

May 11, 1943.

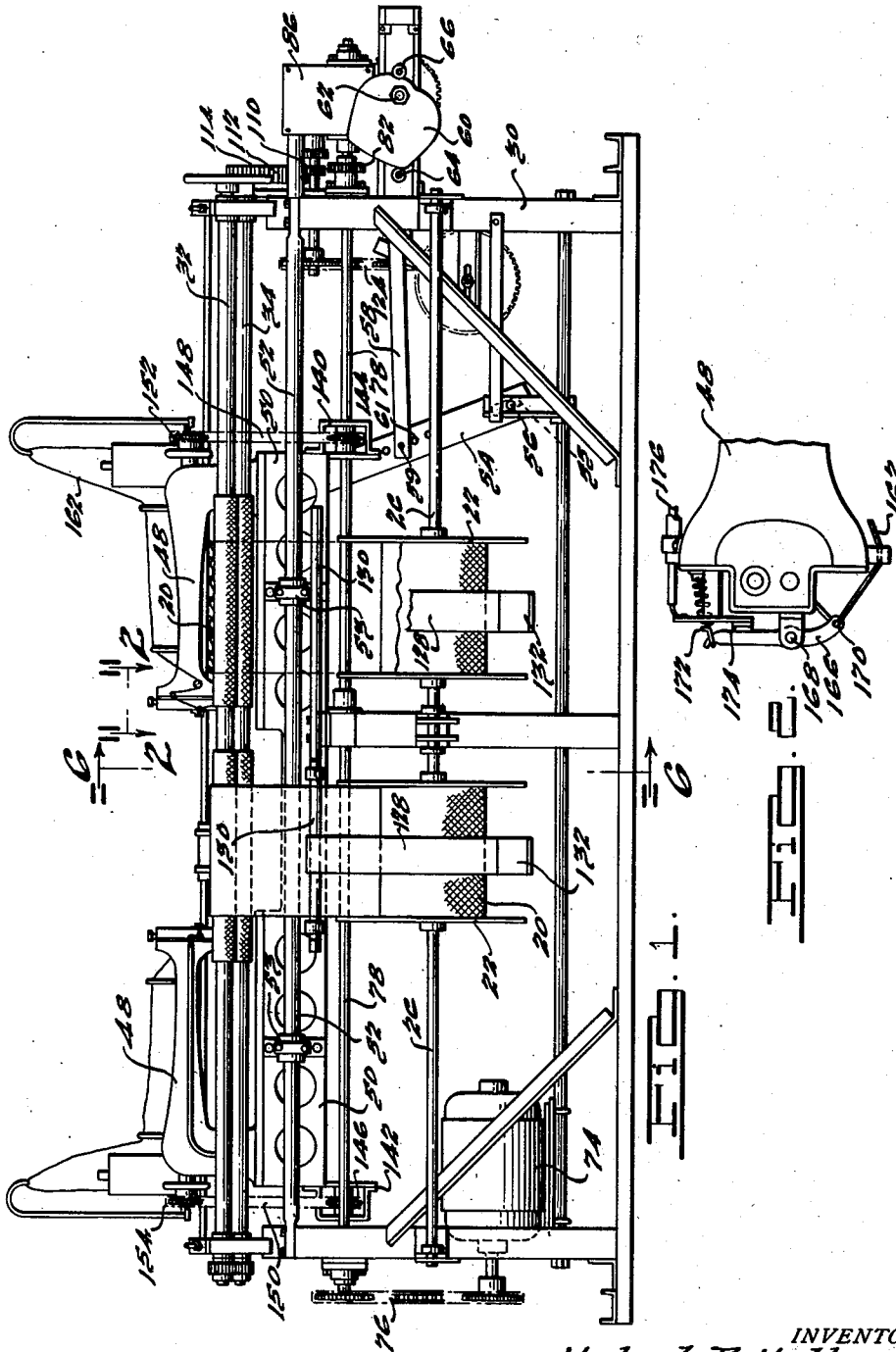
H. B. HATHAWAY

2,318,686

POCKET SEWING MACHINE

Filed April 11, 1940

5 Sheets-Sheet 1



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