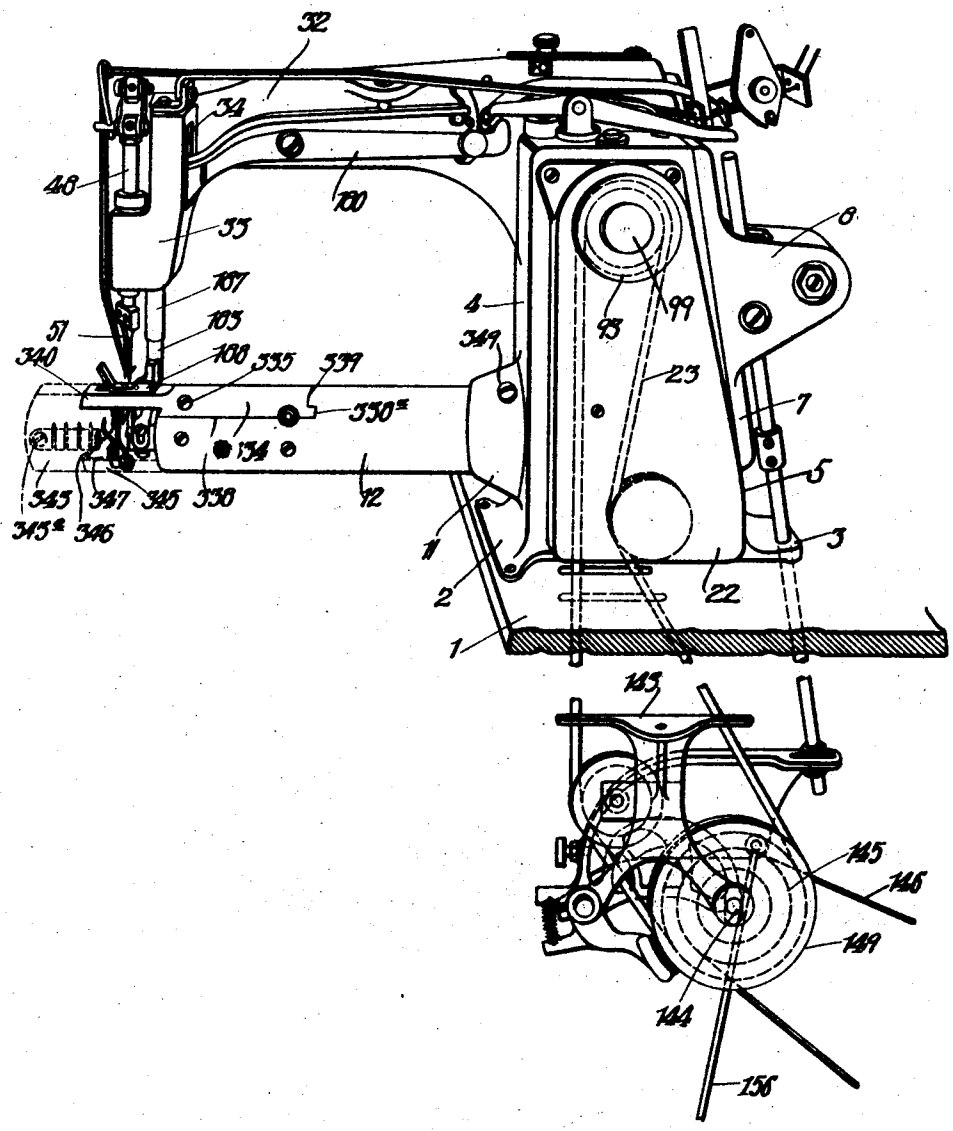
April 20, 1926. 1,581,498

J. P. WEIS

SEWING MACHINE

Original Filed June 28, 1921 5 Sheets-Sheet 1.

Fig. 1.



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April 20, 1926. 1,581,498

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SEWING MACHINE

Original Filed June 28, 1921 5 Sheets-Sheet 2

Fig. 2.

