

July 12, 1938.

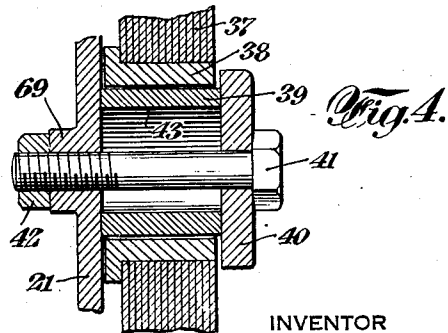
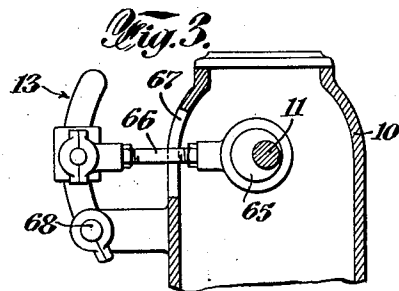
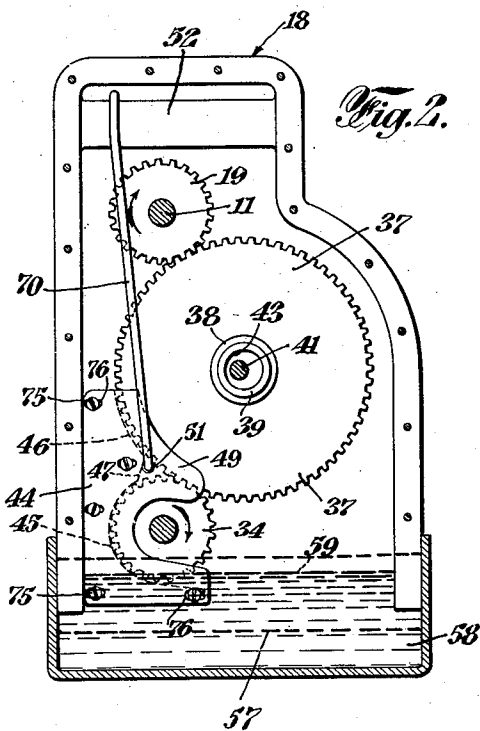
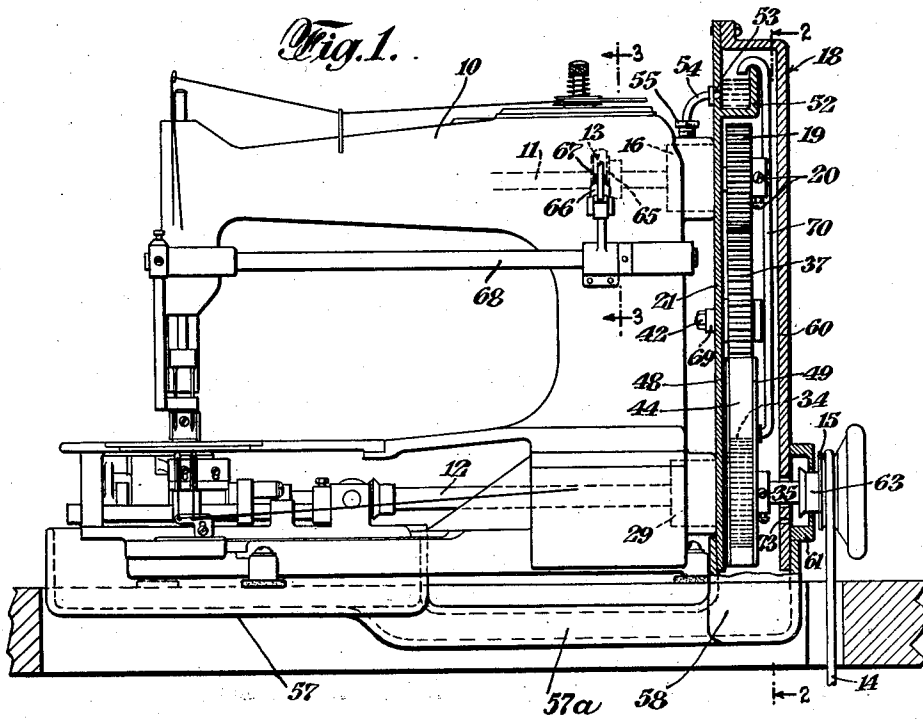
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2,123,738