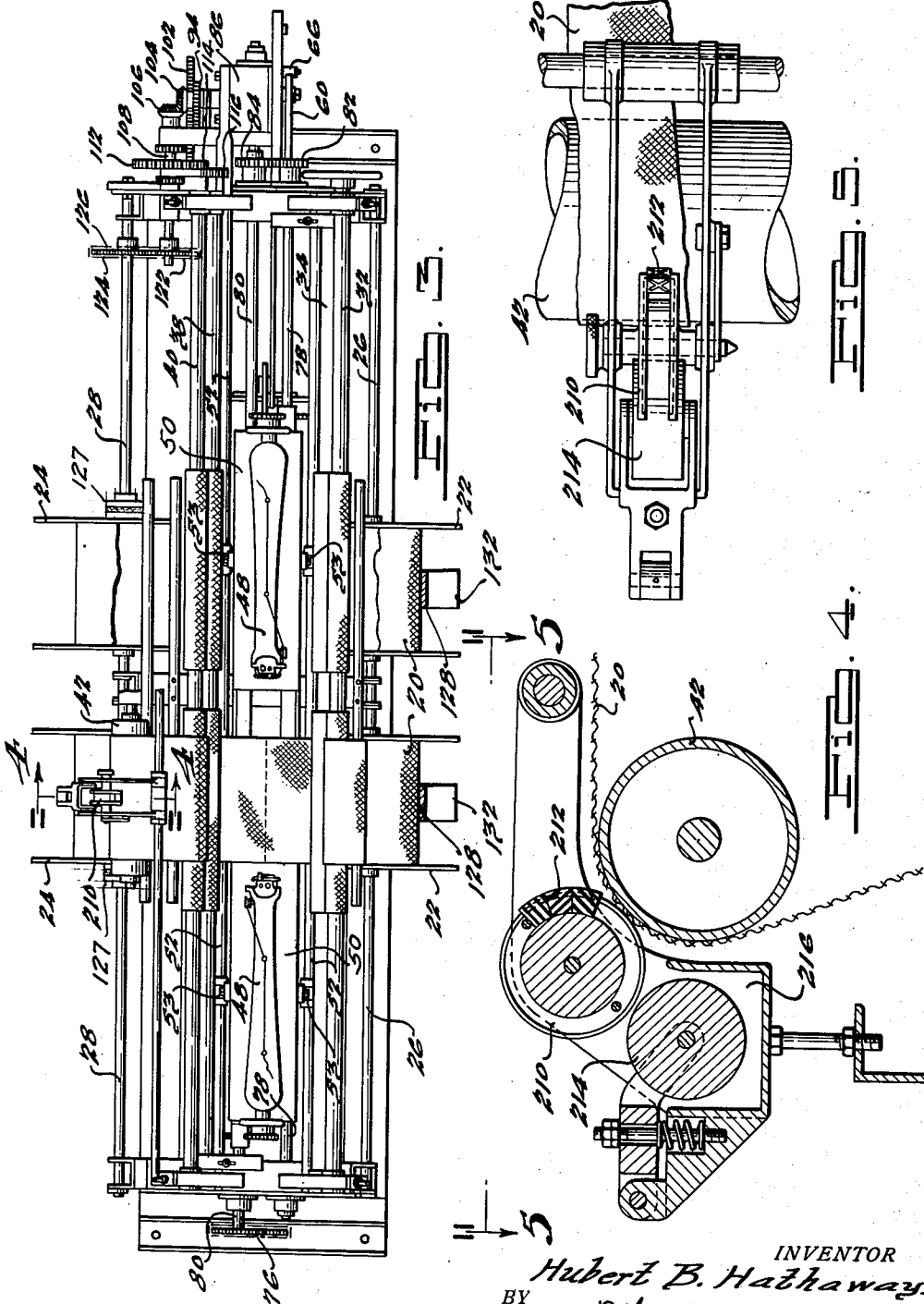
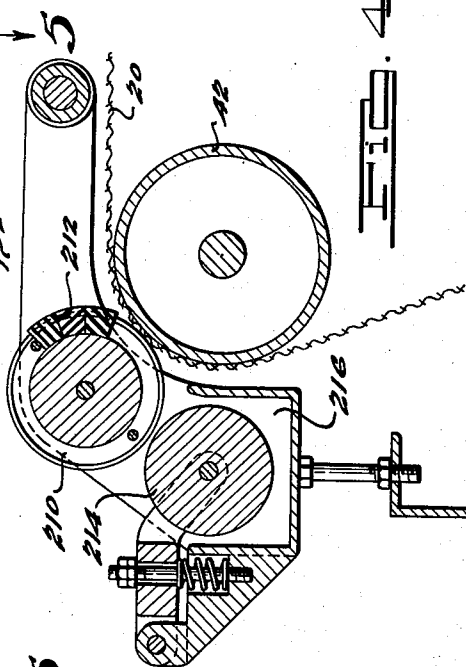
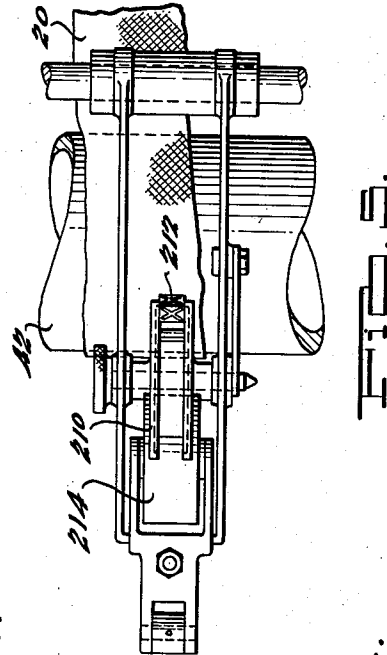
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POCKET SEWING MACHINE