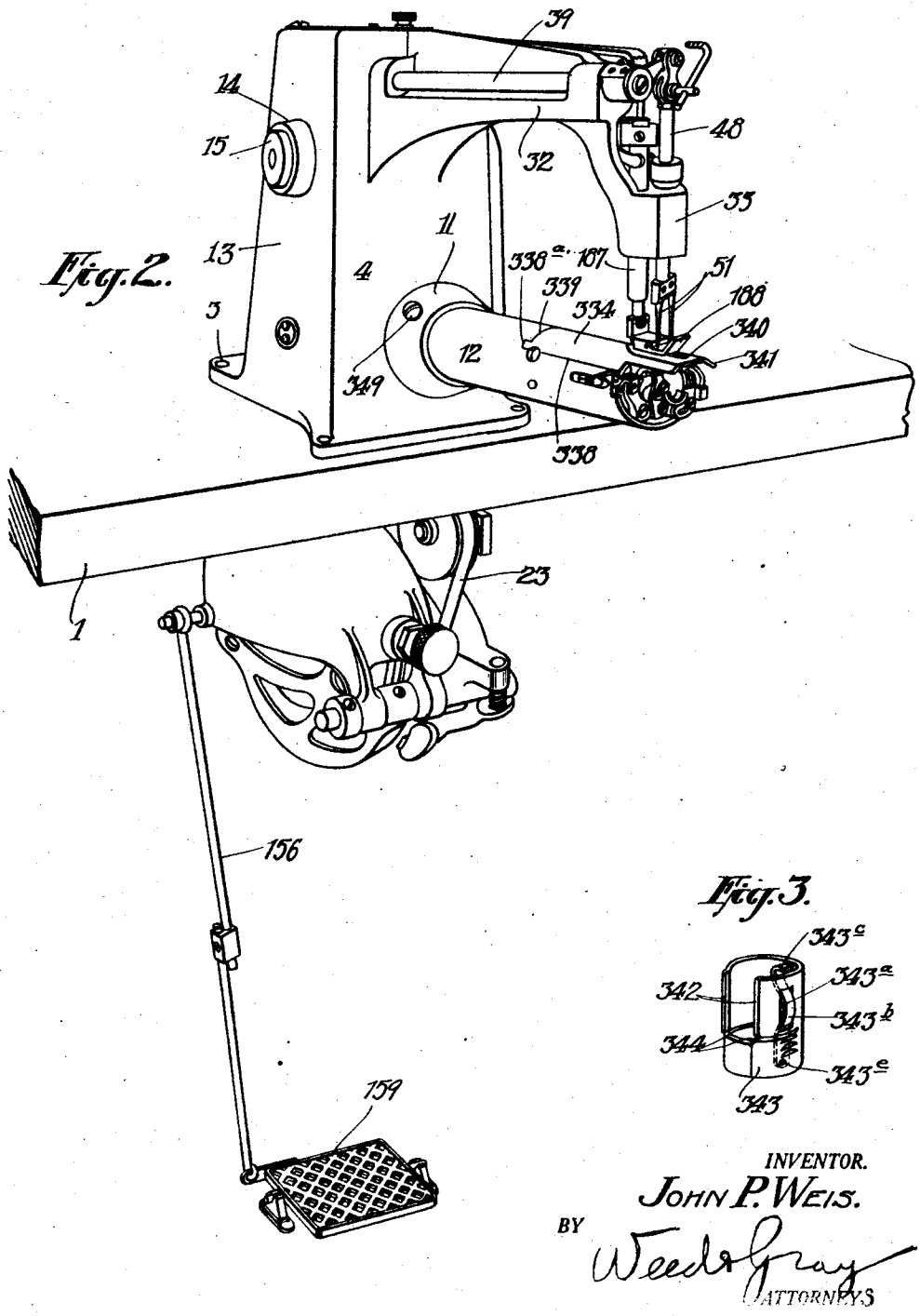


Fig. 3.

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SEWING MACHINE

Original Filed June 28, 1921 5 Sheets-Sheet 3

Fig. 4.

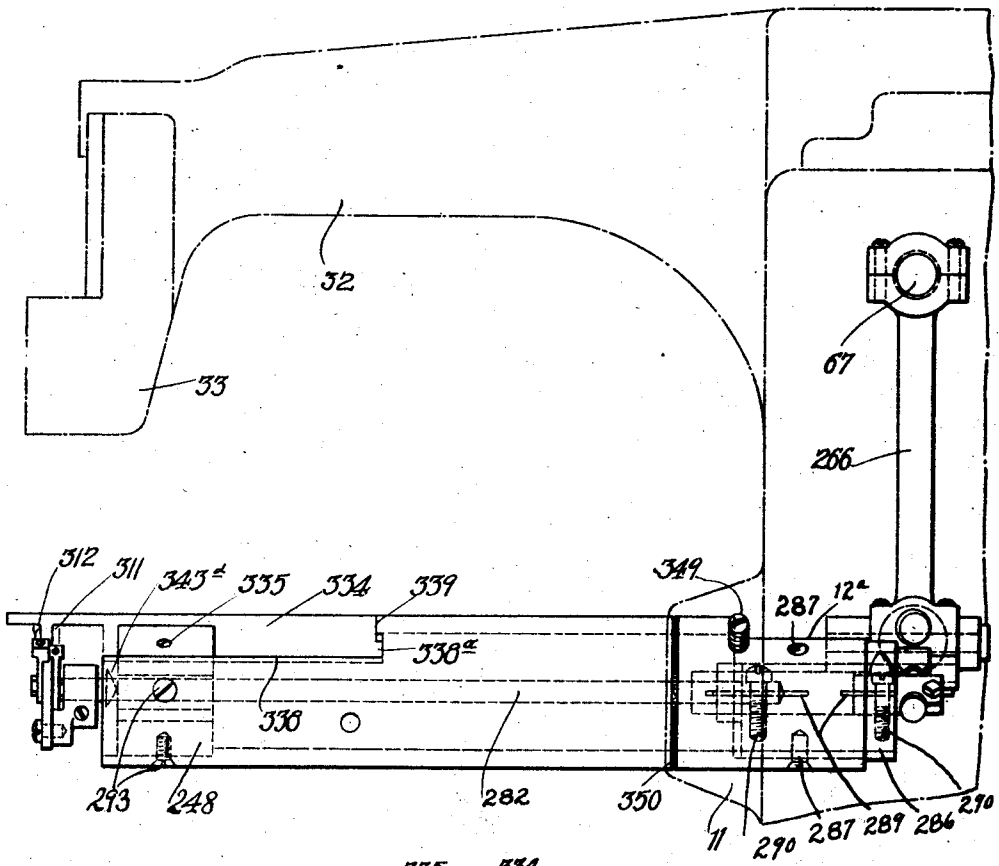
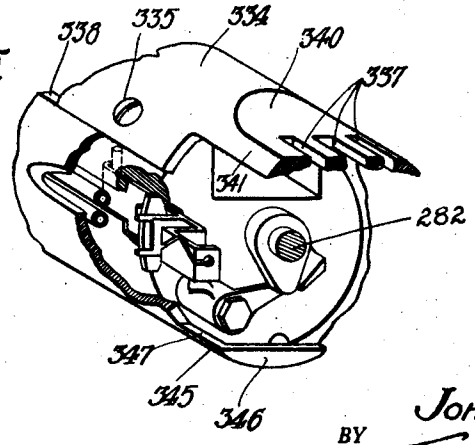