SEWING MACHINE

Filed Dec. 12, 1936

2 Sheets-Sheet 1



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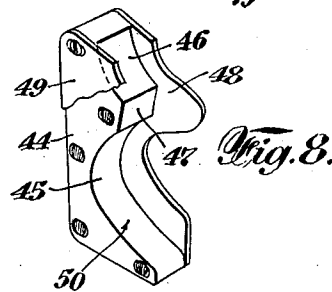
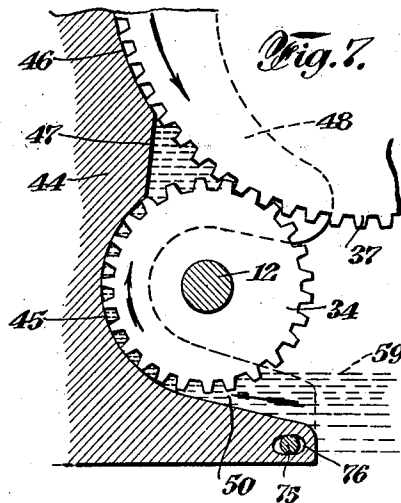
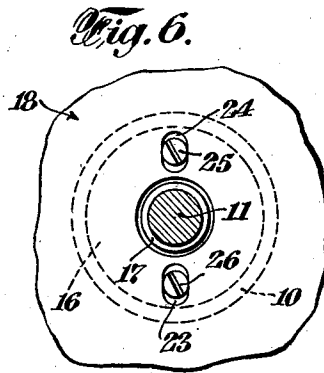
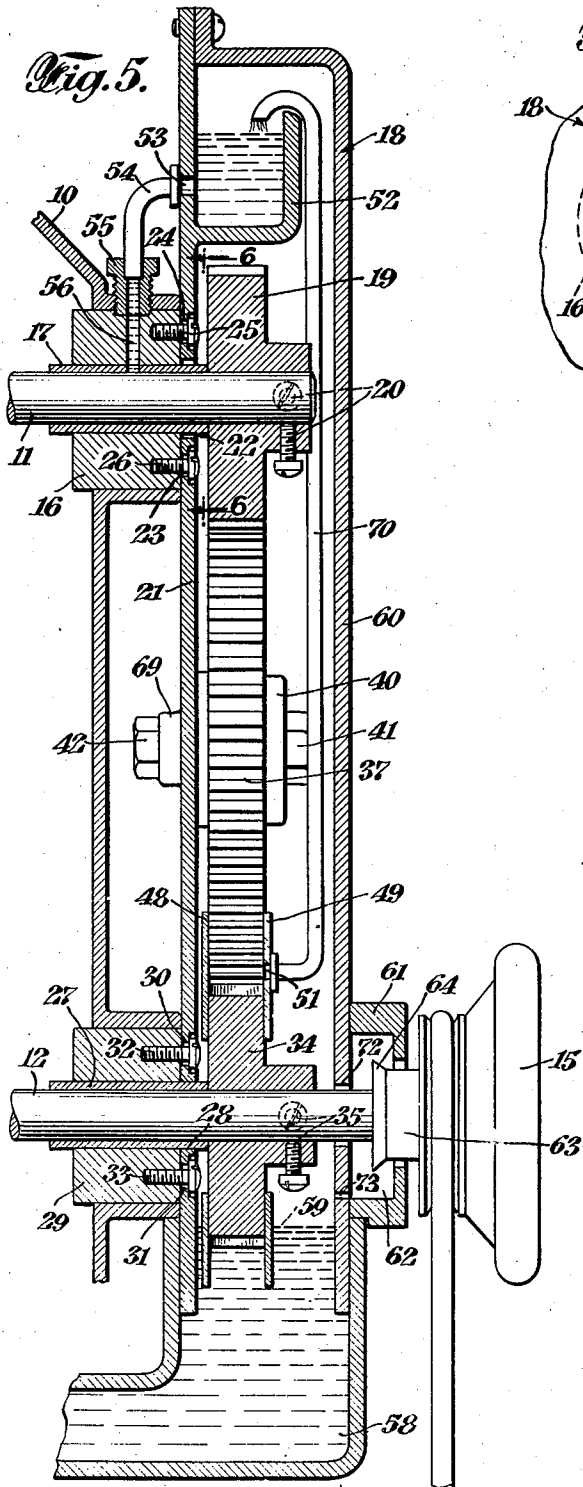
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2,123,738