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5 Sheets-Sheet 2



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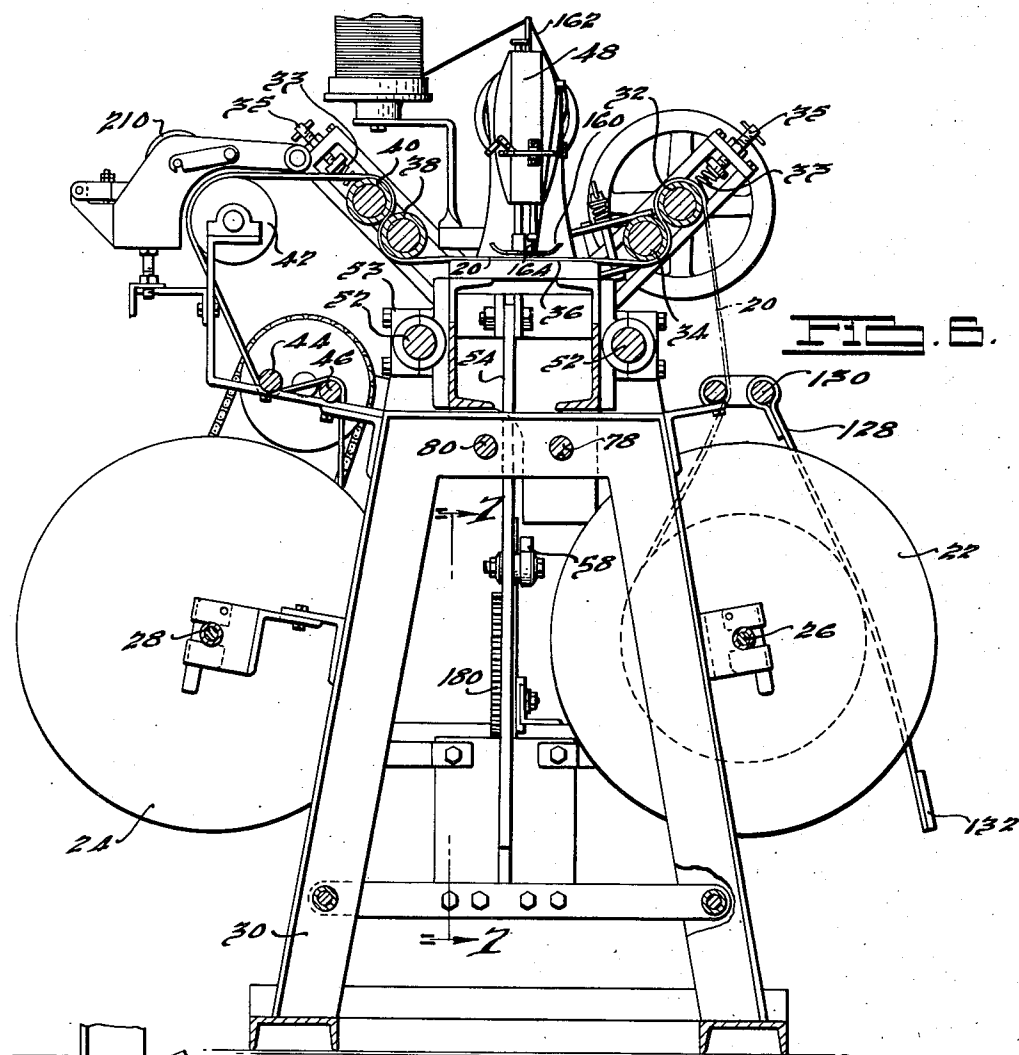
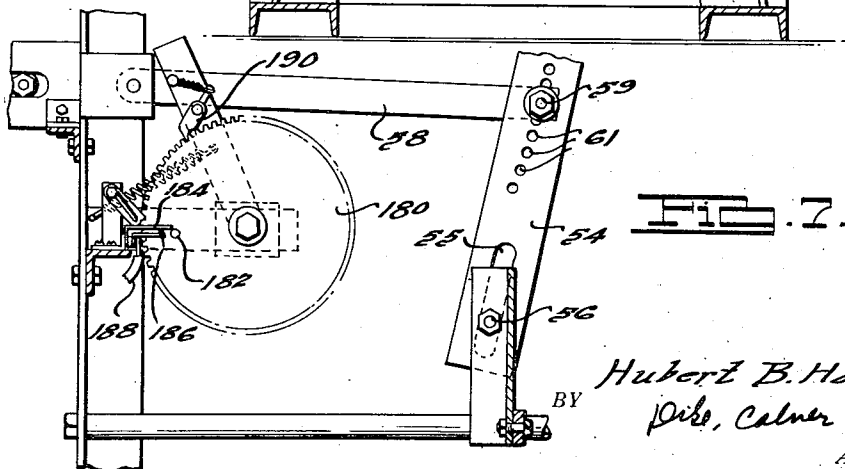
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POCKET SEWING MACHINE

Filed April 11, 1940

5 Sheets-Sheet 3



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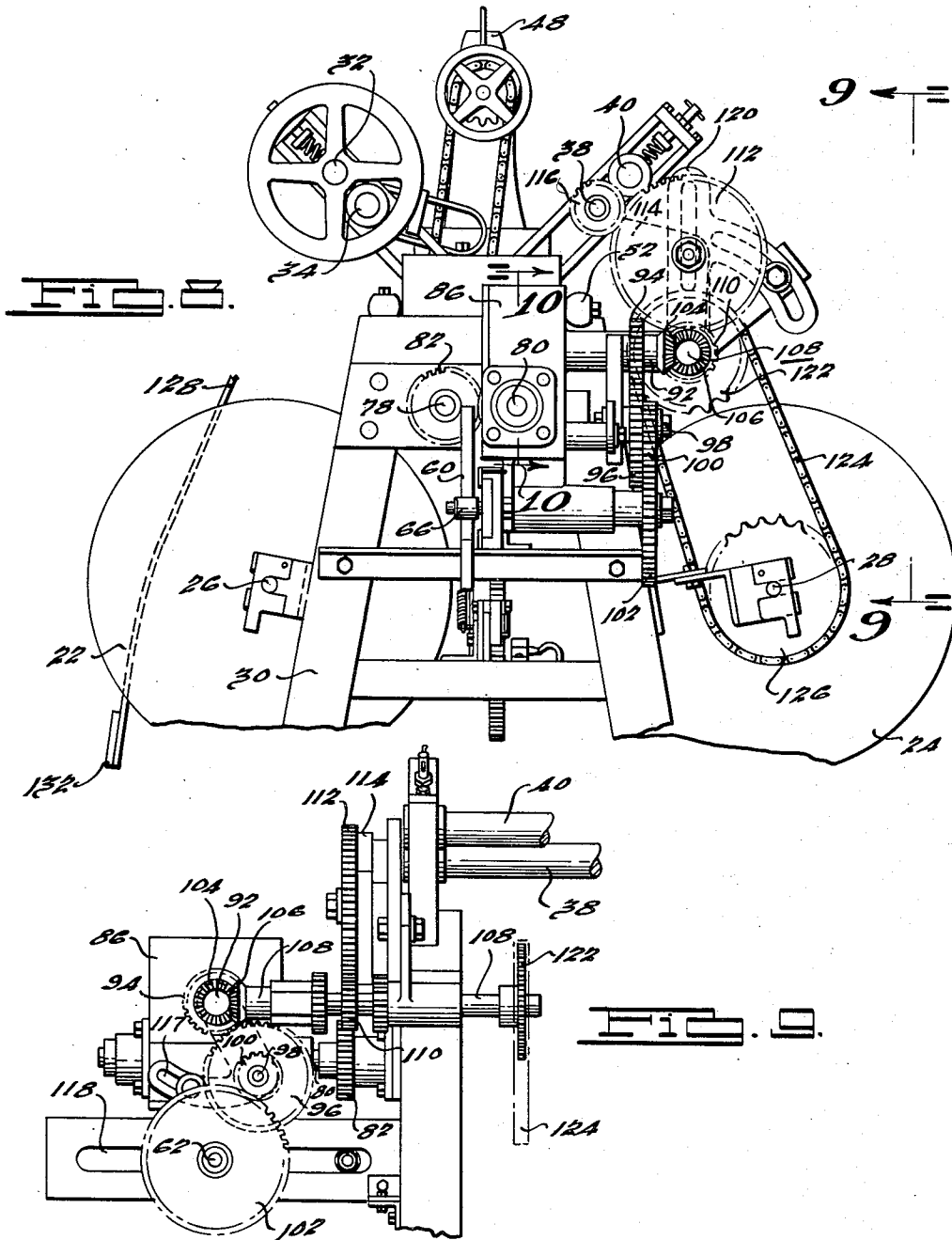
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POCKET SEWING MACHINE