Fig. 5.



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SEWING MACHINE

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Fig. 6.

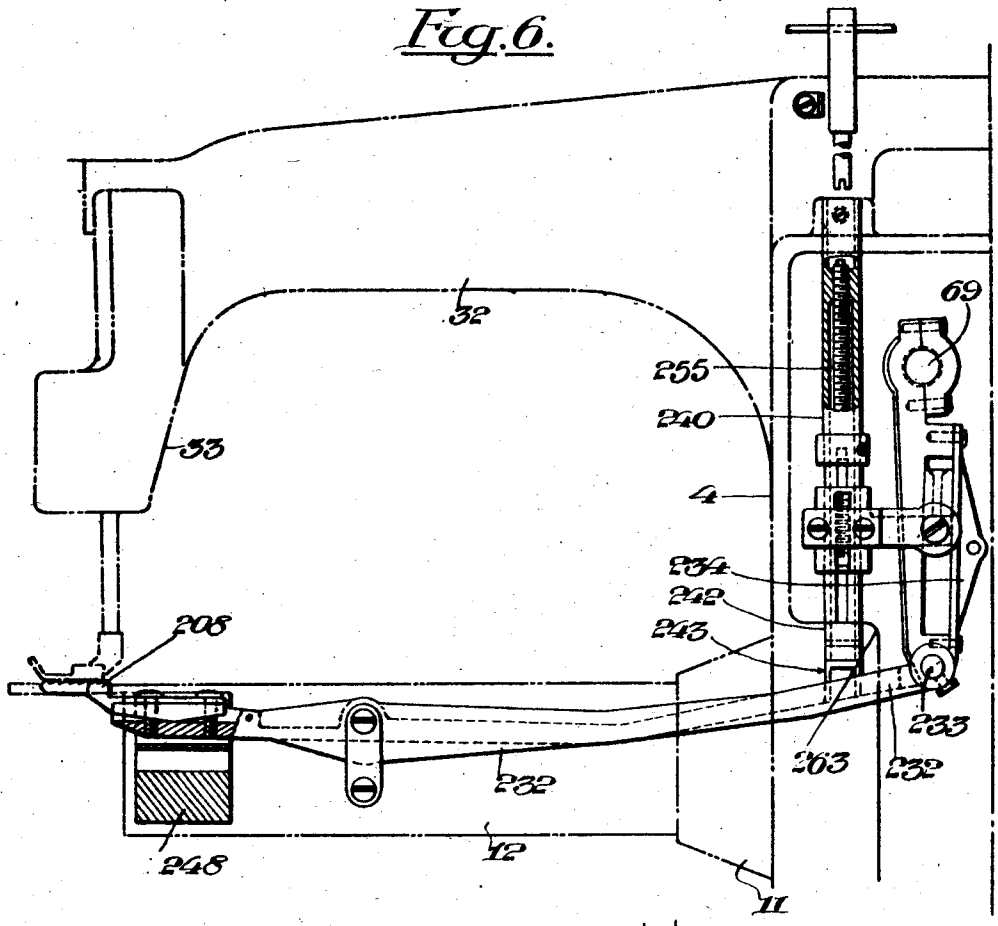
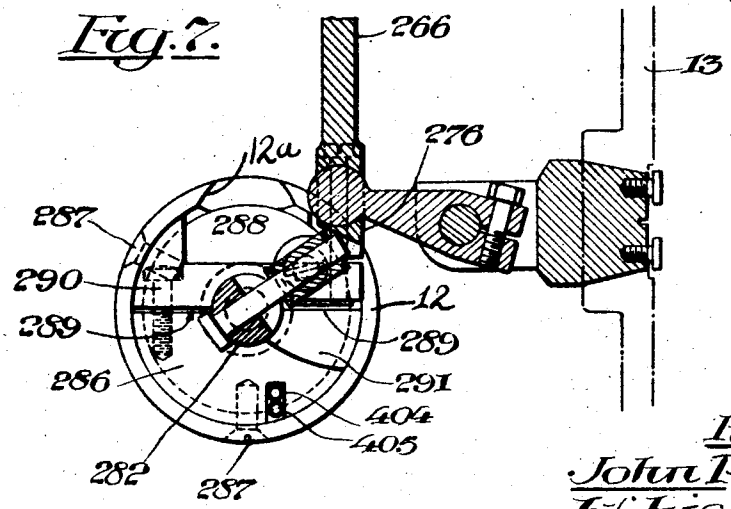


Fig. 7.



