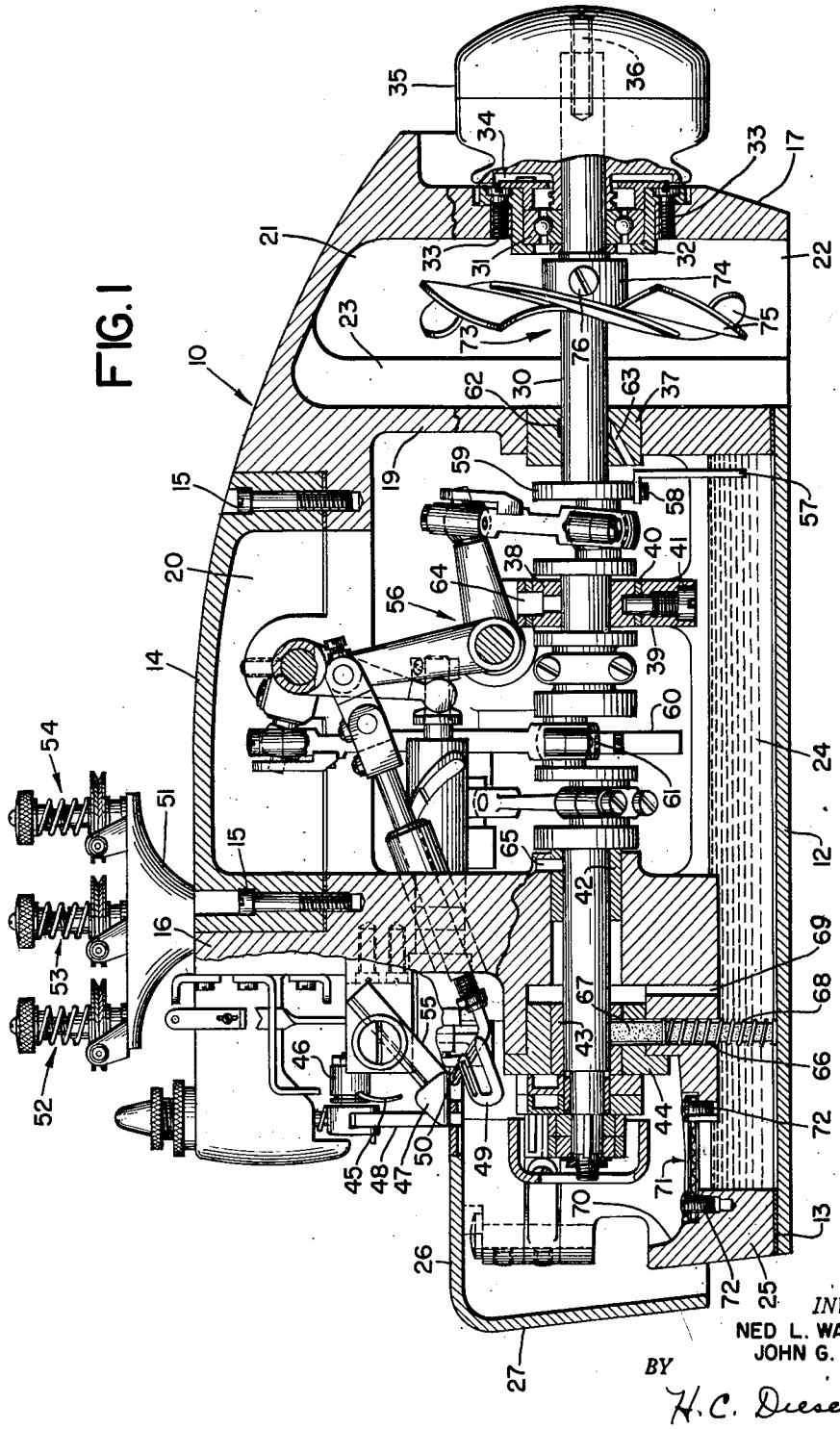
May 11, 1954 N. L. WALLENBERG ET AL 2,678,013

