings, and actuating means associated with said embroidery frame for displacing same relative to said frame work.

2. In an embroidery machine, the combination of: a frame work, a plurality of vertical guiding elements attached to said frame work, an embroidery frame for holding fabric to be embroidered, the upper portion of said embroidery frame including at least one horizontally extending cylindrical member, a number of bearing elements equal to the number of vertical guiding elements, each bearing element comprising a body having a vertical bore and a horizontal bore, a vertical ball bushing inserted into said vertical bore of the bearing element and slidably engaged with one of said vertical guiding elements and a horizontal ball bushing inserted into said horizontal bore of the bearing element and slidably engaged with said horizontal cylindrical member at the upper portion of said embroidery frame, balancing means, connecting means connecting said balancing means with said bearing elements, and actuating means associated with said embroidery frame for displacing same relative to said frame work in vertical and horizontal directions.

3. In an embroidery machine, the combination of: a frame work, a plurality of vertical guiding elements attached to said frame work, an embroidery frame for holding fabric to be embroidered, the upper portion of said embroidery frame including at least one horizontally extending member, a number of bearing elements equal to the number of vertical guiding elements, each bearing element comprising a first vertical ball bushing slidably engaged with one of said vertical guiding elements and a second horizontal ball bushing slidably engaged with said horizontal member at the upper portion of said embroidery frame, a series of idling pulleys arranged on said frame work, balancing means, connecting means including rigid means extending longitudinally of the machine and a series of flexible means attached to said rigid means at one of their ends, said flexible means being engaged with said idling pulleys and being connected with said bearing elements at their other ends, said rigid means being connected with said balancing means, a series of third horizontal ball bushings attached to said supporting means, said rigid means of the connecting means being slidably engaged with said third horizontal ball bushings, and actuating means associated with said embroidery frame for displacing same relative to said frame work in vertical and horizontal directions.

References Cited in the file of this patent

UNITED STATES PATENTS

1,557,786 Sieber ----- Oct. 20, 1925