Filed April 11, 1940

5 Sheets-Sheet 4



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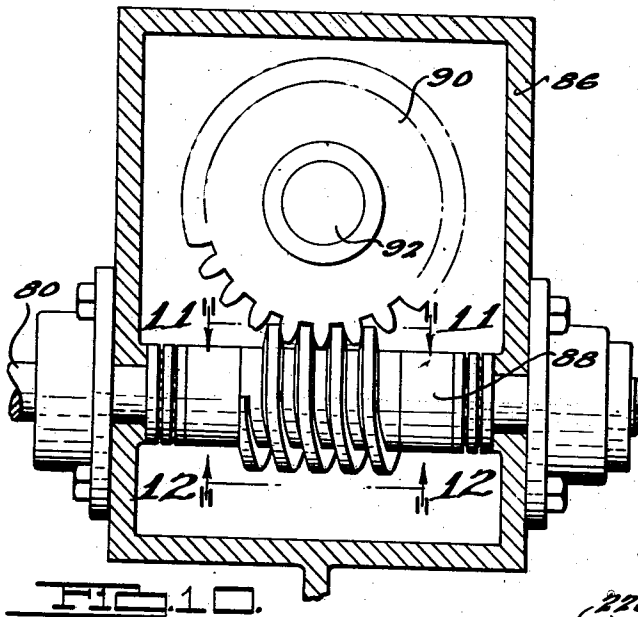
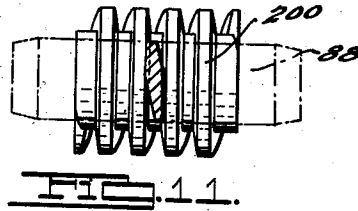
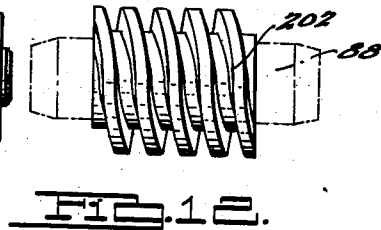
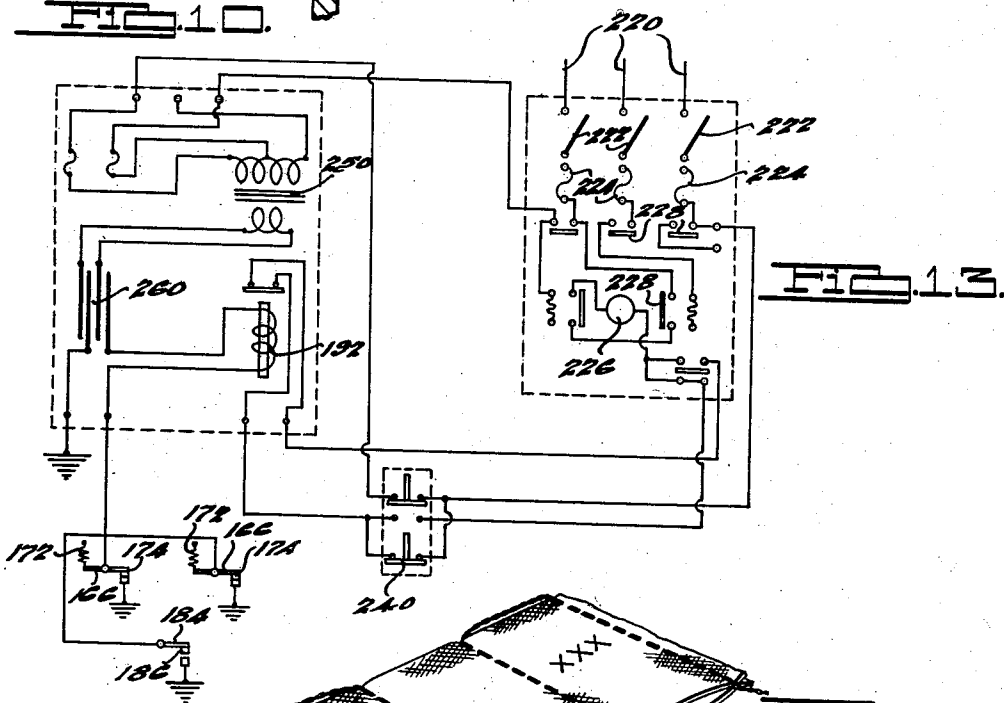
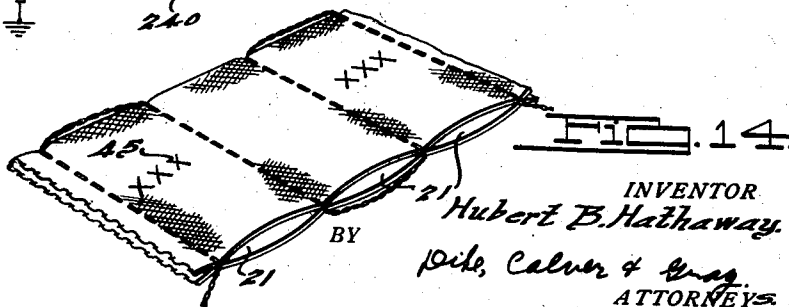
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H. B. HATHAWAY
POCKET SEWING MACHINE