COOLING MEANS FOR SEWING MACHINES

Filed March 10, 1951 3 Sheets-Sheet 1

FIG. 1




INVENTORS.
NED L. WALLENBERG
JOHN G. ATTWOOD

BY H. C. Dressend

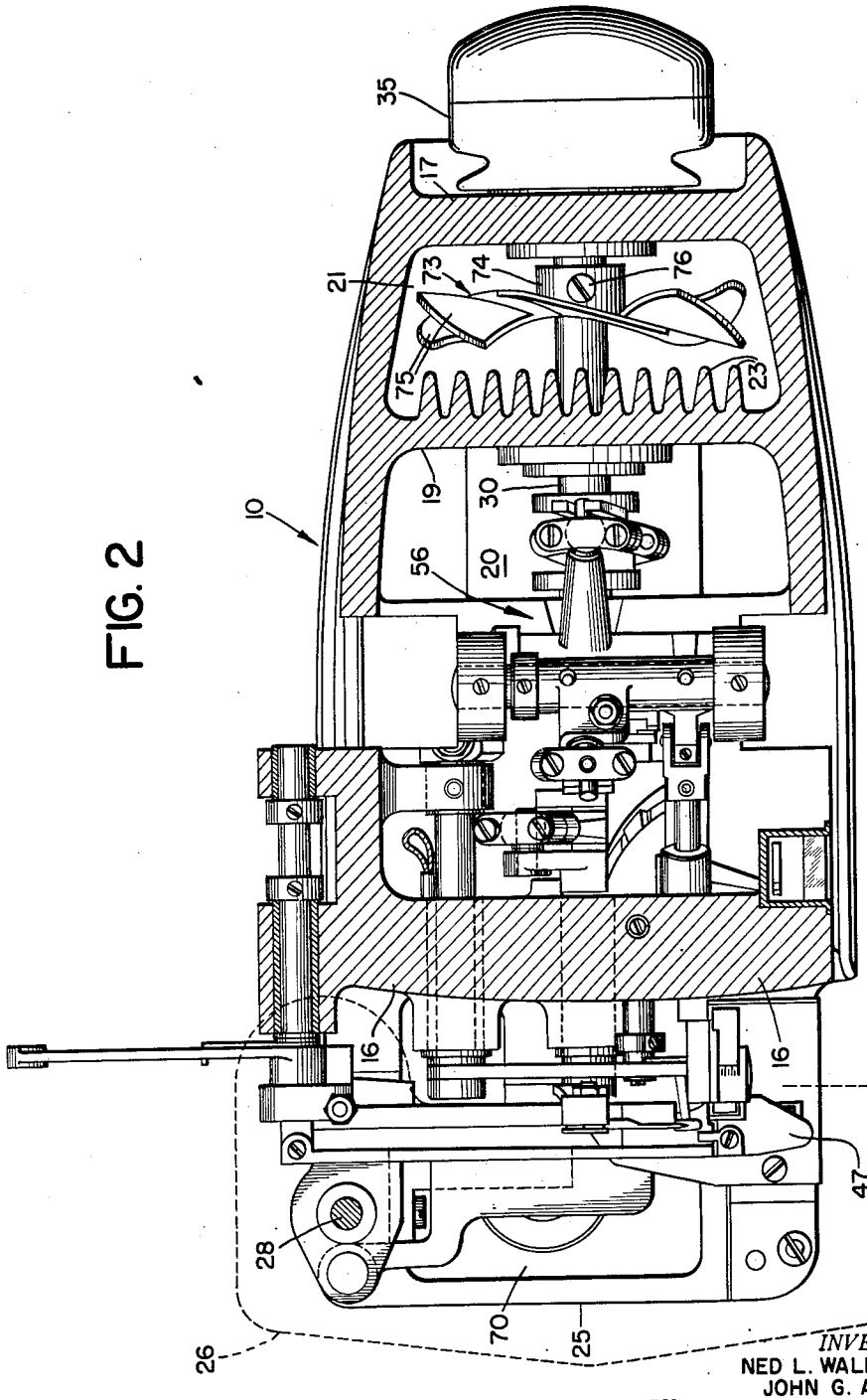
ATTORNEY.

May 11, 1954 N. L. WALLENBERG ET AL 2,678,013

COOLING MEANS FOR SEWING MACHINES

Filed March 10, 1951 3 Sheets-Sheet 2

FIG. 2




INVENTORS.
NED L. WALLENBERG
JOHN G. ATTWOOD

BY H. C. Duesend

ATTORNEY.

