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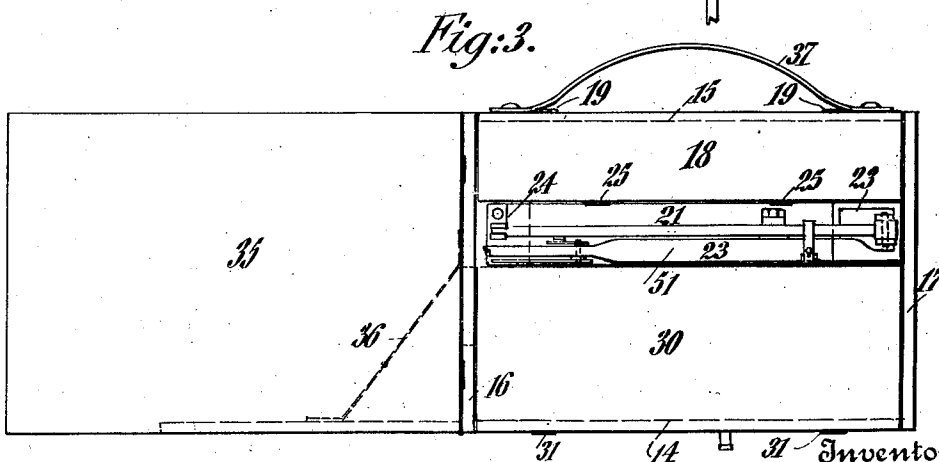
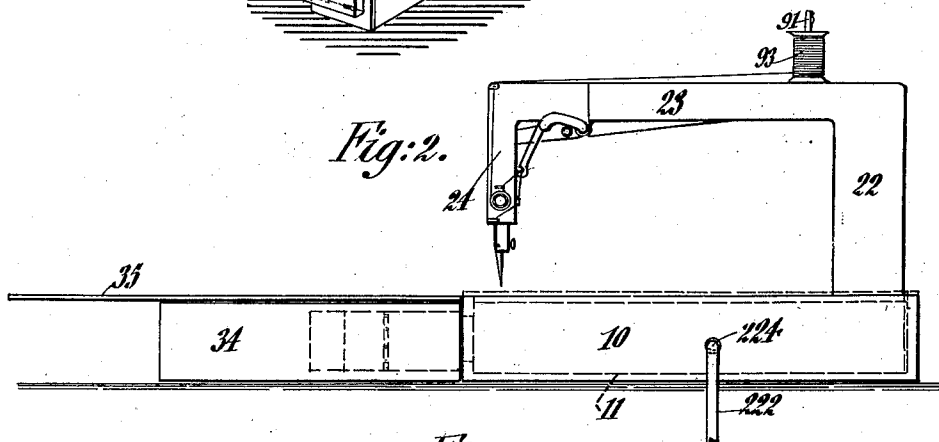
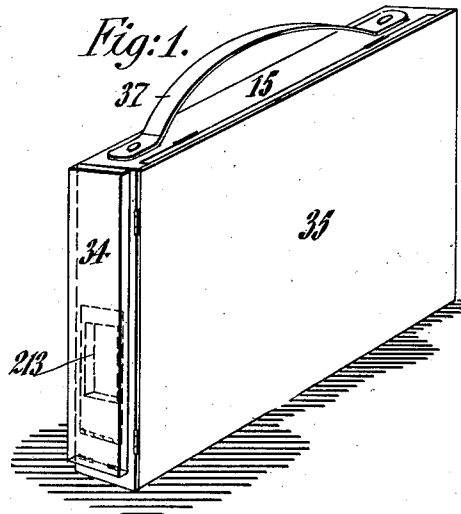
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2,091,994

PORTABLE SEWING MACHINE

Filed July 13, 1931

6 Sheets-Sheet 1



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6 Sheets-Sheet 2

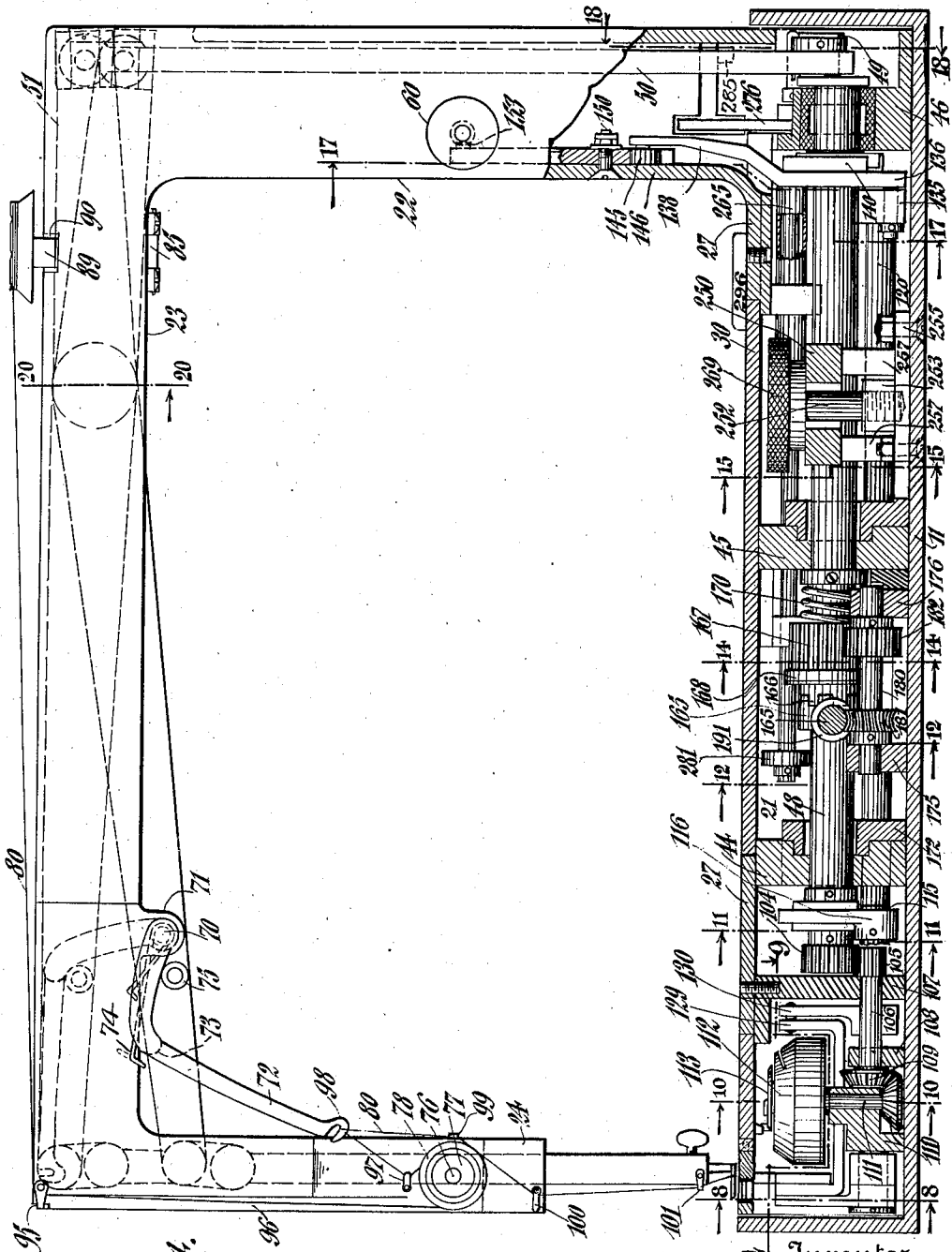


Fig. 4.