2,318,686

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,318,686

POCKET-SEWING MACHINE

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Application April 11, 1940, Serial No. 329,025

1 Claim. (Cl. 112—2)

This invention relates to fabric pocketing de-
vices, and more particularly to an improved ma-
chine adapted to sew folded material transverse-
ly to form a plurality of spaced pockets therein.

In the devices heretofore employed to form
spaced pockets in fabric material it has been cus-
tomary to sew transverse pockets separately on a
sewing machine having a stationary head. This
practice is objectionable because it is time con-
suming since it is necessary to move the material
relative to the machine and the cost of forming
pockets of the type under consideration has
therefore been undesirably high.

An object of this invention is therefore to pro-
vide an improved machine capable of forming
spaced pockets in folded material economically
and more rapidly than has heretofore been pos-
sible.

A further object of the invention resides in
the provision of a machine wherein folded mate-
rial may be intermittently fed in a substantially
straight line through a machine having sewing
heads which move transversely relative to the
fabric material to sew spaced pockets therein.

Another object of the invention is to provide
novel intermittence movement mechanism capa-
ble of alternately moving a sewing head trans-
versely relative to fabric material and indexing
the fabric material forwardly when the sewing
head approaches each extreme position of its
transverse movement.

A still further object of the invention is to pro-
vide novel electrically controlled means whereby
the sewing machine will be automatically ren-
dered inoperative in the event that the sewing
thread breaks or the thread in the bobbin of the
sewing machine runs out.

A further object is to provide an improved sew-
ing machine having sewing heads movable lon-
gitudinally of the machine to intermittently sew
fabric material passing transversely through the
machine in a substantially straight path.

Another object resides in the provision of im-
proved marking means to automatically mark
characters on material passing through the ma-
chine to indicate part numbers, order numbers,
etc.

A further object of the invention is to provide
improved motion transmitting means wherein a
sewing head is moved across folded material and
the folded material is intermittently moved a
substantially predetermined distance when the
sewing head approaches each of its extreme
transverse positions to form substantially uni-
formly sized pockets in the folded material.

Another object is to provide a sewing machine
head capable of stitching fabric material passed
in either direction under the sewing head.

Yet a still further object resides in the provi-
sion of motion transmitting means including a
ratchet worm gear mechanism capable of induc-
ing a lag in the movement of the operative parts
of the machine as it is started or stopped while
sewing heavy material, and to permit movement
of the fabric material only when the sewing nee-
dles are out of the fabric.

Another object is to provide an improved brake
mechanism to exert a progressively decreasing
force on a roll of fabric material as the size of the
roll decreases thereby maintaining a substan-
tially predetermined tension on the fabric as it is
passed through the machine.

Other objects and advantages of this inven-
tion will be apparent from the following detailed
description considered in connection with the ac-
companying drawings, submitted for purposes of
illustration only, and not intended to define the
scope of the invention, reference being had for
that purpose to the subjoined claim.

In the drawings wherein similar reference
characters refer to similar parts throughout the
several views:

Fig. 1 is a side elevation of a machine embody-
ing the present invention.

Fig. 2 is a top plan view taken substantially
on the line 2—2 of Fig. 1.

Fig. 3 is a top plan view of the machine illus-
trated in Fig. 1.

Fig. 4 is a sectional view taken substantially on
the line 4—4 of Fig. 3.

Fig. 5 is a top plan view of the device illus-
trated in Fig. 4.

Fig. 6 is a sectional view taken substantially on
the line 6—6 of Fig. 1.

Fig. 7 is a sectional view taken substantially on
the line 7—7 of Fig. 6.

Fig. 8 is an end view from the right hand side
of the machine disclosed in Fig. 1.

Fig. 9 is a sectional view taken substantially
on the line 9—9 of Fig. 8.

Fig. 10 is a sectional view taken substantially
on the line 10—10 of Fig. 8.

Figs. 11 and 12 are sectional views taken sub-
stantially on the lines 11—11 and 12—12 re-
spectively of Fig. 10.

Fig. 13 is a schematic view showing the wiring
diagram of this machine.