May 11, 1954 N. L. WALLENBERG ET AL 2,678,013

COOLING MEANS FOR SEWING MACHINES

Filed March 10, 1951 3 Sheets-Sheet 3

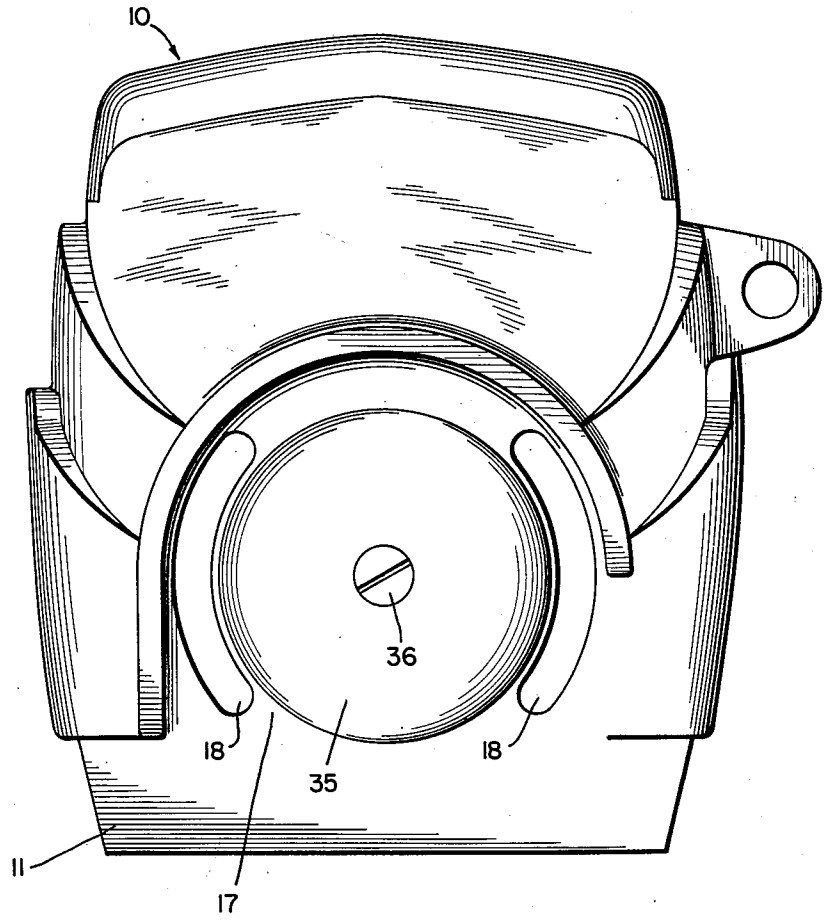



FIG. 3

*INVENTORS.*
NED L. WALLENBERG
JOHN G. ATTWOOD

*BY* H. C. Diesend

ATTORNEY.

Patented May 11, 1954 2,678,013

# UNITED STATES PATENT OFFICE

2,678,013

## COOLING MEANS FOR SEWING MACHINES

Ned Leo Wallenberg, Chicago, and John G. Attwood, Oak Park, Ill., assignors to Union Special Machine Company, Chicago, Ill., a corporation of Illinois

Application March 10, 1951, Serial No. 214,915

5 Claims. (Cl. 112—256)

1

This invention relates to sewing machines adapted to contain a liquid lubricant for lubricating actuating mechanisms that operate stitch forming devices and associated devices, and more particularly to the provisions in such machines of means for adequately cooling the lubricant.

It is a principal object of this invention to provide a sewing machine having a liquid lubricant contained therein with improved means for effecting adequate indirect cooling of the lubricant.

Another object of the invention is to provide a sewing machine, having a rotary driving shaft, with lubricant cooling means including a fan carried by and rotatable with the shaft, and capable of quiet and substantially vibrationless operation at sustained high speeds, such as speeds in excess of 5500 R. P. M. of the shaft.

The invention has for a further object the provision of lubricant cooling means for sewing machines, which means are simple and compact in construction and efficient and dependable in operation.

For the purpose of attaining the foregoing objects, a sewing machine constructed in accordance with this invention comprises a hollow frame, preferably made of cast iron, and including spaced front and rear end walls and a partition intermediate the end walls and dividing the interior of the frame into a front compartment and a rear compartment. The front compartment is closed while the rear compartment has at least one air inlet opening that preferably extends through the rear end wall of the frame and an air outlet opening formed in the bottom of the frame and communicating directly with the atmosphere.