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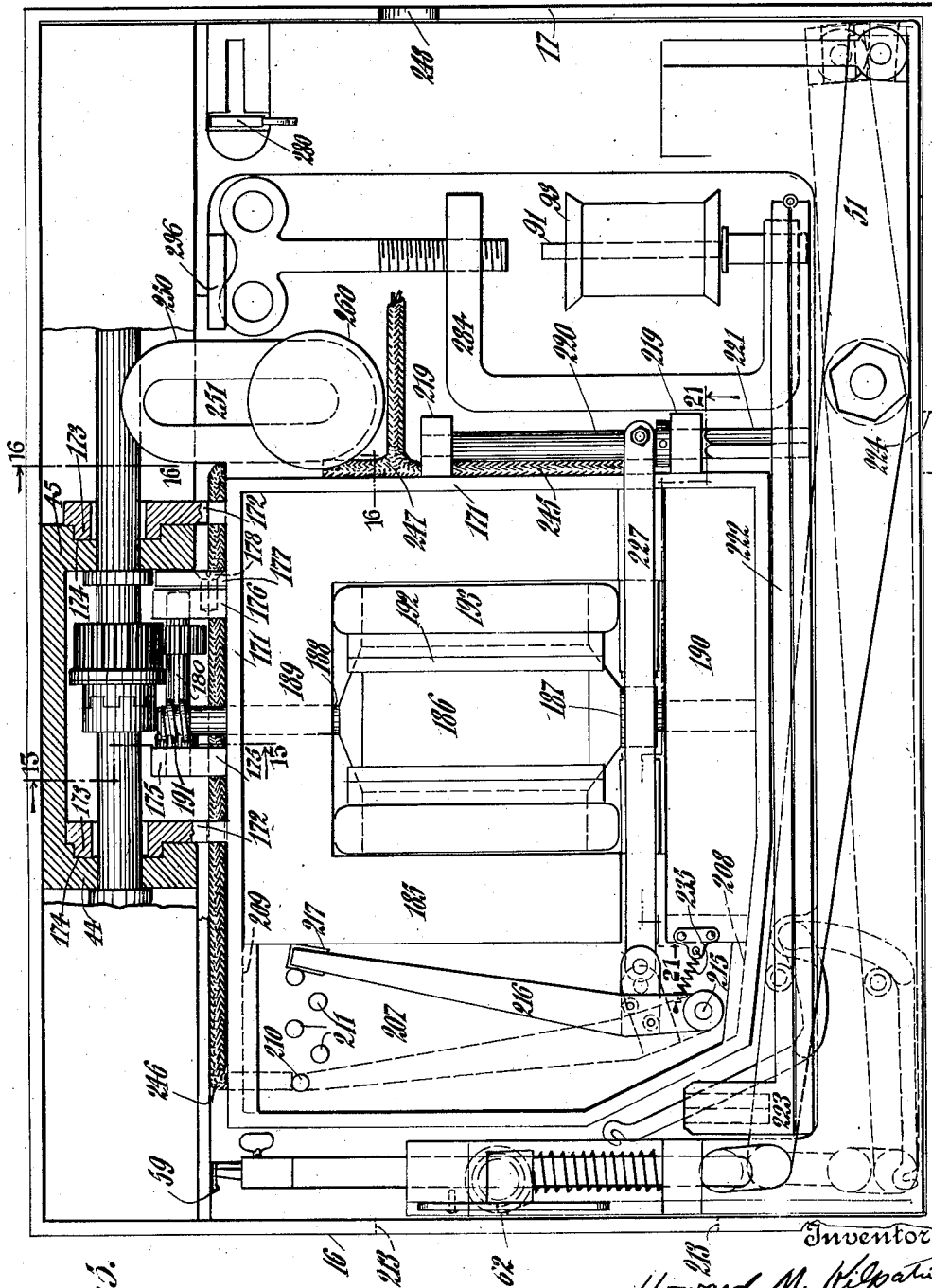
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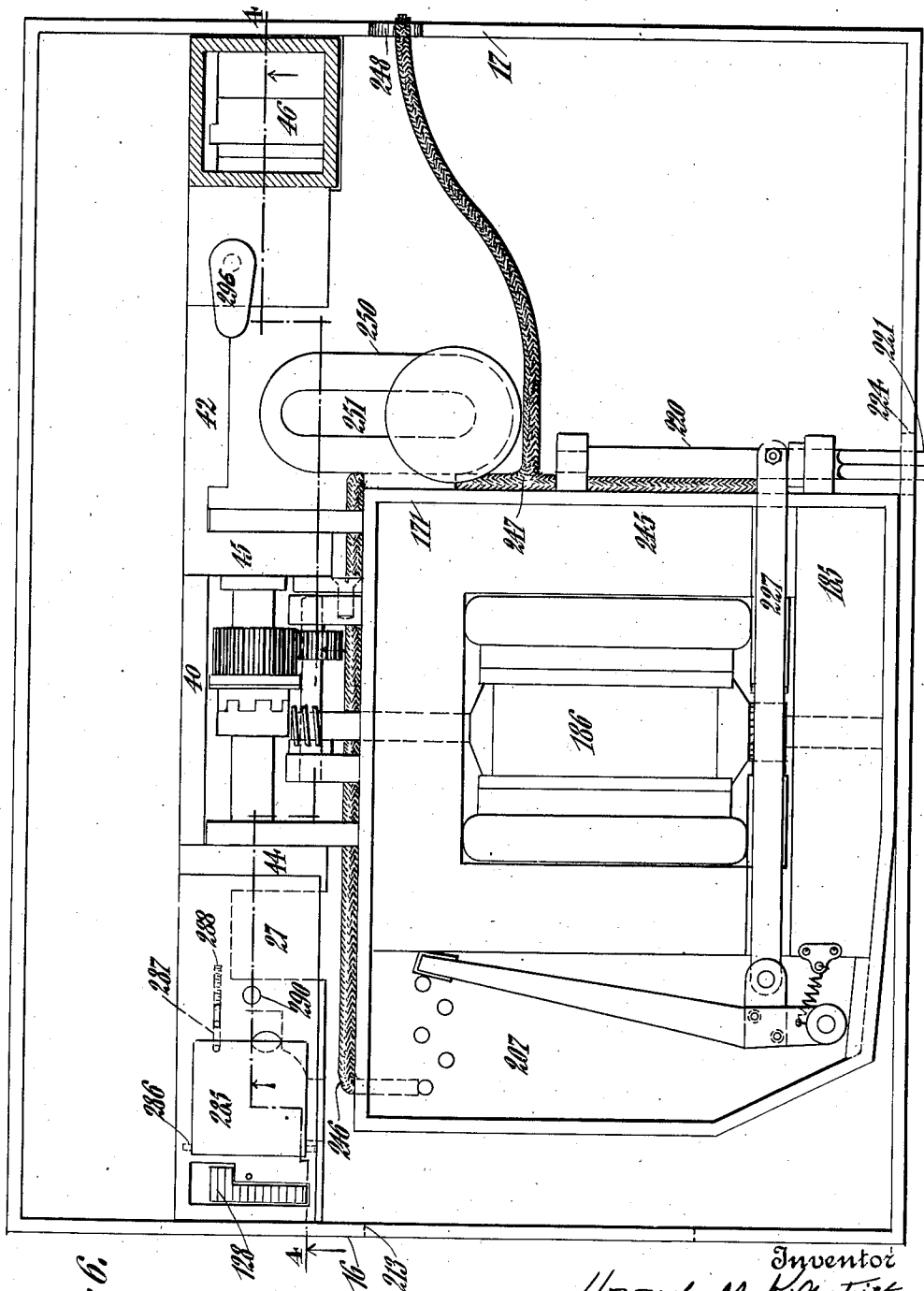
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PORTABLE SEWING MACHINE

