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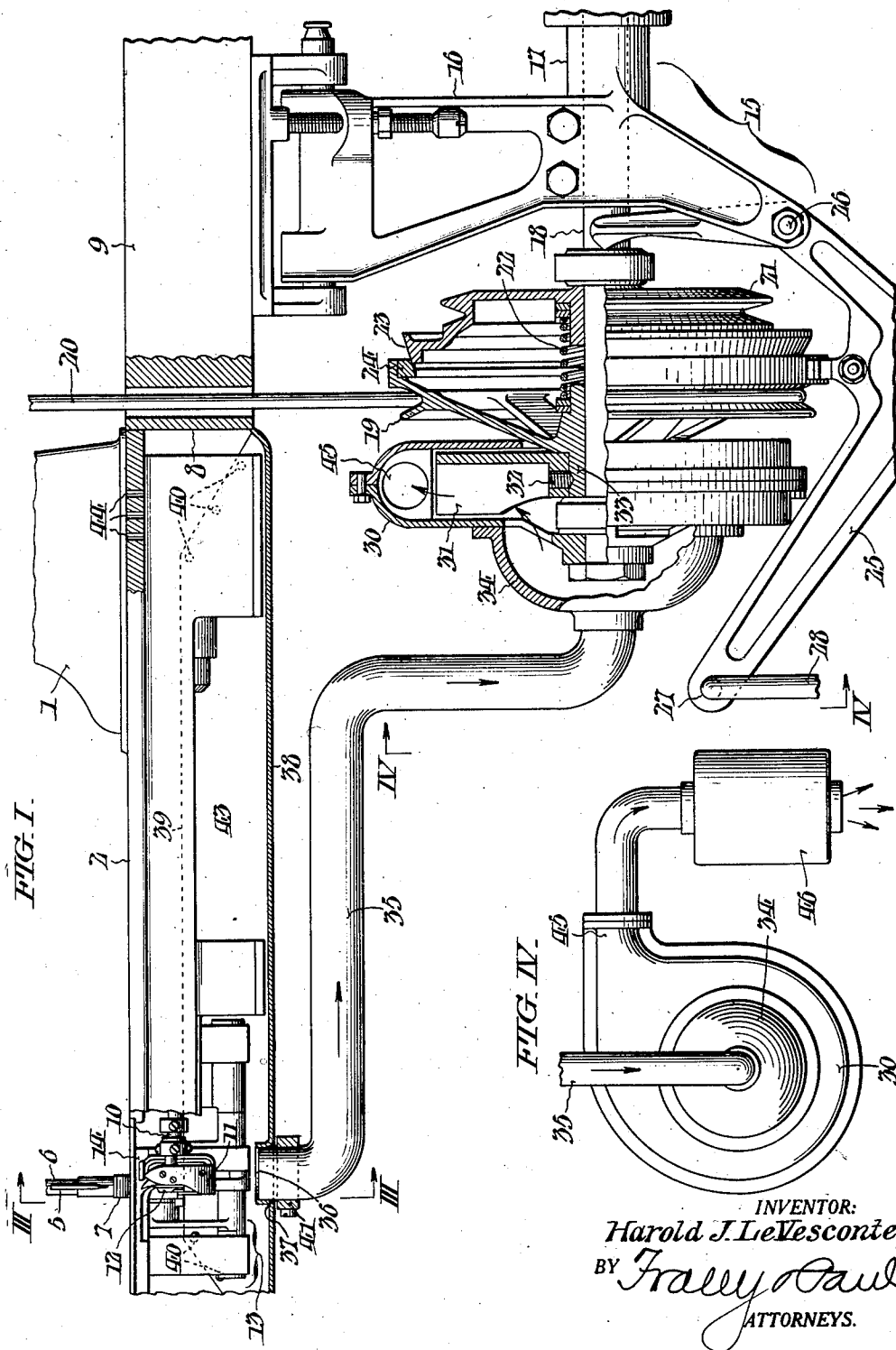
H. J. LE VESCONTE