The lower portion of the front compartment constitutes a reservoir for containing a supply of a suitable liquid lubricant, such as an appropriate lubricating oil. A rotary driving shaft extends through both compartments and is supported for rotation in the end walls and partition. Stitch forming devices are carried by the frame adjacent the front wall and are operated by actuating means in response to rotation of the shaft. The actuating means are at least partially disposed within the front compartment and are adapted to be adequately lubricated by the lubricant upon rotation of the shaft. The front compartment is provided with a removable bottom plate to permit of ready access to parts of the actuating means and other elements that are positioned in the lower portion of that compartment. The front compartment

2

also has a removable top cover for ready access to other parts of the actuating means and for introducing lubricant into the reservoir, as required.

Integral with the partition is a plurality of heat radiating elements that are wholly within the rear compartment and that project toward the rear wall of the frame. These elements comprise upstanding spaced-apart heat radiating fins that extend substantially from the bottom to the top of the rear compartment. Also, wholly within the rear compartment is a fan that is secured to and rotatable with the shaft. The fan is adapted, upon rotation of the shaft, to draw a stream of air from the atmosphere into the rear compartment by way of the inlet opening, and the air is directed by the fan toward and along the fins, thereby cooling the fins and partition and, consequently, cooling the lubricant by indirect heat exchange. The air is discharged from the rear compartment through the outlet opening.

The enumerated objects, together with the advantages of the invention, will be readily understood by persons skilled in the art upon reference to the following detailed description taken in conjunction with the accompanying drawings which respectively describe and illustrate an illustrative sewing machine embodying the invention.

In the drawings wherein like reference numerals denote corresponding parts throughout the several views:

Figure 1 is a view of the machine, mostly in longitudinal vertical section, taken along the axis of the main driving shaft;

Figure 2 is a horizontal cross-sectional view through the machine shown in Figure 1 with the cloth plate or work supporting member indicated merely in broken lines; and

Figure 3 is an enlarged end elevational view of the machine as observed from the right of Figure 1.

Referring now to the drawings, the machine illustrated therein is an overedge sewing machine that includes a hollow frame 10 which is of relatively low, streamlined construction and is provided with a flat bottom and a curved sloping top, as best shown in Figures 1 and 3. This frame includes a base 11, having a removable bottom plate 12 which is maintained in sealed relation to the remainder of the frame by a gasket 13 and screws (not shown), and a removable cover plate 14 that is held in position by screws 15. The frame has a front end wall

16 and a rear end wall 17, the latter wall being provided with a pair of arcuate air inlet through slots or openings 18 (Figure 3).

Intermediate the end walls is a partition 19 that divides the interior of the frame into a closed front compartment 20 and a rear compartment 21 that is open at the bottom, as indicated, to provide an air outlet or discharge opening 22. The partition has a plurality of heat radiating elements or fins 23. These fins, as best shown in Figures 1 and 2, extend vertically from the bottom to the top of rear compartment 21 (Figure 1) and are spaced apart, as shown in Figure 2, to provide a relatively large heat radiating surface.

The lower portion of compartment 20 constitutes a reservoir for containing a supply of a suitable liquid lubricant 24 for lubricating major wear-receiving actuating parts of the machine that are located in the frame above the normal upper level of the lubricant. Top cover 14 is adapted to be easily and quickly removed to permit introduction of the initial supply of lubricant into compartment 20 or to replenish the lubricant supply, as required.

The frame has a lower extension 25 which projects to the left of front wall 16, as viewed in Figure 1. This extension partially encloses and protects certain stitch forming and work feeding devices which must be located exterior compartment 20, and carries a cloth plate 26 having a depending apron 27 that further protects and conceals stitch forming and work feeding devices of the machine. The cloth plate is pivotal with respect to the frame about a pin 28 (Figure 2). A rotary driving shaft 30 for the operating parts of the machine extends longitudinally of the frame, substantially along a line about midway between the side walls of the frame and midway between the planes of cloth plate 26 and bottom plate 12. The rear end portion of the shaft is journaled in a ball bearing unit 31 and is mounted in a housing 32 that is positioned in a through opening in rear end wall 17 and secured to that wall by screws 33. The outer side of the ball bearing unit is enclosed by a cap member 34 which fits snugly within housing 32 and is secured thereto either by screws or by a press fit therewith. The rear end portion of shaft 30 extends outwardly beyond the frame through the bearing unit and carries a combined hand wheel and pulley 35 that is secured to the shaft by a screw 36. Shaft 30 is supported by a sleeve bearing 37 positioned in partition 19. The shaft is supported intermediate partition 19 and wall 16 in a horizontally split bearing 38 that is mounted in a cross member 39 which is integral with the frame casting. The parts of bearing 38 are disposed in a collar 40, bearing 38 and collar 40 being maintained in assembled position in cross bearing 39 by a screw threaded stud 41. The forward portion of shaft 30 is supported in sleeve bearings 42 and 43 that are carried by front wall 16, bearing 43 being maintained in the illustrated position (Figure 1) by a retainer 44.