Fig. 14 is a perspective view illustrating one
type of the finished article produced by this
machine.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring now to the drawings, it will be observed that folded fabric material 20 may be withdrawn from spaced reels 22 and passed over suitable sewing tables to form transversely extending pockets therein. After the pockets have been formed the pocketed material may be rolled up on spaced reels 24 or passed directly to another machine designed to use the pocketed material for the desired purpose. If desired the fabric material may be fed across the sewing tables from a fabric folding machine such for example as the slitting and folding machine disclosed in my co-pending application Serial No. 329,024.

The invention is disclosed as embodied in a machine having a pair of sewing heads preferably adapted to move in unison back and forth across two spaced generally parallel strips of folded material 20. It will be understood however that the invention may be carried out just as conveniently on a machine having a single sewing head adapted to operate on a single strip of folded material, or wherein a plurality (more than two sewing heads) are employed, and also that where two or more sewing heads are employed they may move simultaneously in the same direction or in opposite directions as desired.

The reels 22 and 24 may be supported on suitable shafts 26 and 28 respectively supported by a frame member 30. In passing from the reels 22 to the reels 24 the folded fabric 20 passes over a roll 32 and between the roll 32 and a roll 34 and is thereafter directed across a pair of substantially flat working surfaces 36 as more clearly illustrated in Figure 6.

Beyond the working surfaces 36 is a roll 38 over which the material 20 passes and it is thereafter directed between the roll 38 and another roll 40. After the folded fabric passes from the roll 40 it may if desired be passed over a roller 42 as more clearly illustrated in Figs. 4, 5 and 6. The roller 42 is associated with a suitable marking device 44 to stamp the pocketed material to indicate a part number or an order number. After passing over the roll 42 the fabric 20 may be passed around a pair of spaced guide rollers 44 and 46 before being wound upon the reels 24.

Two spaced sewing machine heads 48 are mounted on movable bases 50 to move across the flat working surfaces 36 over which the folded fabric 20 moves in passing from the reels 22 to the reels 24. The movable bases 50 are mounted by means of clamps 53 to move longitudinally on spaced rods 52 carried by the frame 30.

Means are provided to move the sewing heads 48 and the movable bases 50 longitudinally on the rods 52 to sew pockets in the folded fabric 20. One desirable form of intermittent movement mechanism includes an angularly movable bar 54 pivotally mounted on one of the bases 50 and having a slot 55 adapted to receive a bolt 56 carried by the frame 30. The bar 54 may be actuated angularly by means of a link 58 con-

nected therewith by means of a bolt 59. The link 58 may be actuated by a suitable rotatable cam 60 mounted on a shaft 62 and adapted to engage spaced roller members 64 and 66 carried by the link 58 to actuate the bar 54 to move the bases 50 and heads 48. The length of stroke imparted to the sewing heads 48 and the bases 50 may be varied by changing the effective lever arm of the bar 54 by inserting the bolt 59 through a different one of a plurality of spaced apertures 61 in the bar 54. Adjustment can also be made by changing the contour of the cam member 60.

The various elements of this pocket sewing machine may be driven from a single source of power such for example as an electric motor 74 mounted on the frame 30. Power may be transmitted from the motor 74 through a chain 76 to drive a main power shaft 80 extending longitudinally through the machine. An auxiliary power shaft 78 extends longitudinally through the machine parallel to the power shaft 80 and is driven by cooperating gears 82 and 84 fixed to the shafts 78 and 80 respectively.

The power shaft 80 projects into a housing 86 and drives a worm gear 88 which meshes with and drives a worm wheel 90 fixed to a shaft 92. The shaft 92 is provided with a gear 94 which meshes with and drives a gear 96 fixed to a shaft 98. The shaft 98 is provided with a second gear 100 which meshes with a gear 102 fixed to the shaft 62 which drives the cam 60 to actuate the link 58 connected to the movable bar 54 which moves the bases 50 and the sewing heads 48 transversely across the folded material to sew pockets therein.

The shaft 92 is also provided with a beveled gear 104 which meshes with and drives a beveled gear 106 fixed to a shaft 108. A gear 110 fixed to the shaft 108 meshes with and drives a larger gear 112 having a segmental gear portion 114 fixed thereto. The segmental gear portion 114 meshes with a gear 116, fixed to the drive feed roll 38 to index the folded fabric 20 forwardly when the sewing heads approach either extreme position in their path of movement.

The number of stitches sewed by the sewing heads 48 as they move across the folded material 20 may be controlled by varying the size of the gears 100 and 102 and the gears 110 and 112. It should be noted that the gears 102 and 112 should be the same size and also that the gears 100 and 110 should also be the same size. It will be noted that the shafts 98 and 62 which carry the gears 100 and 102 are adjustably mounted in slots 117 and 118 respectively whereby the ratio of the number of teeth in the gears may be varied through wide limits. The gear 112 and the segmental gear 114 is also mounted in a slot formed in an arm 120 to permit similar adjustment.

The shaft 108 is provided with a sprocket 122 which drives a chain 124 operably connected through a sprocket 126 to the shaft 28 which carries the reel 24. Suitable friction clutches 127 may be interposed between the shaft 28 and the reels 24. Suitable means are provided to engage the friction clutch to rotate the shaft 28 when the segmental gear 114 is driving the drive roll 38. The folded fabric material which has had the pockets formed therein is therefore maintained in suitable rolled condition on the reel 24.

The unstitched folded fabric on the reel 20 is maintained in rolled condition on the reel 22 by means of a weighted flexible member such

as a strap 128 carried by a rod 130 and having a weight 132 thereon. The force exerted on the fabric varies in proportion to the amount of fabric on the reels 22 since the greater the amount of fabric the further the weight 132 will be deflected outwardly from the rod 130. A braking force which varies in proportion to the amount of material on the reels is thus provided.