2,082,738

SEWING MACHINE

Filed June 29, 1935

2 Sheets-Sheet 1



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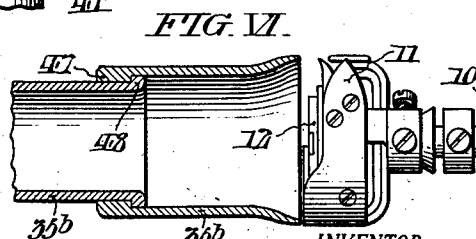
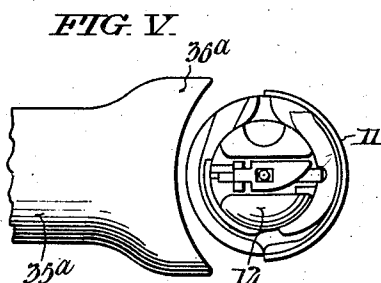
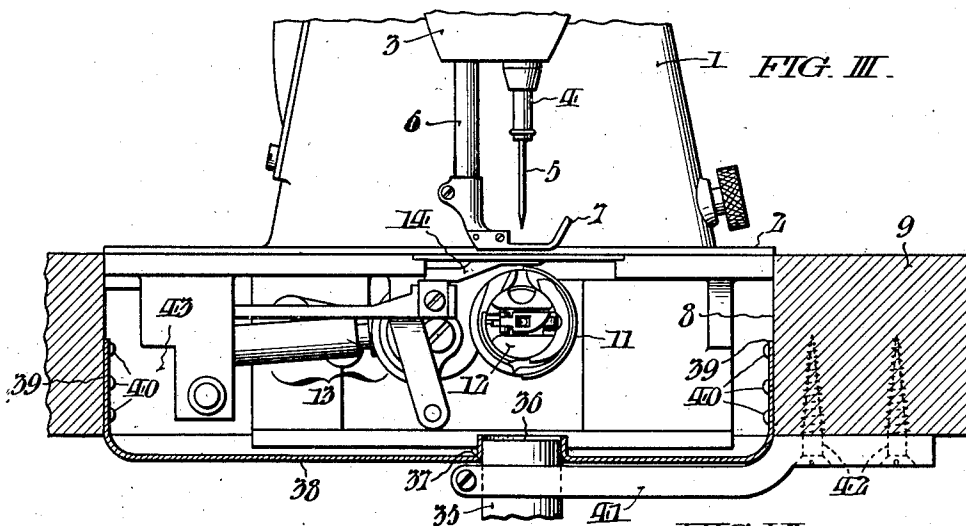
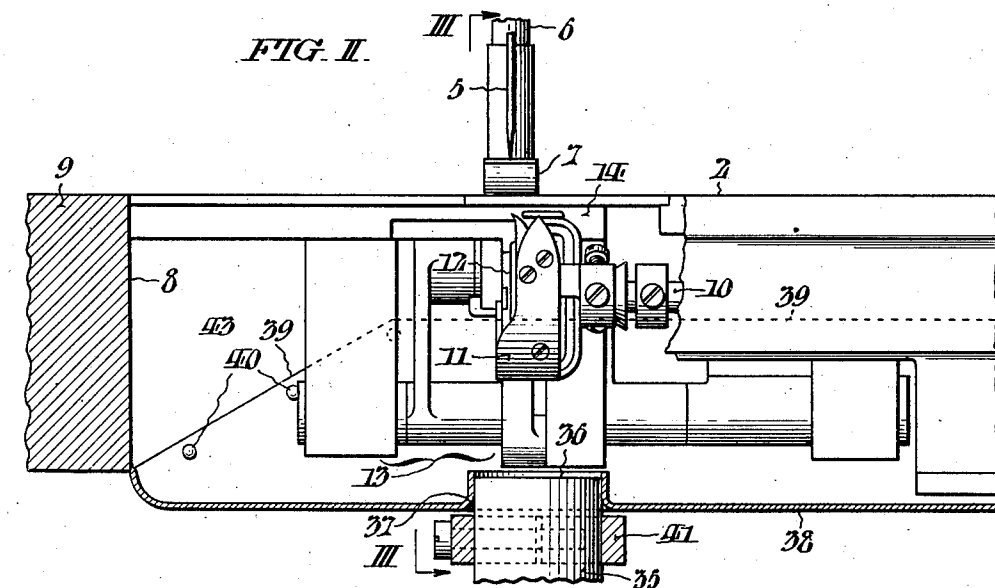
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UNITED STATES PATENT OFFICE

2,082,738

SEWING MACHINE

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Application June 29, 1935, Serial No. 29,012

14 Claims. (Cl. 112-218)

This invention relates to sewing machines, particularly to sewing machines wherein a rotary hook cooperates with the needle in stitch formation.