The machine is equipped with stitch forming and work feeding devices and actuating means for such devices that may be the same as or similar to the corresponding devices and means illustrated and described in pending application of N. L. Wallenberg, J. G. Attwood and J. Schoij, Serial No. 196,104, filed November 17, 1950, and entitled "Overedge Sewing Machine." Among such devices are a curved needle 45 carried at an end of a needle lever 46 and a presser foot 47 pivotally connected to the lower portion of a presser bar 48. Needle 45 is adapted to cooperate with an under-looper 49 and an overedge looper 50 in the formation of three overedge stitches along the free edge of a piece of work. Mounted on and extending upwardly of the frame is a bracket 51 that supports three thread-tensioning devices 52, 53 and 54 for controlling the tension in the thread delivered, respectively, to needle 45, overedge looper 50 and under-looper 49.

The illustrated machine also has a trimming mechanism for trimming the edge of the work in advance of the stitching operation. This mechanism includes a movable blade 55 that coacts with a stationary plate (not shown) in trimming the work. The devices for forming the stitches, for advancing the work and for trimming the work are operated in unison by a suitable actuating means, generally indicated by numeral 56. The parts of actuating means 56 are preferably the same in construction and operation as corresponding parts disclosed in said N. L. Wallenberg et al. application, Serial No. 196,104, to which reference may be had for further details with respect thereto.

Certain wear-receiving parts of shaft 30, connections between shaft 30 and parts of actuating means 56, connections between relatively movable parts of the actuating mechanism, and devices associated with the actuating mechanism are lubricated in a manner that will now be briefly outlined. In this connection, a splasher 57 is secured by a screw 58 to the periphery of a flange 59 integral with shaft 30. Splasher 57, when in its lowermost position, as shown in Figure 1, projects into the body of lubricant 24. During each revolution of shaft 30 the splasher dips into and out of the lubricant and flings particles of lubricant in the form of a mist or spray into the portion of compartment 20 above the level of the lubricant. Also, a finger 60, carried by a strap 61 that constitutes an element of actuating means 56, dips into and out of the lubricant during each revolution of shaft 30, and generates additional lubricant spray or mist. The lubricant spray lubricates sleeve bearing 37, excess lubricant being returned to compartment 20 by way of annular groove 62 and an inclined passage 63 that establishes communication between the annular groove and the interior of chamber 20. Shaft 30 is lubricated in the region of split bearing 38 by lubricant spray directed thereto by way of a vertical passage 64 which is formed in cross bar 39, collar 40 and bearing 38. The shaft is similarly lubricated in the region of bearing 42 by lubricant which passes downwardly through a vertical passage 65 formed in the frame and in bearing 42. The connections between the relatively movable parts of the actuating mechanism are subjected to and thereby lubricated by the lubricant spray or mist within compartment 20. Parts of the actuating means which extend through front wall 16 are lubricated by the lubricant mist directly or with the aid of suitable wicking (not shown).

For the purpose of supplying lubricant to sleeve bearing 43 and elements to the left thereof, as viewed in Figure 1, we have provided a passage 66 that extends vertically through frame extension 25, retainer 44 and bearing 43. Wicking 67 has its upper part positioned in passage 66 and its lower part immersed in lubricant body 24 and is supported by a helical support 68. Excess lubricant that flows to the left of bearing 42 or to the right of bearing 43 is returned to the

body of the lubricant by way of a passage 69. Excess lubrication to the left of front wall 18 drips into the concave upper portion 70 of frame extension 25, whence it passes downwardly through a filter unit 71 and is returned to the lubricant reservoir. Filter unit 71 is removably attached to extension 25 by screws 72 for ready removal for cleaning or replacement, as required.