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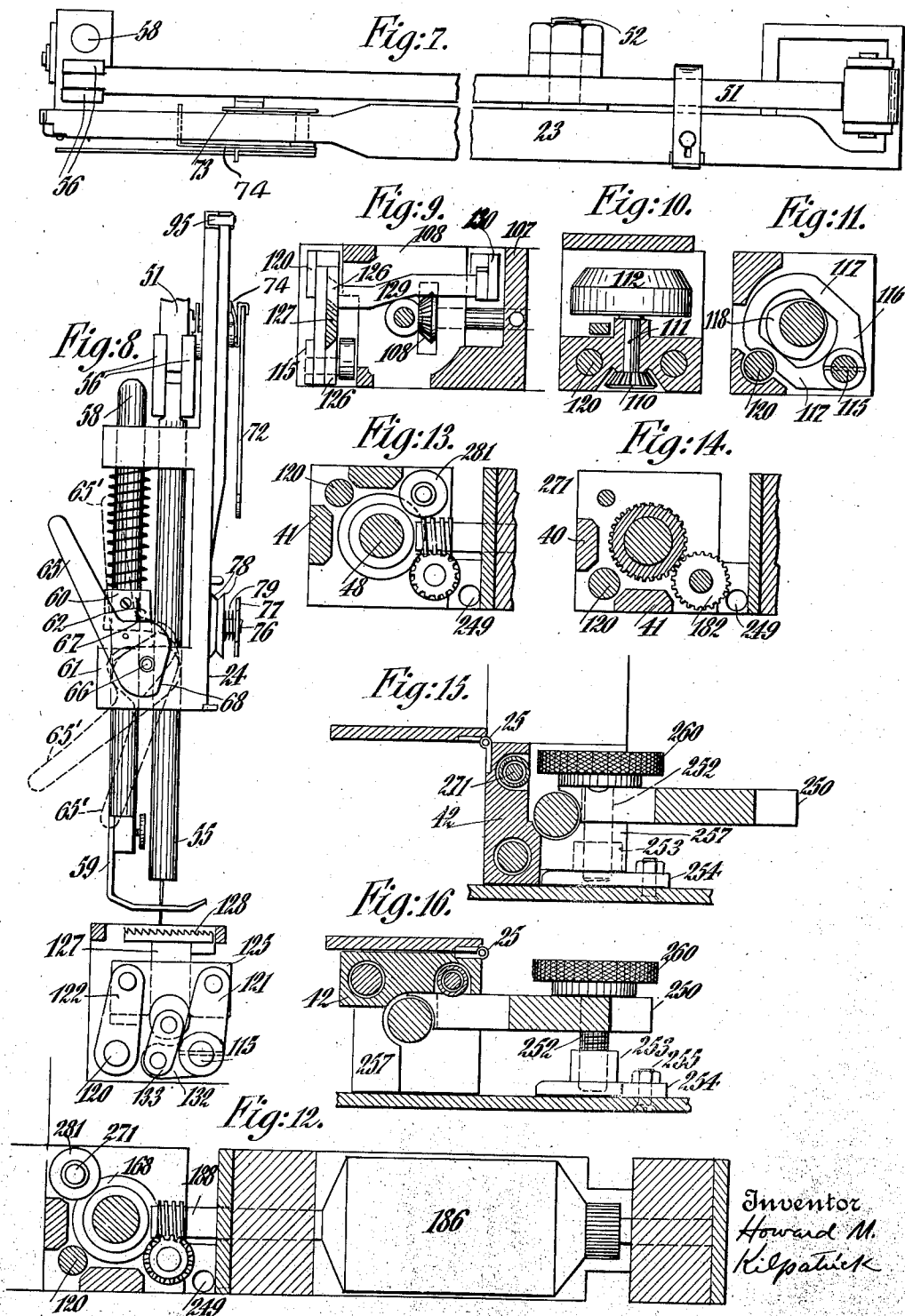
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PORTABLE SEWING MACHINE

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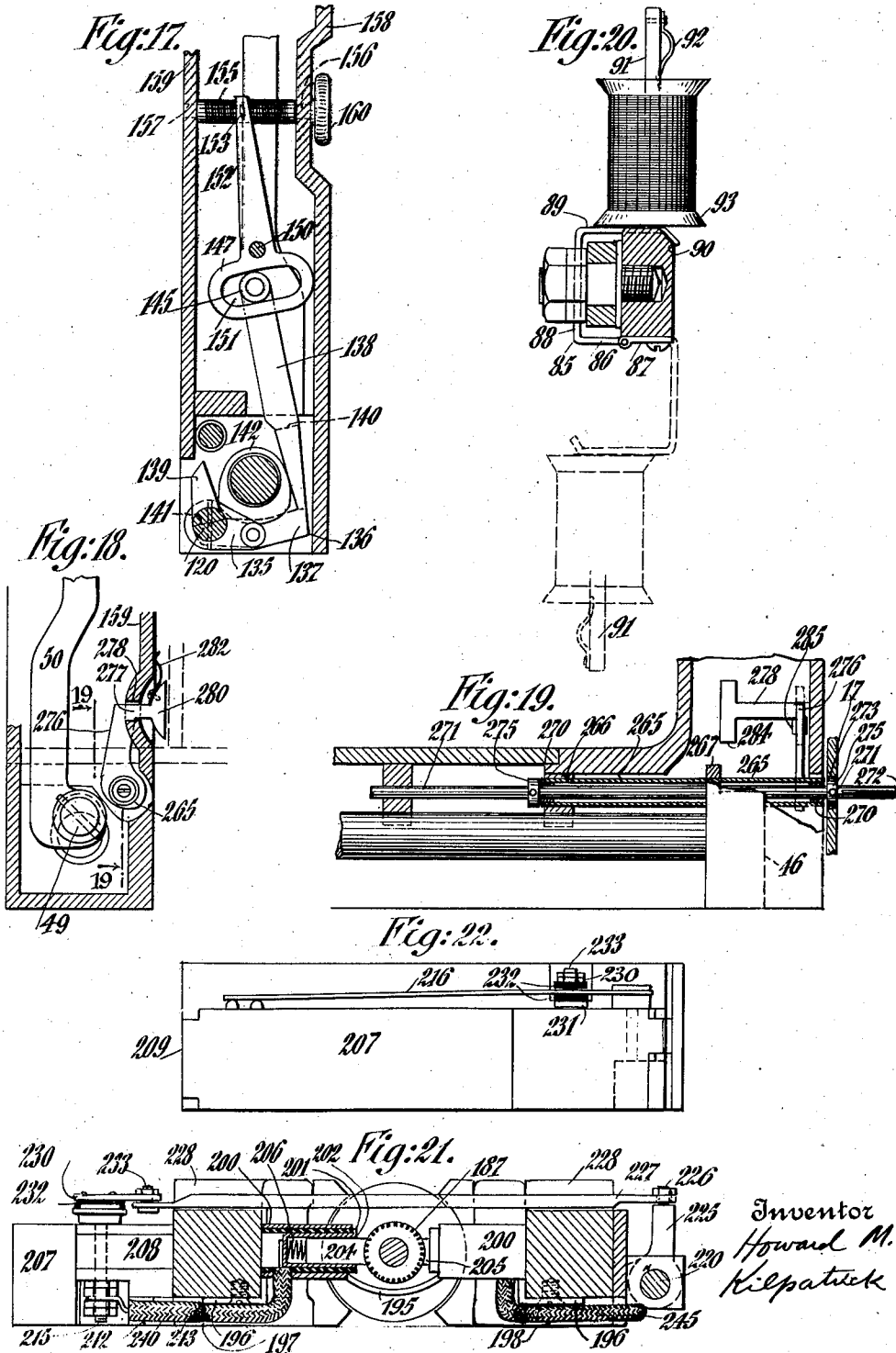
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PORTABLE SEWING MACHINE

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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,091,994

PORTABLE SEWING MACHINE

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Application July 13, 1931, Serial No. 550,941

49 Claims. (Cl. 112-220)

This invention relates to portable sewing machines, and has for its object to provide a convenient full-size machine foldable to occupy a very small space.

This machine has full size under-arm area, and is provided with self-contained motor drive and control, and bobbin winding and feed regulatory mechanisms, and when folded occupies a space ten times smaller than that of other sewing machines having as great under-arm area.

In the accompanying drawings,

Fig. 1 is a perspective view of the machine folded;

Fig. 2 is a front elevation of the machine in operative position;

Fig. 3 is a plan of the machine as in Fig. 1;

Fig. 4 is a sectional view approximately on the line 4-4 of Fig. 6, and partly in elevation;

Fig. 5 is a plan showing the machine folded, parts being removed;

Fig. 6 is a plan, partly in section, showing the machine in operative position, parts being removed;

Fig. 7 is a fragmental plan showing the machine arm;

Fig. 8 is a fragmental end elevation partly in section on the line 8-8 of Fig. 4;

Fig. 9 shows a horizontal section on the line 9-9 of Fig. 4;

Figs. 10, 11, 12, 14, 15 and 17 shows sections taken approximately on the lines 10-10, 11-11, 12-12, 14-14, 15-15 and 17-17 of Fig. 4;

Figs. 13 and 16 are sectional views taken approximately on the lines 13-13 and 16-16 of Fig. 5;

Fig. 18 is a sectional view taken approximately on the line 18-18 of Fig. 4, looking in the direction of the arrows of said line;

Fig. 19 is a sectional view taken approximately on the line 19-19 of Fig. 18;

Fig. 20 is a sectional view taken on the line 20-20 of Fig. 4;

Fig. 21 is a sectional view taken approximately on the line 21-21 of Fig. 5; and

Fig. 22 is a side elevation of the electric resistance block.