At high speeds, the moving parts of such machines, including the needle and the rotary hook, heat up notwithstanding the use of anti-friction bearings and lubrication of the parts. This condition is aggravated by collection of lint and dirt on the rotary hook and the associated bobbin casing, with formation of a blanketing which acts as thermo-insulation to prevent free dissipation of the heat.

My present invention obviates the drawbacks which have been mentioned. This is accomplished by provision of a simple suction system for maintaining a flow of cooling air through and about the stitch forming instrumentalities, as well as around the moving parts of the mechanism by which the rotary hook is actuated, so that the various parts are not only effectively cooled, but kept free of lint and dirt accumulation. The suction means preferably include a pump of the rotary type having its air-displacing fan driven directly by a moving element of a power transmitter unit associated with the machine. From this pump extends a suction tube with its intake or mouth positioned adjacent the rotary hook within an enclosure below the work supporting plate of the machine housing said hook, the feed dog of the machine and the parts whereby these elements are directly actuated.

I am aware that compressed air has been employed heretofore to cool the rotary hooks of sewing machines. While cooling in this way was effective, it was unsatisfactory in that the lint and dirt dislodged from the rotary hook was blown about beneath the work plate of the sewing machine and settled upon other parts of the mechanism. This drawback is also overcome through my invention.

Other objects and attendant advantages will appear from the description following of the drawings wherein Fig. I is a fragmentary view partly in front elevation and partly in longitudinal section of a sewing machine embodying the suction system of my invention.

Fig. II is a fragmentary longitudinal sectional view of the machine in the vicinity of the stitch-forming and feeding instrumentalities, drawn to a larger scale.

Fig. III is a fragmentary cross sectional view of the machine taken as indicated by the arrows III-III in Figs. I and II.

Fig. IV is a view looking as indicated by the

arrows IV-IV in Fig. I, and drawn to a smaller scale.

Figs. V and VI are detail views showing slight modifications of my invention.

The sewing machine herein illustrated is of well known construction having a standard, partly shown at 1, rising from the work supporting plate 2 at one end of the latter. As usual, the standard 1 supports an overhanging arm, not shown, with a terminal head 3 (Fig. III) which affords guidance to a vertically-reciprocating bar 4 for a seaming needle 5, as well as to a presser bar 6 for the presser foot 7. In the illustrated instance, the bed plate 2 of the sewing machine fits within an opening 8 in a table 9 with its upper surface flush with that of said table. Suitably journaled in bearings pendant from the work supporting plate 2 is a shaft 10 to which is secured the rotary hook 11 of the machine, said rotary hook revolving about a bobbin casing 12 incident to cooperation with the needle 5 in the well known manner. The mechanism 13 for actuating the feed dog 14 is also disposed beneath the work supporting plate 2 as shown in Figs. I-III. The machine is in this instance driven from a transmitter which is comprehensively designated in Fig. I of the drawings by the numeral 15. This transmitter 15 comprises a bracket 16 which is adjustably suspended from the bottom of the table 9, and which affords a supporting boss 17 for a non-rotating shaft 18. A pulley 19 free on the shaft 18 is coordinated, by means of a belt 20, with the main shaft (not illustrated) of the sewing machine. Also freely mounted on the shaft 18 adjacent the pulley 19, is another pulley 21 which is normally pressed away from the pulley by a spring 22 and which is adapted to be connected, by means of a belt (not illustrated), with a suitable source of power such as an electric motor for example. When it is desired to operate the sewing machine, the pulley 21 is shifted leftward on the shaft 18 in opposition to the spring 22 to bring an integrally-formed clutch portion 23 with a cooperating clutch portion 24 of the pulley 19. The means for effecting the clutching includes a lever 25 fulcrumed at 26 on the bracket 16, and having an aperture 27 at its free end for connection, by a link 28, to a suitable control treadle, not illustrated.