SEWING MACHINE

Filed Dec. 12, 1936

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,123,738

SEWING MACHINE

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Application December 12, 1936, Serial No. 115,503

12 Claims. (Cl. 112—220)

This invention relates to sewing machines, and particularly although not exclusively to machines for performing ruffling operations.

In the conventional commercial machine of this type, there are two parallel shafts, the lower one being generally motor driven and operating the feed and looper mechanisms, and the upper one actuating the ruffling mechanism. The two shafts contain crankshaft or eccentric portions, operatively joined by suitably positioned connecting rods; and these crankshaft portions are usually independent elements that are attached to the straight portions of their respective shafts by couplings. Due to continued use, the bearing surfaces of the crankshafts, generally made of malleable iron, are subjected to wear, resulting in knocking, a whipping effect and vibration, which in turn cause a loosening of the couplings. It is hence one of the objects of this invention to avoid these disadvantages and shortcomings and present a smoothly operating machine of extended useful life,—an objective which I accomplish, in accordance with this invention, by eliminating the crankshafts, connecting rods and couplings, and substituting therefor a transmission mechanism containing a novel arrangement of gears, shafts and other elements, as will be more specifically hereinafter described.

It is also within the contemplation of this invention to provide an efficient and leak-proof automatic lubricating system, operated by the transmission mechanism constituting part of my invention.

Another and important object of this invention is to enable a sewing machine containing a plurality of shafts to operate either continuously or intermittently at a high rate of speed.

It frequently occurs in machines now in common use that a yarn or thread becomes entangled in the hand wheel and the ruffling attachment inasmuch as these parts are positioned at the extreme upper right hand side of the machine and in close proximity to one or more threads. It is one of the objects of this invention to remove this danger by so arranging the structure as to position the hand wheel and the ruffler remotely from the yarn.

Whenever the conventional crankshaft and connecting rod arrangement is employed, the parts are assembled in fixed relative positions, such as by set screws or other keying means, so that they bear a permanent, fixed and final relation to the position of the needle. To effect a retiming of the needle with respect to the position of the crankshaft is possible, in such cases,

only by additional machining or suitable resetting operations. To overcome this difficulty and to facilitate the retiming of the needle is still a further object of this invention, the accomplishment of which is effectuated by suitably manipulating the transmission mechanism forming a part of this invention.

It is within the further contemplation of this invention to provide an assembled unit containing the improvements above mentioned, and adapted to be adjustably attached to a conventional machine either with no machining at all or a minimum amount thereof.

And another object is to enable such adjustments to be made in the device constituting the operative portion of my invention so that it can be applied to machines of slightly different dimensions, and also for the purpose of compensating for wear.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

Figure 1 is a front partially sectional view of my invention assembled in operative position on a conventional machine.

Figure 2 is a vertical section of Figure 1 taken along line 2—2 with the base of the machine removed.