The sewing machine head and its drive mechanism are carried by a combined case and base 10 (Fig. 2) having a fairly thin bottom or bottom wall 11, and fixed front, back and end walls 14, 15, 16 and 17 (Fig. 3). A rear bed plate or board 18 is hinged as at 19 to the top edge of said rear wall and has a width equal to the width or the depth of the case.

and stitch forming mechanism housing or support 21 (Fig. 3), a standard 22 (Fig. 2), an arm 23 and a needle bar head 24, all of small front to rear dimensions not greater than the depth of the case, all of the outside dimensions of the machine head being such that the machine head will substantially snugly fill the case when the machine is folded as in Figs. 1 and 5. Hinges 25 connect the feed housing near its upper rear edge with the front edge of the rear bed plate 18, whereby the machine may pivot from lying position (Fig. 5) within the case to standing position (Fig. 4) forward of the forward edge of the rear bed plate, with the top bed-wall 27 of the feed housing flush with the rear bed plate 18, and the bottom face of the feed housing on said thin bottom 11.

A front bed plate 30 (Fig. 3) is hinged as at 31 at its front edge to the top edge of said front wall 14 of the case, and when closed lies flush with said top bed-wall 27. The front bed plate 30 is opened forwardly to permit the machine head to swing from the position of Fig. 5 to Fig. 4.

A bracket piece 34 (Fig. 2) hinged at one end of the front edge of the left or needle-end-wall 16 of said case and adapted to lie against the end wall may be moved to an outer position where it is stopped by a feeding brace or strap 36 in the plane of the front wall 16 (Fig. 3), in which position it supports a main cover board 35 hinged to the top edge of said needle-end-wall and adapted, when closed, to lie against and cover said bed plates 18 and 30 (Fig. 1) or when in operative open position, to lie in the plane of the bed plates and rest on said bracket in said outer position as in Fig. 2.

The handle 37 of the machine is mounted on the back wall 15, which becomes the top wall when the case is closed and carried, or disposed as in Fig. 1.

When the machine is to be used the case is placed as in Fig. 2 with its bottom 11 lying on a table or similar support and its various parts moved to the positions shown.

The feed and stitch forming mechanism housing or support 21 comprises connecting webs 40, 41 and 42 (Figs. 6, 14 and 15) carrying a plurality of cross-webs 44, 45 and 46 (Fig. 4) provided with main shaft bearings carrying a main shaft 48 provided under the standard 22 with an end crank 49 (Fig. 18) linked by a pitman 50 to the motive end of a needle lever 51 (Fig. 7) intermediately fulcrumed on a stud shaft 52 projecting from the rear face of the arm 23. As shown by

the cross hatching of the drawings, the standard 22 and the bed portion 27 (Figure 4) are integral, or one-piece, with each other, and the connecting web 40 and the webs 44 and 45 (Figures 5 and 14), are integral with each other. The cross-hatching just below 270, of Figure 19, and the absence of dividing lines between the web 45 and the connecting web 42 of Figure 6, show that the bed 27 is one-piece, or integral, with the web 45. Figure 4 shows that parts 22, 23 and 24 are integral, or one-piece, with each other. Figures 4 and 18 show that parts 22 and 46 are one-piece with each other. Therefore, parts 22, 23, 24, 44, 45, 27, 146 (Figure 4) and 46 are integral, or one-piece, with each other. The needle bar 55 (Fig. 8) reciprocates in the needle bar head 24 is linked at the upper end by a pair of links 56 to the active end of the needle lever 51.

A presser bar 58 vertically movable in the rear of the needle bar head is provided with a presser foot 59, and a lifting block 60 fast on the presser bar just above the lower lug 61 of the needle bar head, said block being provided with a projecting lug 62 having a lower shoulder. A lifting lever 65 pivoted as at 66 on the end face of said lower lug 61 just under said shoulder is provided with a cam edge comprising normal faces 67 and 68 respectively engaging the shoulder when the presser bar is up or down and held at a slight rearward angle from the presser bar, said cam faces 67 and 68 being slightly extended causing a slight raising of the presser bar when the lifting bar is pressed inward to the position of the dotted lines 65', thus permitting the lever to be pressed inward, from either upper or lower position, when the machine head is housed and front bed plate 30 is closed thereon and against said lever.

A take-up shaft 70 (Fig. 4) passing transversely through a bracket 71 on the arm bears fast thereon, the take-up lever 72 at all times remaining throughout its movement within the boundaries of the machine head to prevent any interference with housing the head. A cam arm 73 (Figs. 4 and 7) fast on the rear of the take-up shaft between the machine head arm 23 and the needle lever 51 is caused, by the action of the spring 74, to engage an antifricition roller 75 on the needle lever whereby the take-up lever is reciprocated as the needle lever reciprocates.

A tension screw 76 (Fig. 8) fast in the front face of the lower part of the needle bar head carries a tension adjusting nut 77 on its outer end, a pair of tension disks 78 on its inner part, and a spring 79 compressed between said nut and the outer disk for yieldably pressing the disks together on the thread 80 (Fig. 4) therebetween.

A U-shaped spring spool bracket 85 (Figs. 4 and 20) having a short arm 86 pivoted on a hinge member 87 fast on the lower face of the arm 23, has a yoke 88 disposable to the rear of the needle lever and a flat, hooked support-arm 89 adapted to clamp in a notch 90 on the top face of the machine head arm. A spool-receiving spindle 91 fast on and perpendicular to the support-arm 89 carries at its top a spring latch 92 adapted to hold the spool 93 thereon.

The machine is threaded as follows: The spool of thread is slipped on the spindle, over the spring latch, the latch snapping back to its outer position. The thread is then carried around the back turned hook 95, thence downwardly in the groove 96, and then between the tension disks 78, around the hook 97, through the hooked end 98

of the lever 72, and thence through the hooks 99, 100 and 101 to the needle.

When the machine is being closed, the front bed plate 30 forces the spool to a position below the machine arm (Figs. 5 and 20) in which position the spring latch 92 prevents the spool from falling off.

A gear 104 (Fig. 4) on the left hand end of the main shaft 48 meshes with a pinion 105 carried on a short shaft 106 disposed in bearings of webs 107 and 108 and provided with a bevel gear 109 at its left hand end engaging a miter gear 110 on a stud shaft 111 carrying on its upper end a rotary hook or loop taker 112 revolving at twice the speed of the main shaft adjacent to the path of the needle eye and carrying the bobbin 113.

A pressure rock shaft 115 (Figs. 4, 8 and 11) mounted in bearings in the webs 107 and 108 carries fast on its right hand end a yoke lever 116 (Fig. 11) comprising spaced parallel contact members 117 engaging an eccentric cam 118 fast on the main shaft 48 for rocking the rock shaft.

A feed rock shaft 120 (Figs. 4 and 8) disposed in bearings in said webs 44, 45, 107 and 108 is rocked in a manner presently to be described. Front and rear parallel supporting levers 121 and 122 (Fig. 8) mounted respectively loose and fast on the left hand ends of said pressure and feed rock shafts 115 and 120 carry a reciprocatory frame 125 connecting and pivotally mounted on the upper ends of the levers and carrying undercut vertical guides 126 (Fig. 9) fast on the inner face of said frame. A post 127 vertically slidable between said guides carries a toothed feed dog 128 (Fig. 8) fast on the top of the post. The frame is steadied against lateral tilting on the levers 121 and 122 by means of a cradle piece 129 formed on the rear of the lower edge of the frame 125 and passed under the loop taker and pivotally secured to the upper end of an arm 130 fast on the shaft 120. A rearwardly pointing oscillating arm 132 fast on the pressure rock shaft next to the supporting lever has pivotally connected to its free end a link 133 linking said arm to the post 127 whereby when the rock shaft is rocked the post and feed dog are vertically reciprocated.

A forwardly projecting supporting arm 135 (Figs. 4 and 17) is mounted fast on right hand end of the feed rock shaft near the standard. An inverted yoke lever or U-lever 136 pivotally mounted at the mid-part of its yoke 137 to the free end of said supporting arm 135 comprises long front and short rear parallel arms 138 and 139 provided at the right hand face with a pair of parallel contact lugs 140 and 141 engaging an eccentric cam 142 fast on said main shaft 48 to give vibratory movement to said long arm 138. Said long arm 138 projects into the standard 22 and carries on its upper end a roller 145 disposed adjacent to the inner wall 146 of the standard.