The movable bases 50 which support the sewing heads 48 are provided with brackets 140 and 142 which carry sprockets 144 and 146 respectively keyed to and slidably mounted on the oppositely turning drive shafts 78 and 80 respectively. Chain drives 148 and 150 interconnect the sprockets 144 and 146 with sprockets 152 and 154 respectively to drive the sewing needles of the spaced sewing heads 48 in opposite directions.

Referring now to Fig. 6, it will be observed that the sewing heads 48 are provided with substantially U-shaped presser feet members 160 whereby the sewing heads 48 may be moved in opposite directions across the folded fabric 20 to sew pockets therein. Sewing thread 162 is supplied to needles 164 which cooperate with bobbin members positioned to underlie the folded fabric 20 to perform the sewing operation.

Means are provided to automatically stop the machine from operating in the event that the thread breaks. One desirable form of control member is illustrated in Fig. 2 and comprises an arm 166 pivoted at 168 and provided at one end with an aperture 170 through which the thread 162 passes. The other end of the arm 166 is yieldingly urged by a spring 172 to hold spaced contact members 174 in contact. Electric current to operate the control device is supplied through a wire 176. The arm 166 is designed and proportioned in such a manner as to vibrate at approximately 1500 cycles per minute. In the event that the thread 162 breaks the spring 172 exerts sufficient force on the arm 166 to close the contacts 174 thereby shutting off the machine. The cut-off mechanism may be designed in such a manner as to stop the machine in the event that the arm 166 vibrates at a frequency of less than a desired speed, such for example as approximately 1200 cycles per minute.

Means are also provided to stop the machine when the bobbin thread is exhausted. One desirable form of bobbin control device comprises a gear wheel 180 having a pin 182 carried thereby intermediate its periphery and its axis, and adapted to engage an arm 184 which controls electric contact members 186 interposed in the motor circuit as illustrated in Figs. 7 and 13 and supplied with electric current through a wire 188. Means such for example as a pawl 190 carried by the link 58 may be employed to rotate the gear 180 a distance corresponding to one gear segment each time the link 58 oscillates to move the sewing heads 48 across the folded fabric to form a pocket therein. It is of course possible to determine approximately how many pockets can be sewed with a bobbin thread of a given length, and the control mechanism can be calibrated in such a manner that the gear 180 has a sufficient number of teeth to permit the sewing heads 48 to make the desired number of sewing operations across the folded fabric. When the bobbin thread is approximately exhausted a pin 182 contacts the members 184 to actuate the contact members 186 thereby stopping the machine. The solenoid 192 may be actuated by contact members 184 illustrated in Fig. 13.

Referring now to Figs. 10 to 12 inclusive, attention is called to the fact that means are provided to hold the folded fabric 20 stationary while the needles 164 are projecting therethrough. When the machine is being employed to stitch relatively light material there is sufficient give or flexibility in the material that there is little danger of breaking the needle in the event that the sewing heads 48 are continuously fed across the folded fabric. If heavy material is being used there is danger of breaking the needles 164 in the event that the sewing heads 48 are moved continuously across the folded fabric during the sewing operation. The worm gear 88 which cooperates with the worm wheel 90 may be formed with teeth segments 200 extending substantially perpendicular to the longitudinal axis of the gear 88 as illustrated on Fig. 11. The opposite side of the gear 88 may be provided with teeth segments 202 having twice the normal pitch as more clearly illustrated in Fig. 12. When this type of device is employed it will be noted that when the needles 164 are projected through the folded fabric 20 the gear segments 200 are in engagement with the worm gear 90 whereupon no forward motion of the sewing heads 48 is transmitted through the chain of gears which actuates the bases 50 and the sewing heads 48. When the needles 164 are withdrawn from the folded fabric the segments 202 of the worm wheel 88 are in engagement with the worm gear 90 whereupon the bases 50 and the sewing heads 48 are moved a distance corresponding to the length of the stitch in the folded fabric 20.

Means may be provided to mark the folded material with characters to indicate part or order numbers. This marking device is preferably suitably positioned to imprint the folded fabric 20 after it has passed through the sewing heads 48 to form the pockets therein. One desirable form of marking device is illustrated in Figs. 3 to 6 inclusive and comprises a roller 42 over which the folded fabric 20 passes. A roller 210 having a type pad 212 formed of rubber or other suitable material is disposed adjacent the roller 42 to engage the folded fabric 20. An inking roller 214 is positioned to lie within a well 216 and to be engaged by the periphery of the type pad 212 to rotate the inking roller 214 thereby transferring ink or other suitable marking medium from the well 216 to the type pad 212. Since the roller 210 rotates continuously with the folded fabric 20 the type pad 212 will impress markings on the fabric 20 each time the type pad 212 makes a complete revolution. The size of the rollers 42 and 210 may be varied to vary the space between the indicia to correspond with the length of pockets formed in the folded fabric 20.

The electrical circuits of our improved machine are more clearly illustrated in Fig. 13. Electrical current generally of the alternating current type may be supplied to the machine through three wires 220. The supply of the current to the machine from the wires 220 is controlled by suitable contact members 222 having fuses 224 associated therewith. Magnetic starter units 226 including contact members 228 may be employed to assist in starting the device. A manual starter button 240 having two settable positions, one of which is employed to start the device initially and the other of which may be actuated after the device is in operation at low speed, are employed to control the device. A

transformer 250 is provided to reduce the voltage of the current to approximately 6 to 8 volts, and a suitable rectifier 260 which may be of the Ratox type is provided to transform the alternating current to direct current. Current from the rectifier 260 passes through the solenoid 192 which is actuated by the contacts 174 and 186 associated with the thread control mechanism as more clearly illustrated in Fig. 2, and the bobbin control mechanism as more clearly illustrated in Fig. 7.