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April 20, 1926. 1,581,498

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SEWING MACHINE

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Fig. 8.

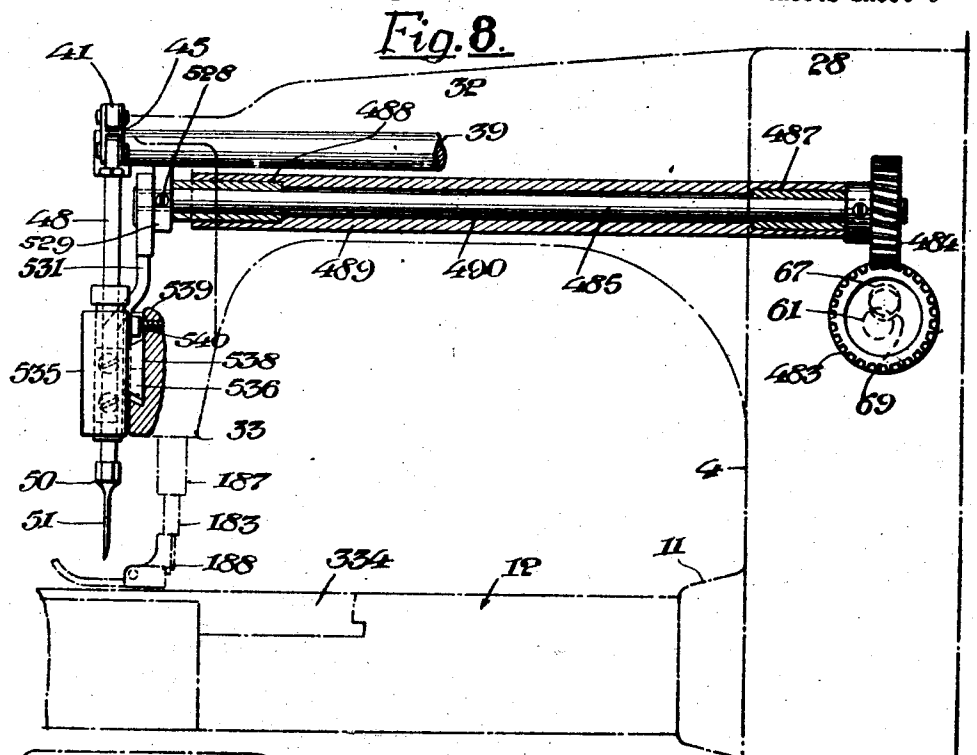


Fig. 9.

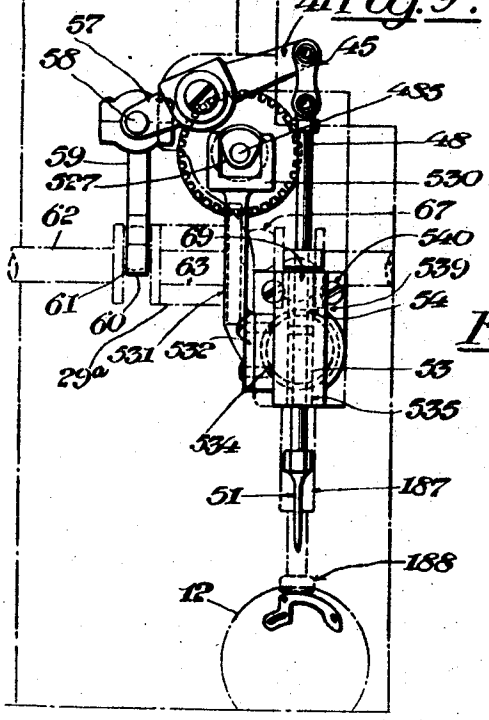
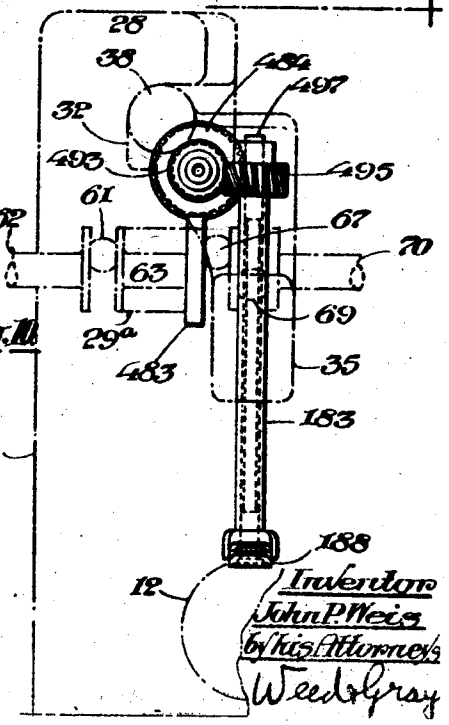


Fig. 11.