Figure 3 is an enlarged fragmentary vertical sectional view of the ruffling attachment taken along line 3—3 of Figure 1.

Figure 4 is a fragmentary transverse section of the intermediate gear and adjustable mounting therefor.

Figure 5 is an enlarged fragmentary sectional view of the casing and enclosed parts similar to that shown in Figure 1, the casing being shown operatively attached to the housing of the machine.

Figure 6 is a fragmentary section of Figure 5 taken along line 6—6.

Figure 7 is an enlarged fragmentary vertical sectional view of the two lower gears shown in Figure 2, illustrating a portion of the lubricating mechanism with the front wall thereof removed, and

Figure 8 is a fragmentary perspective of the oil guide channel constituting part of this invention.

In the drawings the sewing machine housing 10 is adapted to receive two shafts 11 and 12 the upper shaft 11 being operably connected to the ruffling mechanism 13, which will be more specifically hereinafter described, and the lower

shaft being driven by a motor (not shown) connected by belt 14 to pulley 15 which is suitably keyed to its shaft. This latter shaft is adapted to actuate the feed and looper mechanisms of the machine in a conventional manner.

The framework of the conventional machine 10 contains a bushing 16 which is normally adapted to support the upper shaft, generally a crankshaft. In the structure shown, another bushing 17 is inserted within the bushing 16, the latter bushing 17 being somewhat longer than the surrounding bushing and extending into the hollow casing 18. The shaft 11 is operatively supported by bushing 17, and carries on its right end the gear 19 which is held fixed in position by suitable keying means such as the set screws 20. Said gear 19 is positioned within the casing 18, and in spaced relation to the wall 21 forming part of the casing, said spacing being effectuated by the protruding portion of the bushing 17.

The said wall 21 contains therein the enlarged opening 22, which is of greater diameter than the bushing 17; and said wall also contains therein the enlarged openings 23 and 24 which are of greater diameters than the shanks of screws 25 and 26, said screws being adapted to be received by the bushing 16.

The lower shaft 12 extends through the lower bushing 27 which is inserted through the opening 28 in the wall 21 and the axial hole in the bushing 29 preferably by a forced fit. The lower portion of the wall 21 also contains the enlarged openings 30 and 31 to accommodate the shanks of the screws 32 and 33, the diameters of said shanks being smaller than those of said openings. Said lower shaft 12 carries the gear 34 suitably secured thereto by the set screws 35.

For the purposes of this specification, the bushings 16 and 29 will hereinafter be referred to as the outer bushings, and the bushings 17 and 27 as the inner bushings.

Operatively positioned between the two gears 19 and 34 is the large intermediate spur gear 37 preferably made of fibre or other similar material, this gear operatively intermeshing with the other two gears. The said intermediate gear 37 is mounted upon the bushing 38 and is rotatably supported by the hollow cylindrical sleeve 39. The said sleeve is clamped in predetermined position between the plates 21 and 40 by the bolt 41 and nut 42. It is thus apparent that the position of gear 37 with respect to the casing 18, and consequently with respect to the gears 19 and 34, can be varied, inasmuch as its position is dependent upon that of the sleeve 39, which is movable with respect to said casing or the plate 21 thereof because of the enlarged axial opening 43 through which the relatively small shank of the bolt 41 extends.

Positioned within the casing 18 and in close proximity to gear 34 is the oil guide plate 44 containing the arcuate recessed portion 45 in close proximity to a peripheral portion of gear 34, and curved to conform with said periphery, and another arcuate recessed portion 46 curved to conform with the periphery of a portion of gear 37 and adjacent thereto. The juncture of the curved portions 45 and 46 is the inwardly protruding wall 47. Suitably attached to the oil guide plate 44 are the two walls 48 and 49, these walls extending beyond the corresponding portions of plate 44 and being preferably similarly shaped, thereby forming an oil channel 50 extending past the aperture 51 in wall 49. It

will be noted that the walls 48 and 49 overlap the adjacent portions of the gears 34 and 37.