The operation of the machine as a whole is as follows: Assume that folded fabric material 20 of a desired width is wrapped on the reels 22 and that it is desired to form a plurality of substantially equally spaced pockets therein. The folded fabric 20 is threaded through the machine passing over the roll 32 and around the roll 34, the tension exerted between the rolls 32 and 34 being resiliently controlled by means of the springs 33 and the manually operable screw 35. After passing around the roll 34 the fabric is passed across the working surfaces to the drive feed roll 38, around the roll 40 which exerts a pressure on the roll 38 by means of the spring 33 and the screw 35. The fabric 20 then passes around the marking roll 42 and thence to the spaced guide rolls 44 and 46 after which it may if desired be wrapped on the spaced reels 24.

Power to drive the machine may be supplied by the motor 74 which through the chain 76 drives the main drive shaft 80 extending the full length of the machine. Cooperating gears 84 and 82 carried by the main drive shaft 80 and an auxiliary drive shaft 78 cooperate to drive the auxiliary shaft 78 at the same speed as the shaft 80 but in the reverse direction. The sprockets 144 and 146 slidably mounted on the shafts 78 and 80 respectively operate through the chain drives 148 and 150 respectively to drive the sewing mechanism of the heads 48 in opposite directions at substantially uniform speed.

The main drive shaft 80 projects into the housing 86 and drives the worm wheel 88 as more clearly illustrated in Fig. 10. The worm wheel 88 drives a worm gear 90 fixed to the shaft 92 which in turn through the gears 94 and 96 drives a shaft 98 having a gear 100 which drives a gear 102 fixed to a shaft 62 operably connected to drive a cam member 60. The cam member 60 operates between spaced rollers 64 and 66 operably connected with the link 58 to oscillate the bar 54 about the member 56 to actuate the bases 50 and the sewing heads 48 to sew pockets in the folded material 20.

The shaft 92 is operably connected by means of beveled gears 104 and 106 to drive a shaft 108 which is in turn operably connected through gears 110 and 112 and a segmental gear 114 to drive the feed roller 38 intermittently to index the folded fabric 20 forward when the sewing heads 48 approach either extreme position in their cycle of operation.

The number of stitches sewed in the fabric material 20 as the sewing heads 48 move from one extreme position to the other may be controlled by varying the size of the intermeshing gears 100 and 102, it being observed that the gear 112 should be the same size as the gear 102, and that the gear 110 should be the same size as the gear 100.

In the event that it is desired to sew relatively thick or tough material and there is danger of the needles breaking due to movement of the sewing head while the needle 164 is projected

through the material 20, a ratchet worm wheel drive of the type illustrated in Figs. 11 and 12 may be employed to permit movement of the worm gear 90 and the associated driving members only when the needle 164 is out of the folded material 20.

The solenoid controlled contact points 174 are operably connected in such a manner through the electric circuit illustrated in Fig. 13 that the contacts 174 must be opened to permit the machine to operate. These contacts vibrate at some suitable speed, such for example as approximately 1500 cycles per minute, and in the event that the sewing thread 162 breaks, the spring 172 closes the contacts whereupon the machine stops.

Assuming the the contacts vibrate rapidly in the event the machine is running at full speed, such as for example, 1200 to 1500 cycles per minute, if the speed of the machine should drop below this speed, the contact points will remain together long enough to permit the small solenoid to operate and cut off the machine. This happens in the event of a slowdown due to the breakage of thread, which allows the contacts to remain together long enough to stop the machine. However, as long as the machine is operating at its normal speed, the contacts do not remain in contact long enough to operate the solenoid, thus the machine continues in operation at its regular speed. This is due to the time lag in the small solenoid. It takes a certain amount of time, which is predetermined to build this up. As long as the machine is operating at normal speed, the time lag is so great that it does not operate, but as soon as the machine slows down or the thread breaks, the current flows through long enough to cut off the machine.

The bobbin thread control mechanism is also operably connected through the electric circuit illustrated in Fig. 13 in such a manner that in the event the bobbin thread breaks, the solenoid actuated contacts 186 will close thereby stopping the machine. The pin 182 carried by the gear 180 engages the member 184 to render the machine inoperative when a substantially predetermined number of pockets have been formed. The pawl 190 operably associated with the link 58 may be employed to rotate the gear 180 a distance corresponding to one tooth length each time the sewing heads make a complete cycle of operation.

The marking device 44 operates to impress symbols 45 on the fabric material to indicate job or order numbers on the sewed material. The roller 210 having the rubber type 212 positioned thereon is so mounted as to engage the folded material passing over the roller 42 to impress a mark thereon each time the roller 210 makes a complete revolution.

It will be observed that I have provided a novel and improved machine for economically and rapidly forming pockets in folded material since the folded material is passed in a substantially straight line through the machine and is indexed forwardly rapidly while the sewing heads are at each extreme position of their cycle of operation, and that the sewing heads are designed in such a manner as to sew a transverse pocket each time the sewing head moves in either direction. Automatically operable means have been provided to stop the machine in the event that something breaks, thereby immediately warning the operator that something has gone amiss and minimizing the possibility of seriously injuring the machine.

I claim:

In a machine to sew fabric material, a working surface adapted to receive the fabric material, a sewing head including a sewing needle movable across the working surface, a driving shaft, means driven by the driving shaft to move the sewing head across the fabric material, ratchet worm gear driving means driven by the driving shaft to move the sewing head relative to the fab-

ric when the sewing needle is out of engagement with the fabric material, and intermittent motion mechanism including segmental gear drive means to move the fabric material a substantially predetermined distance relative to the sewing head each time the sewing head approaches one extreme position in its movement across the working surface.

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