A guide frame 147 intermediately pivotally mounted against the inner wall of the standard on a pivot bolt 150 is provided with a lower transverse inclined arcuate slot 151 receiving said roller 145 to give up and down movement to the yoke lever and the supporting arm 135. Said guide frame also has an upwardly extending arm 152 disposed against said wall and having an out-turned tooth 153 engaging threads of an adjusting worm 155 having bearing ends 156 and 157 rotatably mounted in the front and rear walls 158 and 159 of the standard. The front

projecting end 156 of said worm carries fast thereon a feed regulating head 160 which may be rotated to change the angle of said arm and slot thereby to change the amount of up and down movement of the roller, the yoke lever and said supporting arm, and consequently the amount of front to rear movement of the frame 125 and the feed dog 128.

A rightwardly castellated collar 165 fast on an intermediate part of the main shaft 48 meshes with the castellations 166 of a castellated clutch gear 167 loosely rotatably and slidably mounted on said main shaft and provided with a friction flange 168 between its gear teeth and said castellations 166. A spring 170 between the gear 167 and the web 45 yieldably holds the gear in clutch. A motor carrying frame 171 (Fig. 5) provided with a pair of forwardly projecting lugs 172 having annular projections 173 engageable in annular bearing grooves 174 of the webs and movable leftwardly therefrom, for detaching the motor frame, is also provided with a pair of short bearing lugs 175 and 176 between said pivoting lugs.

A bolt block 177 detachably secured by a screw 178 between the left hand lug 176 and the adjacent web prevents said leftward movement and thus holds the motor in place. This block is detached if the motor frame is removed. A countershaft 180 (Fig. 4) rotatably mounted in said lugs 175 and 176 carries a worm wheel 181 and also a pinion 182, the latter meshing with said clutch gear 167. A horizontal motor magnet frame 185 carried in said motor frame 171 carries therein an elongated high speed armature 186 having a frontwardly disposed commutator 187 and an armature shaft 188 rotatably mounted in the yoke pieces 189 and 190 of the magnet frame. A worm 191 on said armature shaft meshes with the worm wheel 181. As the frames 171 and 185, the yoke pieces 189 and 190, the shaft 188, the armature 186, pole pieces 192 and field coils 193, all lie in the same plane, the height or thickness of the motor is very small.

A brush holder 195 (Fig. 21) disposed below the commutator 187 and having its ends 196 secured to said magnet frame in lower recesses 197 and 198, is provided with diametric open-ended tubular bushing holders 200 radial to the commutator and carrying insulating bushings 201 fast in said holders, said bushings carrying conducting brush holders 202 having closed outer ends. Brushes 204 and 205 mounted in said holders yieldably engage the commutator under the action of springs 206 compressed between the brushes and said closed ends.

A porcelain resistance block 207 (Fig. 5) in said carrying frame 171 to the left of the motor is provided with end tenons 208 and 209 engaging in suitable mortises of the frame. Said block carries a staggered series of contact points 210 and 211 interposed in series with resistances (not shown) disposed to the rear part of the block. Heat generated in the resistances may pass out through the ventilating opening 213 in the wall 16. A conducting stud 215 in the front end of the block carries a contactor 216 engageable with said contacts and adapted when in off-position to rest on an insulated seat 217 next to the magnet. A pair of aligned bearing lugs 219 on the right hand member of the frame 171 carry therein an arbor 220 having a squared front end 221. A foldable knee-lever 222 carries on the end thereof a key 223 adapted, when the motor has moved forward to the position of Fig. 6, to pass

through a key hole 224 and detachably fit on said squared end. The knee-lever being foldable is containable within the case as shown in Fig. 5, but in use is unfolded and hangs down as in Fig. 2. An upwardly projecting shift arm 225 (Fig. 21) carried on said arbor 220 is provided with a reduced upper end 226 on which is pivotally received an end of a shift bar disposed, without contact, in transverse grooves 228 in the upper face of the magnet frame.

Upper and lower securing plates 230 and 231 (Fig. 22) are secured above and below insulating plates 232 secured on the upper and lower faces of the contactor 216; and the plate 230 is pivotally connected, by a bolt 233, to the adjacent end of the shift bar whereby the shift bar 227 is pivotally secured to and insulated from the contactor 216. When the knee-lever is shifted, the contactor is moved to stop and start and regulate the speed of the motor. A spring 235 yieldably moves the contactor to off-position.

An insulated conductor 240 (Fig. 21) connects said conducting stud 215 with the adjacent brush 204, passes through a channel 242 in the bottom of the block and the adjacent lower transverse recess 243 of the magnet frame. Insulated cables 245 (Fig. 21) and 246 (Fig. 5) connected to the other brush 205 and the end contact 210 pass to the right hand edge of the frame 171 where they are joined at 247 and may be coiled and stored in the case or may be passed out through a notch 248 (Figs. 5 and 6) in the right hand end wall of the case to a suitable electric socket or other source of current. The perforations 249 (Figs. 12 to 14) are for the reception of the cable 246.

A horizontal clamping frame 250 secured on the right hand member of the motor carrying frame 171 is provided with a longitudinal slot 251 disposed in a plane transverse to and extending nearly to the main drive shaft. In said slot there is disposed a headed clamping screw 252 (Figs. 4, 15 and 16) received in an upright internally threaded tubular post 253 of an anchor pedestal 254 anchored by bolts 255 to the bottom of the case and forming laterally extended base members.

A pair of intermediate pieces 257 formed on the web 42 in the feed mechanism housing rest on said base members of the pedestal and under said clamping frame 250 when the machine head is in operative position (Fig. 15), and are adapted to slide off from said pedestal when the machine head is moving to folded position (Fig. 16). Said clamping screw 252 with its head 260 engaging on top of the clamping frame 250 is adapted to clamp said pieces (Fig. 15) between the frame 250 and the pedestal 254, thereby to hold the motor rigid with the machine head and the case.

A slidable tube 265 (Figs. 4, 18 and 19) parallel to the main shaft 48 and slidably mounted in a lug 266 and an extension 267 of the web 46 carries bearing bushings 270 in its ends in which bushings is rotatably mounted a bobbin winding spindle 271 provided with a split outer bobbin-receiving end 272 projecting a bobbin length from the tube in alignment with an opening 273 in the end wall 17. Collars 275 on the spindle engaging opposite ends of the tube hold the spindle in the tube. An upwardly disposed shift-arm 276 fast on the outer end of the tube has a back-turned projection 277 (Fig. 18) projecting through a rear-wall slot 278 and provided with a vertical manipulating cross-arm 280, whereby said tube may be shifted until the split end 272

projects from the case through the opening 273 to receive the bobbin to be wound.

A friction disk 281 (Figs. 4 and 12) fast on the inner end of the spindle thus comes in contact with said friction flange 168 of the clutch gear 167, whereby the winding spindle is rotated by said flange and said clutch gear 167 moved, against the spring 170, out of clutch with the castellated collar 165 to permit the stitch forming and feed mechanism to remain at rest while the bobbin is being wound.

A flat spring 282 (Fig. 18) mounted on the inner face of said cross-arm 280 and engaging the back wall 159 of the standard yieldably forces said shift arm 276 into one of the notches 284 or 285 (Fig. 19) on the inner face of the back wall at the limits of movement of the shift arm, thereby to hold the shift arm against accidental movement for operative or inoperative position.

The machine is disposed as in Fig. 1 for carrying by the handle 37, but it may be placed in any position, when thus closed, for storing or transportation.

When the machine is to be operated, it is placed with the bottom 11 on a table or the like; the bracket piece 34 is moved to the position of Fig. 2 to uncover the ventilating opening 213; the main cover board 35 is then opened, as in Fig. 2, to rest on the bracket piece 34; the front bed plate 30 is opened and moved far forward, the screw clamp 284 (Fig. 5) is removed, and the clamping frame bolt 252 is loosened so as to raise the head from the clamping frame 250. Next the operator, with his fingers against the lower edge of the arm 23, raises the machine head to the position of Figs. 3 and 4 by pivotal movement on the hinges 25.

As the distance from the hinge 25 to the diagonally opposite edge of the feed support is greater than the depth of the case, the hinge 25 has to rise, which it can do by the pivotal movement of the rear bed plate 18 on the hinges 19. After the machine is in the position of Fig. 4, but while the front bed plate 30 is still open, the clamping bolt 252 is screwed home thus clamping the clamping head, the clamping frame and the motor frame together, to firmly anchor the machine head in place.