At the upper portion of the casing 18 is an oil reservoir 52 which contains an outlet 53 into which is inserted an oil tube 54 communicating with the tubular fitting 55 shown screwed into the housing of the machine 10. The said fitting communicates with oil hole 56 in the outer bushing 16 which coincides with a similar hole in the inner bushing 17 in registry therewith for supplying oil to the shaft 11.

The lower portion of the machine is provided with oil collecting and retaining means including the oil case 57 and the pan 58. It should be noted that said pan and case are in communication by means of the channel or conduit 57a, the said conduit and pan extending below the case, so that any oil drippings from the forward portion of the machine that would be received by the case 57 would naturally flow into the pan 58. It is thus apparent that the said pan 58 serves as an oil reservoir within which the gear 34 is immersed as shown in Figure 2. The position of the gear 34 is such that the lower portion thereof is immersed in the oil which is at the level represented by the broken line 59. The outer plate 60 of casing 18 is provided with an enclosed chamber 61 forming an oil receptacle 62 through which extends the shaft 12 and outside of which is positioned the combined pulley and hand wheel 15. Mounted over and affixed to the shaft 12 and adjacent the pulley 15 is the sleeve 63 containing an annular expanded portion or collar 64.

The ruffling attachment 13 is operated by an eccentric 65 operatively mounted on the shaft 11, the eccentric rod 66 extending through an aperture 67 in the frame of the machine and being operatively connected to the ruffling shaft 68.

It should be noted that in this invention the machine 10 is, as aforesaid, of the conventional construction, and is used in combination with the inner bushings 17 and 27, the shafts 11 and 12 and the casing 18 with the structures contained therein. Although most sewing machines of this type are standardized as to controlling dimensions, frequently slight variations appear, such as in the distance between the upper and lower shafts. The structure forming a part of this invention is adapted to be adjustably mounted on the housings of such sewing machines within the limits of the dimensional variations generally found in these machines, as will be hereinafter more fully described.

The conventional outer bushings 16, and 29 are secured within the housing 10 of the sewing machine, and are adapted to support upper and lower shafts. In lieu of the usual shafts contained within these outer bushings the shafts 11 and 12 are substituted, these shafts being rotatably supported by the inner bushings 17 and 27. These inner bushings extend through apertures 22 and 28 respectively within the wall 21 of the casing 18, the upper aperture 22 being of greater diameter than that of shaft 11, whereas the lower aperture 28 is preferably of substantially the same diameter as that of bushing 27. The wall 21 also contains openings 23, 24, 30 and 31 to accommodate the screws 25, 26, 32 and 33 which serve to secure the casing 18 to the outer bushings 16 and 29, and consequently to the machine housing. It will be noted that the said openings are larger than the shanks 75

of the screws, and that the heads of the screws are in abutment with the wall 21.

In assembling the device, the inner bushings 17 and 27 are secured within the outer bushings preferably by a forced fit, the outer ends of the inner bushings preferably extending into the casing. The shafts 11 and 12 are then inserted in place, and the gears 19 and 34 mounted upon the said shafts, and the gear 37 adjustably mounted in place in a manner to be hereinafter described. Due to the said enlarged openings and apertures in the wall 21, the casing, during the process of mounting, can be adjustably located into place in accordance with the position of the two shafts; and thereafter the said screws are tightened to secure the casing in proper fixed relation to the machine housing 10.

During the operation of adjusting the casing as above described, the axial center of the boss 69 of wall 21 (see Figure 4) is obviously correspondingly moved. When the setting is completed, the sleeve 39, carrying the gear 37, is positioned in place so that the said middle gear 37 will be in proper engagement with the gears 19 and 34. Thereafter the plate 40, the bolt 41 and nut 42 are tightened so as to hold said sleeve 39 in a fixed position, and the gear 37 in operable relationship with the other two gears.