A fan 73, coaxial with shaft 30, is positioned wholly within rear compartment 21. The fan comprises a hub 74 and a series of blades 75 and is adjustably secured to the shaft by a set screw 76. During operation of the machine, fan 73 draws a stream of air into compartment 21 through arcuate slots 18. The slots, the fan and heat radiating fins 23 are so arranged that the air drawn into compartment 21 is directed towards and along fins 23 and then discharged from compartment 21 by way of outlet opening 22. This serves to effectively cool the lubricant within compartment 20 by indirect heat exchange as will be apparent from the foregoing description taken in conjunction with the drawings.

From the foregoing it is believed that the construction, operation and advantages of the herein described embodiment of the invention will be readily apparent to persons skilled in the art, without further description. It is to be clearly understood, however, that various changes in the apparatus herein shown and described may be resorted to without departing from the spirit of the invention or sacrificing any of the benefits.

We claim:

1. In a sewing machine, a closed hollow frame comprising spaced first and second walls and a partition intermediate and spaced from said walls and dividing the interior of said frame into a first compartment and a second compartment, said partition being connected to and being in heat conductive relation to the walls of the frame, said second compartment having air inlet and outlet openings communicating with the exterior of said frame, the lower portion of said first compartment constituting a reservoir for containing a supply of a liquid lubricant, a rotary driving shaft extending through said first compartment, stitch forming devices carried by said frame, actuating means for operating said devices in response to rotation of said shaft, said actuating means being at least partially positioned in said first compartment and adapted to be lubricated by said lubricant upon rotation of said shaft, and a fan in said second compartment and secured to and rotatable with said shaft, said fan being adapted upon rotation of said shaft to draw a stream of air into said second compartment through said inlet opening, direct said air toward said partition, and discharge said air through said outlet opening.

2. In a sewing machine, a closed hollow frame comprising spaced front and rear end walls and a partition intermediate and spaced from said walls and dividing the interior of said frame into a front compartment and a rear compartment, said partition being connected to and being in heat conductive relation to the walls of said frame, said rear compartment having air inlet and outlet openings communicating with the exterior of said frame, the lower portion of said front compartment constituting a reservoir for containing a supply of a liquid lubricant, a rotary driving shaft extending through said compartments, said shaft including a rear portion supported for rotation in said rear end wall, means exterior of said frame and attached to said rear portion of said shaft for imparting rotation to said shaft, stitch forming devices carried by said frame adjacent said front wall, actuating means for operating said devices in response to rotation of said shaft, said actuating means being at least partially positioned in said front compartment and adapted to be lubricated by said lubricant upon rotation of said shaft, and a fan in said rear compartment and secured to and rotatable with said shaft, said fan being adapted upon rotation of said shaft to draw a stream of air into said rear compartment through said inlet opening, direct said air toward said partition, and discharge said air through said outlet opening.

3. In a sewing machine, a closed hollow frame comprising spaced front and rear end walls and a partition intermediate and spaced from said walls and dividing the interior of said frame into a front compartment and a rear compartment, said partition being connected to and being in heat conductive relation to the walls of the frame, said rear compartment having air inlet and outlet openings communicating with the exterior of said frame, the lower portion of said front compartment constituting a reservoir for containing a supply of a liquid lubricant, a rotary driving shaft extending through said compartments, stitch forming devices carried by said frame adjacent said front wall, actuating means for operating said devices in response to rotation of said shaft, said actuating means being at least partially positioned in said front compartment and adapted to be lubricated by said lubricant upon rotation of said shaft, said partition including a plurality of upstanding spaced-apart heat radiating fins that extend substantially from the bottom to the top of said rear compartment, said fins being wholly within said rear compartment and projecting toward said rear end wall, and a fan in said rear compartment and secured to and rotatable with said shaft, said fan being adapted upon rotation of said shaft to draw a stream of air into said rear compartment through said inlet opening, direct said air toward said heat radiating fins, and discharge said air through said outlet opening.

4. A sewing machine in accordance with claim 3, wherein said shaft includes a rear portion supported for rotation in said rear end wall, and means exterior of said frame and attached to said rear portion of said shaft for imparting rotation to said shaft.

5. A sewing machine in accordance with claim 1, wherein said partition includes a plurality of heat radiating elements that project into said second compartment.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 2,127,192 | Toth, Jr. | Aug. 16, 1938 |
| 2,144,326 | Callaghan | Jan. 17, 1939 |
| 2,249,615 | Lutz | July 15, 1941 |
| 2,432,285 | Christensen et al. | Dec. 9, 1947 |