Next the front bed plate 30 is closed to the position of Fig. 3 and secured by the button 295 (Figs. 4 and 6). Then the knee-lever is unfolded and the key placed on the squared end 221 with the knee-lever hanging down near the operator's knee.

Before commencing to sew, the machine may be clamped to a table or the like by means of the screw clamp 284 engaging over the front bed plate 30 at a point over the front right hand corner of the magnet frame, which will then be positioned as in Fig. 6, and furnish a backing for the front bed plate.

Before threading up the machine the spool bracket may be moved from the dotted line position of Fig. 20 to the solid line position.

The feed regulating head 160 is adjusted to give the proper length of stitch; the lifting lever 65 raised, the work clamped under the presser foot, and the knee lever pushed to the left to force the contactor off the seat 217 (Fig. 5) into contact with first the low speed contact and then the higher speed contacts.

This brings about rotation of the main shaft, reciprocation of the needle, the take up lever and feed dog and causes the back and forward vibration of the lever arm 138 (Fig. 17) and the

downward and upward movement of the roller 145 and the supporting arm 135, depending upon the relative positions of the front and rear ends of the guide frame 147, thus rocking the supporting levers and carrying the feed dog back and forth at the same time that the arm 132 (Fig. 8) carries the feed dog up and down, thus to feed the work.

When the bobbin is to be wound, the manipulating cross-arm 280 (Fig. 18) is pushed frontwardly to release the shift arm from the inner notch 284; the cross-arm is pulled rightwardly until the shift arm seats in the outer notch 285, thus bringing the friction disk 281 (Fig. 12) against the friction flange and the clutch gear 167 out of clutch. The bobbin is slipped on the split end 272, the motor started and the bobbin wound in the usual way, after which the cross-arm is carried back to its leftward limit.

Access to the bobbin is had through a door 285 (Fig. 6) hinged at 286 and held closed by a spring pressed latch 287 movable in a bore 288 in the bed 27.

Attachments which may be carried in the base with the clamp 284 may be secured in operative position by a screw engaged in the screw hole 290.

Obviously light weight metals and materials may be used whenever practicable for the various parts of the machine, for reducing the weight of the machine as a whole.

The foregoing matter and the drawings herein are substantially as shown and described in my application Serial No. 672,613 filed November 3, 1923 and allowed November 12, 1930; and claims 1 to 9 herein were allowed in said application. Parts 10 to 19 and 25 to 36 of the drawings and the description thereof are substantially similar to matter in my copending application Serial No. 499,386 filed September 9, 1921; and claims 10 to 16 herein are allowed claims transferred hereto from this last named application. Therefore the present application is a continuation in part of my said prior applications 672,613 and 499,386.

While the scope of the invention as claimed is not limited in some of the claims to dimensions and proportions, the machine is very compact. The machine as shown, particularly in Figs. 4 to 22, has, when folded, outside dimensions substantially $10\frac{1}{4} \times 8 \times 1\frac{3}{4}$ inches, even though the under-arm space measures about 5×8 inches. Thus the machine when folded occupies a space less than one-tenth that of any other sewing machine of equal under-arm space known by me to have been described or in existence at the time said prior applications were filed.

While herein a particular type of machine has been described, the type of machine and details thereof may be greatly varied without departing from the scope of the invention as defined in the claims.

I claim as my invention:

1. A portable domestic sewing machine head comprising a rectangular sewing machine head of small maximum front to rear dimension, including a feed mechanism support, having a top bed portion, of equal small top to bottom and front to rear depth, a standard, an arm and a needle bar head; a main shaft in said support provided with an end crank having a throw smaller than said dimension; a needle lever intermediately fulcrumed on said arm; a pitman pivotally connecting the inner end of the lever and said crank; and a needle bar in said needle bar head linked to the active end of the needle lever, the dis-

5 tance of movement of the active end of said needle lever being such that said active end requires a space greater than said dimension; the space required by said end crank and the lower end of pitman in this movement being less than said depth and less than said dimension; whereby the needle may have a movement approximately as great as said dimension and all of the needle operating parts remain between the front 10 and rear planes of the head.

2. A portable domestic sewing machine comprising a combined case and base having front, back and end walls, and a flat bottom; a rectangular sewing machine head pivotally connected to said base and adapted to lie flat on said bottom or stand on said bottom and including a needle bar head; a front and rear bed plate hinged to said case and adapted to lie flat on said needle bar head when the machine head lies 15 on said bottom; a foot carried by said needle bar head; and a foot lifting lever carried by said needle bar head and normally projecting to the rear thereof when the head is upright and the foot is in raised or lowered position; said lever 20 being engageable by said front bed plate after the head and front bed plate are lowered and to be moved by said front bed plate to lie substantially between the front and rear planes of the needle bar head.

3. A portable domestic sewing machine adapted to fit in a rectangular combined case and base having narrow front, back and end walls, and a flat bottom, said head comprising a rectangular sewing machine head adapted to lie flat on said flat bottom and to snugly fit within the outline of said case, said head including a feed mechanism support having a top bed portion, a standard, an arm, and a needle bar support having its upper end joining the outer end of said arm to 30 form an angle part adapted to substantially snugly fit the adjacent corner of the case when the head lies flat on said bottom; and a needle lever, a needle bar and a take-up lever on said head, all remaining in all positions of movement within the boundaries of said head, and adapted to lie 35 within the boundaries of said case when the head lies flat therein.

4. A portable domestic sewing machine comprising a combined case and base having front and back walls, and a flat bottom; a rectangular sewing machine head pivotally connected to said base and adapted to lie flat on or stand on said bottom and including a feed mechanism support having a top bed portion, a standard, and an arm 40 disposable against said front wall; a bed plate hinged to said case and adapted to lie in position to be flush with said top bed portion when the machine head is in upright operative position, and to lie flat on said head and arm when 45 the head lies on said bottom; and a spool spindle pivoted on the machine arm and disposable above said arm, and engageable by said bed plate as the head is lowered into the case, to force the spindle out of the way of said front wall.

5. A portable domestic sewing machine head comprising a feed mechanism support, a standard, an arm disposed a distance above said support; the front to rear depth of said feed mechanism support being less than one-fourth as great as 50 said distance; and a feed mechanism at all times within the boundary of said support and comprising parallel rock shafts in the bottom of said support; parallel supporting levers mounted respectively loose and fast on said rock shafts, 55 and movable within said depths; a reciprocatory

frame pivotally mounted on the upper ends of the supporting levers; a post slidable on said frame; a feed dog on the post, and an oscillating arm fast on the rock shaft of the loosely carried lever and linked to the post.

6. A portable domestic sewing machine head including a feed mechanism support having a top bed portion and a hollow standard; the front to rear and top to bottom depth of said support, and the front to rear depth of said head as a whole when upright being small; a feed mechanism entirely within said support and standard and including a feed rock shaft in the lower rear part of said support; a main shaft in said support; a forwardly extending supporting arm 10 on the feed rock shaft; a yoke lever pivotally mounted at its yoke to the supporting arm and comprising long and short parallel arms; a cam fast on said main shaft between said arms; a roller on the upper end of the long arm; a guide frame adjustably pivotally mounted on the inner wall of the standard and provided with a slot receiving said roller.

7. A portable domestic sewing machine comprising a sewing machine head including a feed mechanism support, a standard and an arm; a main shaft in said feed mechanism support; a horizontal magnet frame comprising poles and yokes all in the same plane with the shaft and 15 pivoted co-axial with said shaft, and movable into the plane of the head and an armature in said magnet frame in said same plane having a diameter approximately equal to the depth of said frame and having an armature shaft rotatably mounted in said magnet frame and operatively connected and perpendicular to said main 20 shaft.

8. A portable domestic sewing machine comprising a rectangular case and base having front, back and end walls and a thin bottom adapted to rest directly on a table or the like; a sewing machine head including a flat bottomed feed mechanism support having a top bed portion, a standard, an arm disposed a distance above said support and a needle bar head; means whereby 25 said head is pivotally connected to said case and is adapted to lie or stand directly on said bottom; a main shaft in said feed mechanism support; a horizontal magnet frame comprising poles and yokes all in the same plane with the base and pivoted co-axial with said shaft and lying on said thin bottom; an armature in said magnet frame in said plane having an armature shaft rotatably mounted in said magnet frame and operatively 30 connected to said main shaft; means carried by said frame and said bottom adapted to clamp said head, motor and bottom together and thereby to hold said head directly on the bottom in standing or lying position; and a front bed plate hinged to said case in position to be flush with 35 said top bed portion and to lie on said magnet frame when the machine is in operative position.