It will thus be noted that this invention is provided with adjusting means so as to permit the casing and associated parts to be positioned in place in accordance with the distance between the two shafts.

It will also be observed that for this operation no machining is necessary in the housing 10 of the sewing machine, inasmuch as the casing 18 is attached directly to the outer bushings 16 and 29. It will also be observed that no crankshafts and connecting rods or couplings are employed and that the transmission mechanism merely consists of a train of gears preferably positioned outside of the machine housing. The arrangement is such as to eliminate bearing wear such as occurs in the crankshaft arrangement, and it also eliminates vibration and "whip", thereby enabling a smooth operation, either continuously or intermittently, at a relatively high rate of speed. This constitutes an improvement over the conventional structures where the shafts consist of several portions coupled together, and where wear and tear and vibration tend to reduce the operating speed of the machine.

The gear 34 has its lower portion immersed in the oil within the pan 58, as shown clearly in Figure 7. During the operation of this device, the teeth of gear 34, which revolves clockwise as shown in the drawings, carry oil upwardly along the channel 50 formed by the plate 46 and the walls 48 and 49, the oil being carried upwardly along the surface 45 until it reaches the space between the wall 47, the lower portion of gear 37 and the upper portion of gear 34. The continued action of the gear 34 causes the oil to be pumped out through aperture 51 into the tube 70 which leads into the reservoir 52. From there it flows outwardly through the tube 54 connected to the fitting 55, and thence through the duct 56 to the shaft 11. Other outlets can be provided from the reservoir 52 to lubricate other parts of the machine.

Any oil that might be carried further upwardly along surface 46 of plate 44 will flow back downwardly and be returned to the vicinity of the hole 51. The overlapping portions of the

walls 48 and 49 serve as retaining member for the oil within the channel 50.

The shaft 12 preferably extends through the wall 60 of casing 18, and has attached to the terminal portion thereof the pulley and hand wheel 15, the pulley being driven by belt 14 attached to a suitable motor not shown on the drawings. Positioned preferably exteriorly of wall 60 is the chamber 61 which serves as a receptacle for any oil that might be carried through the opening 72. Such oil will be thrown back by the annular member or sleeve 64 into the receptacle 62, and from there it will be returned through the aperture 73 into the oil pan.

The ruffling attachment 13 is actuated by the eccentric 65, and where a machine is not provided with a suitable opening, an aperture 67 is milled into the housing to permit the eccentric rod 66 to extend therethrough. It should be noted that this is the only machining that need be done on the conventional sewing machine for this purpose, and is a simple and inexpensive operation.

The hand wheel 15, shown combined with the pulley, is positioned near the base of the machine, thereby eliminating the danger of entanglement thereof with any cotton or thread which generally can be found along the upper right hand portion of the machine shown in Figure 1. The ruffling attachment is also remote from the upper right hand corner of the machine, so that the danger of entanglement with threads is also eliminated. This is an improvement over the conventional machines where the hand wheel and ruffling attachments are generally positioned outside of the machine at the said upper right hand corner thereof.

With further reference to the intermediate gear 37, the adjustable feature thereof is of considerable use in taking up wear on the teeth thereof as a result of continued operation. Inasmuch as this gear is preferably made of some fibrous material, it is readily subject to wear and hence such adjustment is a decided advantage.

It should further be noted that there is still another adjustable feature with reference to the lubricating mechanism above described. The oil channel assembly 50 is attached in place by set screws 75, these screws extending through elongated openings 76 as indicated. Should it be necessary to alter the position of the said channel with respect to the gears 34 and 37, either to compensate for wear of the gears or to provide either a greater or lesser clearance between the channel and these gears, the entire channel block can be moved either to the left or to the right, to any desired position within the limitations of the length of the slots 76. This arrangement hence provides an adjustment that may be found to be necessary or desirable for the effective operation of this apparatus.