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Patented Apr. 20, 1926. 1,581,498

UNITED STATES PATENT OFFICE.

JOHN P. WEIS, OF NYACK, NEW YORK, ASSIGNOR TO METROPOLITAN SEWING MACHINE CORPORATION, OF NYACK, NEW YORK, A CORPORATION OF DELAWARE.

SEWING MACHINE.

Original application filed June 28, 1921, Serial No. 481,032. Divided and this application filed October 31, 1923. Serial No. 671,874.

To all whom it may concern:

Be it known that I, JOHN P. WEIS, a citizen of the United States, residing at Nyack, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Sewing Machines, of which the following is a specification.

This invention relates to sewing machines, an object thereof being to provide an improved construction of machine frame, tubular work arm and overhanging arm, which will be relatively cheap, simple and stronger in construction. The invention embodies an improved tubular work arm supported in an improved manner by the machine frame, and lighter, stronger, smaller in size than heretofore, and at the same time uniform in size, the work arm being adapted to house and support various mechanisms such as the feed and thread control mechanisms. The invention also includes the provision of an improved overhanging arm in which a steel tube is integrally cast into the arm, this construction having important advantages, especially in mounting an operating shaft therein.

This application is a division of my copending application for sewing machines filed June 28, 1921, Serial No. 481,032.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification, wherein like reference characters indicate corresponding parts in the several views, and wherein Fig. 1 is a side elevation of the machine with the end cap or cover of the looper mechanism shown in dotted lines, and the transmitter shown in operating position under the machine, but detached from the work table to more clearly illustrate the relation of the transmitter with the sewing machine; Fig. 2 is a front perspective view of the sewing machine, transmitter and treadle connected for operating the same; Fig. 3 is a perspective view of the end cap for covering the looper and thread controlling mechanisms; Fig. 4 is a side elevation illustrating the forwardly extending cylinder and also showing a part of the machine frame and the overhanging arm diagrammatically; Fig. 5 is a fragmentary perspective view of the end of the cylinder, showing a portion of the throat plate and looper thread control means supported within the cylinder; Fig. 6 is a side elevation showing the frame and work support and the feed mechanism; Fig. 7 is an end elevation of the cylinder and the looper actuating mechanism; Fig. 8 is a side elevation illustrating the construction of the overhanging arm of the machine frame; Fig. 9 is an end elevation carrying the needle vibrating mechanism; and Fig. 10 is an end view showing operating means for the cross stitch mechanism.

Before explaining in detail the present improvement and mode of operation thereof, I desire to have it understood that the invention is not limited to the details of construction and arrangement of parts which are illustrated in the accompanying drawings, since the invention is capable of other embodiments, and that the phraseology which I employ is for the purpose of description and not of limitation.

Referring to the drawings it will be seen that the present machine is mounted upon a suitable table 1 and comprises a machine frame of special construction having flanges 2 and 3 for supporting and securing the machine to the table. The main portion of the frame is preferably of hollow rectangular construction, closed at the bottom, and having a front wall 4 and a rear wall 5 provided with an opening adapted to be closed by means of a cover plate 7 attached thereto in any suitable manner. This cover plate is provided with a hollow projecting portion 8 within which operates a stop lever for the stopping and starting mechanism of the machine. The front wall 4 of the machine frame is shown in Fig. 6 as terminating at its lower end in a bored casting having a forwardly projecting boss 11, into and through the bore of which the end of a cylinder 12 projects a substantial distance into the interior of the hollow frame. The side wall 13 of the frame is provided with a boss 14 for receiving one of the crank shaft bushings 15, the opposite side wall having secured thereto a suitable belt guard 22 which covers the driving belt 23.

Mounted in end bearings 15 and 99 of the frame and in suitable intermediate bearings is a transversely extending crank shaft (not shown) having a clutch wheel 93 provided with a suitable belt groove over which passes driving belt 23 of the transmitter. A detail

description of the crank shaft mechanism may be found in my above mentioned co-pending application, of which the present application is a division.

Projecting from the front wall 4 of the machine frame is an overhanging arm 32 terminating in the needle bar and presser foot bearing 33. This arm is provided with suitable bearings for the opposite ends of a needle operating rock shaft 39. Secured to the forward end of this rock shaft is a needle bar operating arm 41. At the outer end of the arm 41 is pivotally secured a link 45, the lower end thereof being pivotally connected to the upper end of the needle bar 48. Secured to the lower end of the needle bar is a needle holder 50 carrying needles 51. To the rear end of the rock shaft 39 is secured a crank arm 57 and ball stud 58, to which is connected the upper end of a ball connection 59. The lower end 60 also has a ball socket to fit over the ball 61 of the crank shaft 62.