9. A portable domestic sewing machine head including a rectangular sewing machine head including a feed mechanism support having a top bed portion, a standard disposed against one end wall of the case; an arm disposed a distance above said support; said head being adapted to lie flat or stand; the front to rear depth of said head as a whole when upright being small; a main shaft 40 longitudinally disposed in said feed mechanism support; a horizontal motor adapted to lie in a plane perpendicular to the head and pivoted co-axial with said shaft between said standard and needle bar head and having an armature shaft 45

- connected to said main shaft; a bobbin shaft parallel to the main shaft and adapted to project exterior to the head; and clutch means normally connecting the armature shaft to the main shaft and adapted to disconnect it from the main shaft and connect it to the bobbin shaft.
10. A portable sewing machine comprising a head including a feed mechanism support having a top work face, a standard on said support, and an arm disposed a normal distance above said support; a bed member connected to said head and disposable in the plane of said work face to form a continuation thereof, and movable to folded position close to said head substantially contacting against said support, standard and arm of the head; the maximum front to rear depth of said head as a whole and of said machine as a whole, when upright and in folded position, being small relative to said normal distance.
11. A portable sewing machine comprising a combined case and base having front, back and end walls, and a thin bottom adapted to rest on a table or the like; a sewing machine head adapted to lie flat on or stand on said bottom and including a feed mechanism support having a top bed portion, a standard, an arm disposed above said support and a needle bar housing all of equal front to rear dimensions, when the head is upright, substantially equal to the height of said wall; and front and rear bed plates hinged to said case and adapted to lie in position to be flush with said top bed portion when the machine head is in upright operative position, and to lie flat on said head when the head lies on the bottom.
12. In combination, a combined case and base having a thin bottom, and front, back and end walls; a sewing machine head comprising a feed mechanism support having a top bed portion, a standard, an arm disposed a normal distance above said support, and a needle bar housing all of small front to rear dimensions when the head is upright about equal to the depth of the case; means for hinging the feed mechanism support to the case, whereby the machine head may assume lying position on said bottom or move to standing position supported directly and entirely on and by said bottom; a bed plate adapted to lie on said machine head when closed or disposable substantially flush with said top bed portion to form a continuation thereof when the machine head is in upright position; and means for locking said support to said bottom when the head is upright.
13. In combination, a combined case and base having a front, back and end wall, and a thin bottom adapted to rest on a table or the like; a sewing machine head including a feed mechanism support having a top bed position, a standard, an arm disposed a normal distance above said support and a needle bar housing all of small equal front to rear dimensions relative to said distance; means whereby said head is connected to the case and is adapted to lie or stand in the case; and a bed plate hinged to said case in position to be flush with said top bed portion when the machine is in operative position, the top to bottom depth of said support, when the machine head is upright being substantially equal to the depth of said case.
14. In combination, a combined case and base having a bottom, and front, back and end walls; a rear bed plate hinged to the upper part of said case; a sewing machine head comprising a feed mechanism support, a standard, an arm, and a needle bar housing; the upper rear part of said feed mechanism support being hinged to the forward edge of said rear bed plate, whereby the machine head may assume lying position on said bottom or move to standing position; and a front bed plate adapted to lie over said machine head when closed or disposable flush with said support when the machine head is in upright position.
15. In combination, a combined case and base having a bottom, and front, back and end walls; a rear bed plate secured to the upper rear part of said case; a sewing machine head comprising a feed mechanism support having its upper part hinged to the forward edge of the rear bed plate, whereby the machine may lie or stand on said bottom; a front bed plate movably secured to the top of the front wall of the case, and adapted to lie on said machine head, when closed, or flush with the top of the feed mechanism support when the machine head is in operative position; a bracket piece hinged at one of the end walls of said case; and a cover board hinged to the top edge of said end wall and adapted to lie against said bed plates when closed or against said bracket when in outer position.
16. In combination, a case; a sewing machine head adapted to lie in the case or to stand therein and comprising a feed mechanism support, a standard, an arm and a needle bar housing all of substantially equal front to rear dimensions and forming a frame containable within the case; a feed mechanism drive means in part lying in said case when the machine is in operative position, and between the arm and support when the head lies in the case.
17. In a portable domestic sewing machine, the combination of a head comprising a feed mechanism support having a top bed portion, a standard on the end of said support, an arm on the standard, and a needle bar support on the arm; all parts of said head being disposable, when the head is upright, substantially within the space between upright planes determined by the rear planes of said standard and needle bar support and the front planes of the standard and arm; and a bed member disposed relative to said head, when in use, substantially in the plane of said top bed portion, and relatively movable toward said space at least as far as a position in which a broad face of said bed member is substantially in contact with said space.
18. In combination, a sewing machine head comprising a feed mechanism support having a bed, a standard, an arm, and a needle bar support; and a motor for the head disposed below said bed when the machine is operative, and disposable, when the machine head is upright, entirely between said arm and the bottom of the head and between the standard and the needle bar support.
19. In combination, a machine head having a longitudinal main shaft in its lower part; a frame pivoted coaxial with said main shaft; and means for clamping said frame perpendicular to the plane of the arm, standard and needle-bar housing of said head.
20. A portable domestic sewing machine comprising a rectangular case and base having front, back and end walls, and a flat bottom; a sewing machine head including a feed mechanism support having a top bed portion, a standard, an arm, and a needle bar housing; one of the end walls adjacent to said needle bar housing having a ventilating opening therein; means where-

by said head is pivotally connected to said case and is adapted to lie or stand on said bottom; bed plates hinged to said case in position to be flush with said support when the machine is in operative position; a main shaft in said feed mechanism support; a horizontal motor in the base and of less depth than the base and pivoted co-axial with said shaft and having an armature connected to said main shaft; a resistance for said motor adjacent to said motor in the plane of the motor and near said ventilating opening; a bracket piece hinged at one end of said wall with the opening therein and adapted to cover or uncover said opening; and a cover board hinged to the top edge of said end-wall and adapted to lie against said bed plates when closed or against said bracket when in outer position.

21. A portable sewing machine comprising a combined case and base having front, back and end walls, and a thin bottom adapted to rest directly on a table or the like; a sewing machine head adapted to lie or stand on said bottom, including a feed mechanism support, a standard, an arm disposed a normal distance above said support and a needle bar housing all of substantially equal front to rear dimensions about equal to the depth of the case; and bed plates secured to said case in position to be flush with said top of said support when the machine head is in upright operative position, and to lie on the head when the head is on said bottom; said head being free of any fly wheel, whereby said standard may engage flat against said bottom, bed plates and an end wall simultaneously.

22. In combination, a base; a machine head receivable in said base or disposable in operative sewing relation on the base; and a foot-lifting lever projecting from said head and movable by said base into the space between the front and rear planes of the head.

23. In combination, a machine head including a standard and a main shaft in the lower part of the standard; a frame pivoted co-axial with the main shaft; a motor on said frame and operatively connected to said main shaft.

24. In combination, a frame; a machine head disposable in operative sewing relation on the frame and including a standard and a main shaft at the lower part of said standard; a gear mounted on said main shaft for rotating the main shaft; means for pivoting said frame on an axis co-axial with the main shaft; a motor on said frame; and drive means between said motor and said gear; and means locking the head and frame at right angles to each other.

25. In combination, a machine head including a feed mechanism housing; a magnet frame pivoted to said housing; an armature in said magnet frame having an armature shaft rotatably mounted in said magnet frame and operatively connected to said mechanism; the armature shaft, the yokes and poles of the magnet frame lying in the same main plane disposable in the plane of the head.

26. In combination, a combined case and base; a machine head receivable in said case in the main central plane of the case or disposable in operative sewing relation on the base, and including a feed mechanism housing; a main shaft in said housing; a magnet frame pivoted co-axial with said shaft comprising poles and a yoke all substantially in the same plane with the main central plane of the case; and an armature in said magnet frame in said same plane having an armature shaft rotatably mounted in said mag-

net frame and operatively connected to said main shaft.

27. In combination, a combined case and base having an opening in an end wall of the case; a lid for the base and openable over the space just exterior to said opening; a machine head snugly receivable in said base or disposable in operative sewing relation on the base; and a motor having a resistance adjacent to said opening.