It will thus be seen that by means of this invention a standard or conventional sewing machine of the type above referred to can be equipped with a high speed transmission mechanism, adapted to be applied to machines of slightly different dimensional design; and it will be noted that the transmission mechanism serves as a pumping device for automatically supplying oil to the machine, the structure being leak-proof to prevent oil from seeping out, and being arranged so as to eliminate the danger of thread entanglement.

It is of course understood that the various embodiments above described and shown in the

drawings are illustrative of my invention and not employed by way of limitation, inasmuch as numerous changes and modifications may be made within the scope of the appended claims without departing from the spirit of this invention.

What I claim is:

1. In a sewing machine containing a housing for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the casing, a gear affixed to each of said shafts within the casing, an intermediate gear in operative engagement with said other two gears, and an adjustable mounting for said intermediate gear, said mounting being adjustably movable with respect to the position of the two shafts whereby the intermediate gear will be adjustable relative to the other two gears.

2. In a sewing machine containing a housing with two outer bushings for supporting an upper and a lower shaft, two inner bushings secured within said outer bushings and extending outwardly therebeyond, a casing adjustably attached to the said outer bushings and having apertures in a wall thereof through which said inner bushings extend, two shafts operatively associated with the machine and rotatably supported by said inner bushings and extending into the casing, a gear affixed to each of said shafts within the casing, an intermediate gear in operative engagement with said other two gears, and an adjustable mounting for said intermediate gear, said mounting being adjustably movable with respect to the position of the two shafts whereby the intermediate gear will be adjustable relative to the other two gears.

3. In a sewing machine containing a housing with two outer bushings for supporting an upper and a lower shaft, two inner bushings secured within said outer bushings and extending outwardly therebeyond, a casing adjustably attached to the said outer bushings and having apertures in a wall thereof through which said inner bushings extend, at least one of said apertures being of greater diameter than that of the inner bushing extending therethrough, the said wall of the casing containing a plurality of holes adjacent said outer bushings, screws with shanks of smaller diameters than that of said holes and extending therethrough and in operative engagement with said outer bushings and the casing to adjustably hold the casing in place, two shafts operatively associated with the machine and rotatably supported by said inner bushings and extending into the casing, a gear affixed to each of said shafts within the casing, an intermediate gear in operative engagement with said other two gears, and an adjustable mounting for said intermediate gear, said mounting being adjustably movable with respect to the position of the two shafts whereby the intermediate gear will be adjustable relative to the other two gears.

4. In a sewing machine containing a housing for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the casing, a gear affixed to each of said shafts within the casing, an adjustably mounted intermediate gear in operative engagement with said other two gears, the lowest of said gears being immersed

in oil, an oil outlet in the region adjoining the contacting portions of said lower and intermediate gears, an oil conduit from said outlet to predetermined portions of the machine, and oil conveying means for carrying oil forced upwardly by the teeth of said lower gear to said outlet.

5. In a sewing machine containing a housing for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the casing, a gear affixed to each of said shafts within the casing, an adjustably mounted intermediate gear in operative engagement with said other two gears, the lowest of said gears being immersed in oil, an oil outlet in the region adjoining the contacting portions of said lower and intermediate gears, an oil conduit from said outlet to predetermined portions of the machine, an oil channel extending through the said supporting means for one of said shafts, a tubular fitting secured to the housing of the machine and in operative registry with said channel, the said oil conduit communicating with the opening in said fitting, and oil conveying means for carrying oil forced upwardly by the teeth of said lower gear to said outlet.

6. In a sewing machine containing a housing for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the casing, a gear affixed to each of said shafts within the casing, an adjustably mounted intermediate gear in operative engagement with said other two gears, the lowest of said gears being immersed in oil, an oil outlet in the region adjoining the contacting portions of said lower and intermediate gears, an oil conduit extending from said outlet, an oil reservoir at the upper portion of the casing, said conduit extending into said reservoir, an outlet opening from the reservoir, oil distributing means from said outlet opening to predetermined portions of the machine, and oil conveying means for carrying oil forced upwardly by the teeth of said lower gear to said outlet.