In order to cool the needle 5, the rotary hook 11, the feed dog 14, as well as the mechanism of the machine below the work supporting plate 2, I have provided means as follows: Supported on the shaft 18 of the transmitter 15 at the left of

the pulley 19 as viewed in Fig. 1, is the casing of a suction pump 30, which, as shown, has the form of a rotary suction blower whereof the air-displacing fan 31 is secured, by a set screw 32, to the hub 33 of said pulley. Connected to the inlet 34 of the rotary suction blower 30 is an angularly-bent suction tube 35 which extends upward, and then leftward longitudinally beneath the sewing machine. The upturned open end 36 of the tube 35, it will be noted, projects into an aperture 37 in sheet metal plate 38 which closes the bottom of the opening 8 in the table 9, and terminates in line with the rotary hook 11. As shown, the cover plate 38 has upward flanges 39 abutting the sides of the table opening 8, and is secured by fastening devices indicated at 40. The tube 35 may be supported in any suitable way as for example, by a bracket arm 41 which is made fast to the bottom of the table 9 by screws 42, and which clampingly engages the upturned end 36 of said tube. Most of the air displaced by action of the suction blower 30 enters the chamber 3 directly above the rotary hook 11 through the apertures in the work plate for the needle 5 and the feed dog 14 so that a strong draft is maintained at that region, the remainder being permitted to enter said chamber at any suitable location, for example, at the right hand or remote end (Fig. 1) through openings 44 in the work plate. In practice, the number, size and location of the influx openings 44 is such that only a predetermined proportion of the air is admitted into the chamber 43 at that point.

Under the action of the blower 30, air is continuously sucked into the tube 35 with creation of a strong flow through and about the rotary hook 11 and the bobbin casing 12 associated therewith, as well as about the needle 5 when the latter is in its lower position, whereby these parts are effectively cooled, most of this air entering the chamber 43 through the needle and feed dog openings in the work plate 2 directly above the hook as already explained. The air flow thus set up, furthermore keeps the rotary hook 11 and the bobbin casing 12 free of lint and dirt, thereby precluding the formation of a thermo-insulating blanketing such as would interfere with ready dissipation of heat resulting from friction between said hook and bobbin casing at high speeds. There is also maintained under the action of the rotary blower 30 by virtue of the aforescribed allocation of the influx holes 44 in the work plate, a continuous flow of air at a lower velocity through the chamber 43, to effectively cool the other parts of the sewing machine mechanism and to keep them free of lint accumulation. Thus, with the suction air flow system of my invention, it is possible to operate the sewing machine at higher speeds than ordinarily without overheating and excessive wear of the parts; particularly the rotary hook and the bobbin casing, wherein considerable heat is generated by friction between the interengaging groove and ridge portions of said hook and casing.

Although the discharge from the rotary blower may be released directly into the atmosphere, I prefer to filter out the lint and dust. I have accordingly connected, to the outlet 45 (Fig. IV) of the suction blower 30, an air cleaner 46 which may be of any approved or well known type.

In the modification of my invention shown in Fig. V, the end 36a of the suction pipe 35a is enlarged or flared to comprehend a greater portion of the periphery of the rotary hook; and

said pipe end is moreover positioned to draw the air laterally from within and about the hook instead of downward as in Fig. I.

As another alternative, the air may be drawn axially from within and about the rotary hook 11 as shown in Fig. VI by allocation of the end 36b of the suction tube 35b in front of and in direct axial alignment with said hook. In order to render the rotary hook 11 accessible for removal and reinsertion of the bobbin casing as required for thread replenishment, the end 36b of the tube 35b is made as a separate piece and telescopically engages the tube so that it can be slid back out of the way. The extent to which the tube end 36a can be moved in the direction toward the rotary hook 11 is limited through engagement of an internal flange 47 thereof with an external flange 48 on the tube 35b.