The crank shaft carries a driving gear 483 which meshes with a similar gear 484 secured to a shaft 485. These gears are located within the machine frame and the shaft 485 is rotated thereby from the crank shaft. The shaft 485 is supported in a rear bearing 487 and in a front bearing 488, these bearings being secured in a horizontal tube 489 cast in the L-shaped arm 32 of the machine frame. In constructing the overhanging arm in this manner a hole is left for the shaft 485 thereby eliminating the necessity as well as the expense of drilling the same. By integrally casting the metal of the arm 32 around the steel tubing 489 and into uniform engagement with the exterior walls thereof, the cost of construction is greatly reduced, the overhanging arm is considerably strengthened, and it is merely necessary to first enlarge or counterbore each end of the steel tube in order to insert the bearings 487 and 488 for the shaft. Furthermore it will be noted that the steel tube 489 extends rearwardly of the front wall 4 of the machine frame into the chamber of the frame, thereby supporting the rear end of the shaft 485 and gear 484 which overhang the crank shaft of the machine.

In other words, the tube 489 before casting the frame may be counterbored at opposite ends and the bearings 487 and 488 secured in position, and thereafter the steel tube 489 cast into the overhanging arm. This construction has the further advantage of reducing the friction of the shaft 485, permitting greater accuracy in construction, and at the same time providing adequate space 490 for the passage of lubricant.

The shaft 485 may be utilized to operate various stitch controlling mechanisms or devices, such as a trimmer, ruffler, top feed, etc., and in the present instance mechanism is connected thereto for operating a cross stitching mechanism and for vibrating the needle bar. Adjacent to the forward end of the bearing 488 and secured to the shaft 485 is a gear 493 meshing with a gear 495 secured to the upper end of a vertical rotary operating shaft 497 for the rotary cross thread mechanism. This shaft is located and operates in suitable bearings in the hollow or tubular presser bar 183. The presser bar reciprocates vertically in the bushing 187 and carries at its lower end a presser foot 188. The cross stitching mechanism for the machine is located in the presser foot and is connected to the rotary shaft 497 for operation, the construction of this mechanism being described in my aforesaid co-pending application.

As illustrated in Figs. 8 to 10 inclusive, the cross stitch driving mechanism may be utilized for operating a zig-zag needle, one form of mechanism for vibrating the needle bar being shown in Figs. 8 and 9. At the forward end of the shaft 485 is located a triangular cam or eccentric 527 which is secured to the shaft. This cam operates in a fork 530 which straddles the cam, the fork being carried by an arm 531 which extends downwardly and is secured at 532 to the boss 534 of a swinging bearing 535. This bearing is bored to receive the lower and upper bushings 53 and 54 which guide the needle bar 48, and has a tapered circular disk 536 which is seated in a circular socket formed in the face 538 of the head 33 of the overhanging arm. One-half of the circular socket is formed with a beveled circular plate 539 secured by screws 540, so that the swinging bearing may rock therein and be held against lost motion.

From the foregoing construction it will be seen that the rotation of the cam or eccentric 527 by the shaft 485 will impart through the member 531 a vibratory swinging movement to the needle bar, the needle bar at the same time being reciprocated through mechanism operated from the rock shaft 39.

The power transmitter comprises in general a main bracket 143 secured to the bottom of the table in any suitable manner, the bracket having an arm bored to receive a shaft 144. Upon this shaft is mounted a cone pulley 145 over which operates a belt 146 for transmitting power from any suitable line shaft to the pulley. The belt 23 is driven by a pulley 149 for operating the sewing machine. Suitable clutch mechanism for the pulleys 145 and 149 is provided which is controlled by means of a rod 156 connected to a floor treadle 159. A further detailed description of the power transmitter mechanism is not deemed necessary herein since the same is fully described in my co-pending application.

The forwardly extending cylinder or work

support or arm 12 is preferably constructed of steel tubing of small diameter, and has the same diameter from one end to the other, which construction has the important advantage of enabling small tubular goods or work to be handled with greater facility than in the case as heretofore when the tubular support is tapered from the machine frame toward the free end thereof, as it enables the tubular goods to be pushed back entirely to the rear end of the horn. Moreover, the sheet metal or steel tubing construction provides a horn of considerably greater strength and rigidity than heretofore when formed as a casting, and also eliminating the necessity as heretofore of tapering the horn at the rear end or otherwise increasing its diameter for adequately supporting it from the machine frame. The steel tubing structure in addition provides a cylinder of equal diameter throughout having much thinner walls, thus materially decreasing the diameter of the cylinder so as to accommodate small tubular goods, which was heretofore impossible in the case where the horns were castings having relatively thick walls. The sheet metal or steel tubing construction in addition provides a lighter horn as well as a stronger horn, so that the length of the horn may be increased to accommodate more goods. A further advantage in the applicant's construction resides in a material reduction in the cost of manufacture.

Furthermore the cylindrical construction enables the tubular goods, after stitching to be easily drawn by the operator over the cylinder substantially as far as the rear of the cylinder which is ordinarily impossible in the case of a tapered horn, so that as a result a larger quantity of tubular goods or work may be supported at one time on the cylinder.