7. In a sewing machine containing a housing for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the casing, a gear affixed to each of said shafts within the casing, an adjustably mounted intermediate gear in operative engagement with said other two gears, the lowest of said gears being immersed in oil, an oil outlet in the region adjoining the contacting portions of said lower and intermediate gears, an oil conduit from said outlet to predetermined portions of the machine, and a substantially arcuate oil channel adjacent a peripheral portion of said lower gear and curved to conform therewith for conveying oil forced upwardly by the teeth of said lower gear, the walls of said channel overlapping the adjacent portion of said lower gear.

8. In a sewing machine containing a housing for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the

casing, a gear affixed to each of said shafts within the casing, an intermediate gear in operative engagement with said other two gears, the lowest of said gears being immersed in oil, an oil outlet 5 in the region adjoining the contacting portions of said lower and intermediate gears, an oil conduit from said outlet to predetermined portions of the machine, oil conveying means for carrying oil forced upwardly by the teeth of said lower gear 10 to said outlet, and oil return means for conveying back oil carried beyond said outlet, said oil conveying and return means comprising a plate with an edge thereof containing two substantially arcuate portions in close proximity to adjacent 15 peripheral portions of said lower and intermediate gears and curved to conform therewith, and lateral walls flanking said plate and extending beyond said edge thereof.

9. In a sewing machine containing a housing 20 for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the casing, a gear affixed to each of said shafts within 25 the casing, an intermediate gear in operative engagement with said other two gears, the lowest of said gears being immersed in oil, an oil outlet in the region adjoining the contacting portions 30 of said lower and intermediate gears, an oil conduit extending from said outlet, an oil reservoir at the upper portion of the casing, said conduit extending into said reservoir, an outlet opening from the reservoir, oil distributing means from 35 said outlet opening to predetermined portions of the machine, and oil conveying means for carrying oil forced upwardly by the teeth of said lower gear to said outlet, said casing carrying said reservoir, said oil conveying means and the 40 mounting for said intermediate gear.

10. In a sewing machine containing a housing for an upper and a lower shaft, supporting means 45 for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the casing, a gear affixed to each of said shafts within the casing, an intermediate gear in operative en-

gagement with said other two gears, and an adjustable mounting for said intermediate gear, said mounting comprising a hollow cylindrical sleeve rotatably supporting the intermediate gear, a 5 plate engaging an end of the sleeve, the other end of the sleeve engaging a wall of the casing, a bolt with a shank diameter less than that of the axial hole of the sleeve and extending there- 10 through and through said plate and said wall, and a nut in threaded engagement with the extremity of the bolt and abutting said wall of the casing whereby the sleeve is held clamped against the wall and plate.

11. In a sewing machine containing a housing 15 for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried by said supporting means and extending into the casing, a gear affixed to each of said shafts with- 20 in the casing, an intermediate gear in operative engagement with said other two gears, one of said shafts extending through the outer wall of the casing and adapted to be rotatably actuated by suitable driving means, a ring mounted upon the 25 shaft and positioned adjacent said outer wall for holding oil carried by its shaft from further outward movement, and a receptacle for receiving any oil thrown back by said ring during the rota- 30 tion of its shaft.

12. In a sewing machine containing a housing 30 for an upper and a lower shaft, supporting means for said shafts contained within the housing, a casing attached to said housing, two shafts operatively associated with the machine and carried 35 by said supporting means and extending into the casing, a gear affixed to each of said shafts within the casing, an intermediate gear in operative engagement with said other two gears, and a chamber associated with the casing, one of said 40 shafts extending through the casing and chamber and adapted to be rotatably actuated by suitable driving means, a ring mounted upon the shaft and positioned within said chamber for throwing 45 back into the chamber any oil carried there- against by the shaft, said chamber containing an outlet for returning the oil to the casing.

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