28. In combination, a standard carrying an arm and a needle bar support; a needle bar in said support; means for operating said bar including a shaft at the lower part of the standard parallel to said arm; feed and stitch forming mechanisms cooperating with said needle bar and driven by said shaft; a frame pivoted for movement in a plane radial to said shaft; and means for locking said standard upright relative to said frame.

29. A sewing machine head comprising a lower mechanism housing having a bed; a loop taker beneath the bed; a bobbin winding member normally in said housing; a longitudinal drive shaft in the housing below said bed operatively connected to the loop taker; a motor beneath said bed; and means operatively connecting the motor with said shaft and member.

30. A sewing machine head comprising a lower mechanism housing having a bed thereon; feed and stitch forming mechanism in said housing including a loop taker and a longitudinal drive shaft for driving the loop taker and said mechanism; a bobbin winding member in said housing; a motor beneath the bed; means beneath the bed for operatively connecting the motor with said member and shaft; and means for disconnecting the drive shaft from the motor.

31. In combination, a machine head including a feed mechanism housing; a main shaft in said housing; a clutch collar fast on the main shaft; a gear loosely mounted on said main shaft; means holding the gear in clutch with the clutch collar; bobbin winding means for moving the gear out of clutch and rotated by the gear; a motor and an operative connection between said motor and said gear.

32. In combination, a machine head including a feed mechanism housing; a main shaft in said housing; a clutch collar fast on the main shaft; a clutch gear longitudinally slidable on said shaft and to clutch with and unclutch from said collar; a spring holding the gear in clutch with the collar; means for moving the gear out of clutch; and a motor operatively connected to said gear for driving the gear.

33. In combination, a sewing machine head; and a bobbin winder shaft entirely within the frame of the head and having a bobbin-receiving end adapted to be projected from the head.

34. In combination, a sewing machine head having a needle bar housing; and a support for said head pivoted to said head on an axis between the front and rear planes of the housing, and movable to a position substantially parallel to the plane of the head.

35. In combination, a sewing machine head; and a member cooperating with the head to form a support for said head, said member being disposable entirely in the space between the front and rear planes of the head, and movable to a position in part exterior to said space.

36. In combination, a case having a thin flat bottom; a sewing machine head adapted to stand on said bottom; a motor frame connected to said head and adapted to lie on said bottom; said mo-

tor frame being disposable entirely within the space between the front and rear planes of the head, and movable to a position in part exterior to said space to cooperate with the lower part of the head to maintain the head in position.

37. In a portable domestic sewing machine, the combination of a head comprising a feed mechanism support, a standard on the end of the support, an arm on the standard, and a needle bar support on the arm; all parts of said head being disposed, when the head is upright, substantially within the space between two upright front and rear planes, the rear plane being determined by the rearmost faces of said standard and needle bar support, the front plane being determined by the front faces of the standard and arm; and a bed member disposed relative to said head, when in use, substantially in the plane determined by the top face of said mechanism support; said bed member being movable toward said space at least as far as to a position in which all of a broad face of the bed member is substantially in contact with said space.

38. In combination, a sewing machine head comprising a feed-mechanism housing, a standard thereon, an arm on the standard and a needle bar support carried by the arm over an extreme end of said housing; a feed dog at the extreme end of said housing; a rotary shuttle closely adjacent to the feed dog between the dog and the standard; a casing in which said head is pivotal to lie or stand and having one end wall almost in contact with said dog and standard respectively; said housing having a top bed portion; and a cover hinged to the end wall adjacent to the dog and disposable over the head when the head lies, and horizontally disposable in the plane of the bed when the head stands; the hinged end of the cover being almost in contact with the dog.

39. In combination, a combined case and base having a substantially vertical end wall having an opening therein; a lid for the base and openable to a position above said opening, thereby to prevent work cloth from closing said opening; a machine head snugly receivable in said base or disposable in operative sewing relation on the base; a motor having rheostat resistance adjacent to said opening.

40. In combination, a combined case and base; a motor movably mounted in the base; a machine head driven by and movable relative to the motor and receivable entirely in said base or disposable in operative sewing relation on the base; and a releasable clamp for clamping the base, the head and the motor together in contact with each other.

41. In combination, a drive member and a driven member, coaxial with each other and longitudinally slidable relative to each other; stitch mechanism driven by the driven member; a winder adapted to be driven by the drive member; and means operated by said winder for connecting said members when one of said members is moved as a whole relative to the other member as a whole in one direction and disconnecting them when the relative movement is in the opposite direction.

42. In combination, a sewing machine head having a bed and a mechanism housing beneath the bed; a pair of coaxial rotary members in said housing, the members being longitudinally slidable relative to each other, one member being within the other, one member being supported throughout the major part of its length by the other; a motor driving one of said members; a

loop taker driven by the other member; one of said members being provided with a recess at one end, the other being provided with a projection fast and rigid thereon engageable in the recess to clutch said members together, to cause the motor to drive the loop taker; one of said members as a whole being longitudinally movable relative to the other member to effect removal of said notch from said projection thereby to declutch said members from each other to permit rotation of the motor-driven member while the other member and the loop taker are at rest; and bobbin winding means normally within said housing and adapted to be rotated by the motor-driven member while the members are declutched, for winding a bobbin while the loop taker is at rest.

43. In a sewing machine, an actuating shaft, an electric motor having a shaft, gearing connecting said motor shaft to said actuating shaft and including a gear, coaxially rotary on said actuating shaft, and slidable on said actuating shaft for disconnecting said shaft of said motor from said actuating shaft, a bobbin winder, means for sliding said gear and connecting said bobbin winder to said motor.

44. In a sewing machine, a bed, an actuating shaft and an electric motor beneath said bed, said motor having a shaft, gearing connecting the motor shaft to said actuating shaft, said gearing including a gear coaxial on and rotary on said actuating shaft and slidable for disconnecting said motor shaft from said actuating shaft, a bobbin winder, means for connecting said bobbin winder to said motor whenever said motor shaft is disconnected from the actuating shaft.

45. A portable sewing machine comprising a frame including a standard, an arm thereon, and a feed mechanism support carrying the standard and including a bed portion, transverse members and connecting members; said standard, said bed portion and said members comprising a one-piece integral unitary structure; said transverse and connecting members forming a recessed space open at the under side; work feeding and stitch forming mechanism mounted in said frame; a flat base on which said mechanism support rests, with certain of said transverse and connecting members in engagement with the base; a motor mounted over said base, adjacent thereto and having a rotary part extending into said recessed space; a sewing machine drive shaft journaled in said mechanism support; and means connecting the rotary part with the drive shaft.

46. In a portable sewing machine, the combination of a head comprising a feed mechanism support having a top bed portion, a standard on the end of the support, an arm on the standard, and a needle bar support on the arm; a bed member; means connecting the bed member to the head and disposing the bed member relative to said head, when in use, substantially in the plane determined by the top face of said bed portion; said bed member being movable substantially into contact with the space directly under said needle bar support when upright.

47. In a portable sewing machine, the combination of a head comprising a feed mechanism support having a top bed portion, a standard on the end of the support, an arm on the standard, and a needle bar support on the arm; a bed member; hinge means pivotally connecting the bed member to the needle-end edge of the bed portion and disposing the bed member relative to said head, when in use, substantially in the

plane determined by the top face of said bed portion; said bed member being movable substantially into contact with the space directly under some part on said needle bar support when upright.

48. A portable sewing machine comprising a frame including a standard, an arm thereon, and a feed mechanism support carrying the standard and including a bed portion, supporting portions and connecting members; said standard, said portions and said members comprising an integral one-piece structure; said portions and connecting members forming a recess space in part open at one side; work feeding and stitch forming mechanism mounted in said frame; a flat base on which said mechanism support rests, with certain of said portions and connecting members in engagement with the base; a motor mounted over said base, adjacent thereto and having a rotary part extending into said recessed space; a sewing ma-

chine drive shaft journaled in said mechanism support; and means connecting the rotary part with the drive shaft.

49. A portable sewing machine comprising a frame including a hollow bed portion open at its underside and including a work and needle receiving top plate, a completely operative work feeding and stitch forming mechanism mounted in said frame, a base member on which said bed portion directly rests and to which it is detachably secured, a motor mounted on said base member and having a motor shaft extending into the hollow space in said bed portion, said hollow space and the motor frame extending upwardly from said base member as far as the level of the bottom of said top plate, a sewing machine drive shaft journaled in said bed portion, and means connecting the motor shaft to the drive shaft.

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