In the present machine the cylinder is detachably secured in the boss 11 by spot clamping screws 349, permitting the cylinder to be removed and replaced by disconnecting the operating means for the looper and feed within the rear trunk of the machine. To prevent the leakage of oil between the cylinder 12 and the boss 11 a wick insert 350 of suitable material is provided which fits into a groove of the cylinder 12 to form a leakproof joint between the parts.

The cylinder 12 houses and supports the feeding mechanism and the looper and looper thread control mechanisms, the construction and operation of such mechanisms being fully shown and described in my above mentioned co-pending application. In Figs. 4 and 5 the looper shaft 292 is illustrated, together with the loopers 311 and 312 controlled thereby. The looper shaft 292 is driven from the crank shaft of the machine by means of a crank connection 266 connected to the ball crank 267 of the crank shaft. In Fig. 5 the forward end of the looper shaft 292 is shown together with the various parts of the thread control mechanism.

In Fig. 6 is shown the feed bar 232 extending through the cylinder and carrying at its outer end feed dog 208. The feed bar is operated from the crank shaft by means of a pitman 234 connected to the ball crank 69 of the crank shaft.

As described in my aforesaid co-pending application, the feed bar actuating mechanism is adjusted during operation by means of an adjusting screw 255 located in a hollow tube or post 240, the lower end of which is secured as at 242 in the machine casting and has a flattened guide 243 cooperating with the feed bar 232. The cylinder 12 is slotted or cut-away at 12^a to permit the guide 243 to extend therethrough.

Co-acting with the stitching and feeding mechanism supported by the cylinder 12 is a throat plate 334 which is secured to a forward bearing 248 of the cylinder by means of screws 335. The throat plate is provided with the usual feed slots 337 through which operate the serrated surfaces of the feed dog, the throat plate also being provided with the usual needle holes through which the needles operate. The throat plate is of segmental construction forming with the cylinder 12 a complete circle when attached thereto, the cylinder being cut away on the lines 338—338 to receive the throat plate. A longitudinally projecting tongue 338^a of the throat plate cooperates with a groove or slot formed in the cylinder, so that the projecting portion 339 overlaps the tongue 338^a, thereby securely holding the rear end of the plate from tipping or moving when the pressure of the foot is brought to bear upon the outer overhanging end of the throat plate.

Thus it will be seen that the opening 338 at the top of the cylinder extends rearwardly a substantial part of the cylinder length, and that the elongated throat plate has a portion, which forms a cover for the opening, of greater length than the portion 340 projecting beyond the end of the cylinder, the throat plate forming a combined throat and cover plate thereby facilitating ingress to the cylinder, increasing its rigidity and decreasing the cost of construction. Furthermore the throat plate is fastened to the bearing 248 only, by two screws 335, near the forward end of the cylinder, whereas the rear end of the plate is interlocked with the cylinder and held against upward movement by virtue of the side edges of projection 339 overlapping or overhanging the inner side edges of projections 338^a. The throat plate may be readily detached by removing the screws 335 and sliding the plate forwardly so as to free the projections 338^a from the projection 339 of the cylinder.

The forwardly extending end 340 of the throat plate is provided with beveled or inclined edges 341, and an end cap or cover 343 fits thereover, the dove-tailed grooves 342 of the cap cooperating with the inclined portions 341 and hence the same may be shifted on and off the forward end of the throat plate. The side walls of the cap at 344 are partially slotted to make them flexible so that the cap will yield and properly fit over the beveled or inclined edges of the throat plate. The end cap is hollow to provide free working space for the loopers and other parts adjacent thereto. In order to secure the cap 343 to the cylinder and prevent it from becoming disengaged from the throat plate during the operation of the machine the cap is provided with suitable locking means comprising a lock spring or latch 343^b projecting through an opening 343^a for convenient manipulation by the operator, the cap being removed by pressing inward on the spring to disengage the hook end 343^c from a notch 343^d formed in the side wall of the cylinder 12. This lock spring is suitably secured inside of the end cap as by a screw 343^a.

The cylinder 12 may be provided at its forward end with a projecting portion 345 extending outwardly to correspond in length approximately with the overhanging portion 340 of the throat plate, an extension 345 being provided with an end wall 346 to prevent lubricant from escaping. The curved side walls 347 of this extension are adapted to lie in juxtaposition to the curved walls of the cap 343 thereby forming a support upon which the bottom edge of the end cap rests.

It will be seen that by reason of the fact that the feeding and looper mechanisms are arranged and supported within the cylinder 12, the same having the enlarged opening covered by the throat plate extending a considerable distance in the rear of the needles I may do away with the use of a cover plate, and as a result of this construction greater rigidity of the parts is secured, as well as free access to the interior of the cylinder, thus eliminating loose parts with the added advantage of using a cylinder of equal diameter throughout its length.

It will be noted that the bearing 248 is located at the forward open end of the cylinder, and is detachably secured in position by means of screws 293. This bearing 248 supports the forward end of looper shaft 282, and also guides the feed bar 232, and may be readily removed when worn and renewed simply by detaching the looper parts on the end of the looper shaft, detaching the feed dog 208, and removing screws 293. The throat plate 334 is secured to the cylinder through the medium of bearing 248, this bearing being located approximately midway of the length of the throat plate, and it will be seen that the throat plate extends in rear of the bearing a substantial distance to form a removable cover for the forward part of the cylinder, and also extends in front of the bearing to form a support for a detachable end cap or cover.

The rear end of the looper shaft 282 operates in a bearing 286 secured in the cylinder 12 by screws 287, the bearing having an opening 288 at the top thereof to provide a working space for the feed bar, and also having two saw cuts 289 in the front and rear walls diametrically opposite the hole in the bearing within which operates the looper shaft 282, the bearing thus having the opposite ends thereof resilient to permit adjustment thereof to compensate for wear. Clamping screws 290 are provided to adjust the saw cuts for adjusting the bearing portions to fit the shaft 282 thereby taking up wear. The rear wall of the bearing is recessed at 291 to provide clearance for the bottom cap 276 of the feed actuating mechanism. Thus the bearing 286 is adjustable with respect to the cylindrical inner wall of the cylinder and the looper shaft, and it will be noted that by unscrewing the front bearing 248 and the rear bearing 286 the entire looper and feed mechanisms together with the bearings may be slid out endwise through the cylinder to remove or assemble them.

It is to be understood that by describing in detail herein any particular form, structure, or arrangement, it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the modes of its use, I claim:

1. In a sewing machine, the combination of a machine frame, a forwardly extending tubular supporting member connected thereto and having a throat plate, an end cap connected to said throat plate, and means for releasably locking said cap to said supporting member and comprising a spring latch.

2. In a sewing machine, the combination with a machine frame of a forwardly extending work arm of steel tubing.

3. In a sewing machine, the combination with a machine frame of a forwardly extending work arm of steel tubing of substantially uniform diameter from end to end.

4. In a sewing machine, the combination with a machine frame of a forwardly projecting work arm of steel tubing of substantially uniform diameter from end to end, said arm having one end projecting into and through the wall of the machine frame and detachably secured thereto.

5. In a sewing machine, the combination

of an upright machine frame, a forwardly projecting tubular work arm detachably connected to said frame, a shaft extending through said work arm, a bearing for said shaft mounted within the rear end of said arm and detachably connected thereto, said work arm being detachable with said shaft and bearing from the frame, and said bearing being detachable from the end of the work arm relatively to said shaft.

6. In a sewing machine, the combination of an upright machine frame, a forwardly projecting tubular work arm detachably connected to said frame, a shaft extending through said work arm, a bearing for said shaft detachably mounted within the rear end of said arm, said bearing being transversely split at one side of the shaft to form a pair of adjustable portions, and an adjusting screw connecting said portions for adjusting them relatively to said shaft.

7. In a sewing machine, the combination of an upright machine frame, a forwardly projecting tubular work arm detachably connected to said frame, a shaft extending through said work arm, a pair of bearings for said shaft detachably mounted within the rear and forward ends of said arm, said arm being detachable with the shaft and bearings from the frame and each of said bearings being detachable from an end of the work arm relatively to said shaft.

8. In a sewing machine, the combination of a machine frame, a forwardly extending tubular work support carried thereby, a throat plate carried by said support and having an overhanging portion projecting beyond the end of the work support, and an end cap circumferentially slotted to provide a resilient side wall detachably connected to said overhanging portion.

9. In a sewing machine, the combination of a machine frame, a forwardly extending tubular work support carried thereby, a throat plate carried by said support and having an overhanging portion projecting beyond the end of the work support, and an end cap circumferentially slotted at opposite sides to provide a pair of expansible and contractible side walls detachably connected to the side edges of said overhanging portion.

10. In a sewing machine, the combination of a machine frame, a tubular steel work support extending therefrom and detachably connected thereto, and a detachable bearing located within said support, said work support and bearing being detachable together from the frame and said bearing being detachable from the end of the work support.

11. In a sewing machine, a machine frame having an overhanging arm, said arm being strengthened by a longitudinally extending steel tube integrally cast thereinto, and an operating shaft extending through said tube.

12. In a sewing machine, a machine frame having an overhanging arm, said arm being strengthened by a longitudinally extending steel tube integrally cast thereinto, with the metal of the arm engaging around the walls of the tube substantially from end to end thereof, and an operating shaft extending through said tube.

13. In a sewing machine, a machine frame having an overhanging arm, said arm being strengthened by a longitudinally extending steel tube integrally cast therein, the metal of the arm engaging the walls of the tube, said tube extending rearwardly of the arm into the frame, and an operating shaft extending through said tube and into the frame.

14. In a sewing machine, a machine frame having an overhanging arm, said arm being strengthened by a steel tube integrally cast therein and extending longitudinally of the arm substantially throughout the length thereof, and an operating shaft extending through said tube.

Signed at Nyack, New York, this 29th day of Oct., 1923.

JOHN P. WEIS.