Under certain conditions of operation, for instance, in sewing and darning used bags, the dust and lint is very heavy and falls rapidly. Under such a condition, a suction pipe with its end positioned as shown in Figs. I, II and III will serve very satisfactorily. Under other conditions where a very light lint is liberated, it is desirable to extend the suction pipe closer to the rotary hook as shown in Figs. V and VI. I do not, therefore, consider myself limited to the precise details of construction and arrangement herein illustrated by way of example since these may be varied to suit any conditions of practice within the scope of the broader of the appended claims.

Having thus described my invention, I claim:

1. In a sewing machine, a work supporting plate; a reciprocating needle actuated from above said plate; cooperative stitch-forming instrumentalities; feed means to advance the fabric being seamed; mechanism for actuating said cooperative stitch-forming and feed instrumentalities; an enclosure beneath said work supporting plate housing said mechanism; and suction means for maintaining a flow of air through the enclosure to cool the various parts within it and to keep them free of lint.

2. In a sewing machine, a work supporting plate; a reciprocating needle actuated from above the plate; a feed dog to advance the fabric being seamed; a rotary hook to cooperate with the needle, mechanism for actuating said rotary hook and the feed dog, an enclosure beneath the work supporting plate housing said hook, feed dog and mechanism; and suction means for maintaining a flow of air through the enclosure to cool the various parts within it and to keep said parts free from lint.

3. In a sewing machine, a work supporting plate; a reciprocating needle actuated from above said plate; a cooperating stitch-forming instrumentality; feed means to advance the fabric being seamed; mechanism for actuating said stitch-forming instrumentality and feed means; an enclosure beneath said work supporting plate housing said mechanism; a transmitter with a power pulley from which the machine is driven; and suction means for maintaining a flow of air through the enclosure to cool the various parts within it and to keep them free of lint, said suction means including a suction pump driven from a pulley of said transmitter and a suction tube leading from the pump and terminating adjacent the stitch-forming instrumentalities within the enclosure.

4. In a sewing machine, a reciprocating needle; a rotary hook to cooperate with the needle; and

suction means to create a flow of air through and around the hook to cool it and keep it free of lint, including a suction pump, and a suction tube leading from the pump to a point adjacent the rotary hook.

5 5. In a sewing machine, a reciprocating needle; a rotary hook to cooperate with the needle; and suction means to create a flow of air through and around the hook to cool it and keep it free of lint, including a suction pump, and a suction tube leading from the pump and having its end positioned laterally of the rotary hook.

10 6. In a sewing machine, a reciprocating needle; a rotary hook to cooperate with the needle; and suction means to create a flow of air through and around the hook to cool it and keep it free of lint, including a suction pump, and a suction tube leading from the pump and having its end positioned axially of the rotary hook.

15 7. In a sewing machine, a reciprocating needle; a rotary hook to cooperate with the needle; and suction means to create a flow of air through and around the hook to cool it and keep it free of lint, including a suction pump, and a suction tube leading from the pump and terminating at the rotary hook, said tube having an end portion which is movable for convenience of access to the hook.

20 8. In a sewing machine, a reciprocating needle; a rotary hook to cooperate with the needle; and suction means to create a flow of air through and around the hook to cool it and keep it free of lint, including a suction pump, and a suction tube leading from the pump and terminating at the rotary hook, said tube having a telescoping end portion capable of being shifted out of the way for convenience of access to the rotary hook.

25 9. In a sewing machine, a work supporting plate; a reciprocating needle actuated from above the plate; a feed dog to advance the fabric being seamed; a rotary hook to cooperate with the needle and mechanism for actuating said rotary hook and the feed dog; an enclosure beneath the work supporting plate housing said hook, feed dog and mechanism, said mechanism having air influx holes at the end remote from the rotary hook and the feed dog; and suction means for maintaining a flow of air through the enclosure to cool the various parts within it and to keep said parts free from lint, most of the air being drawn into the enclosure through the needle and feed dog openings in the work plate directly above the rotary hook, and the remainder through influx holes at the remote end of said enclosure.

30 10. In a sewing machine, a work supporting plate; a reciprocating needle actuated from above the plate; a feed dog to advance the fabric being seamed; a rotary hook to cooperate with the needle; mechanism for actuating said rotary hook and the feed dog; an enclosure beneath the work supporting plate housing said hook, feed dog and mechanism, and suction means main-

taining a flow of air through the enclosure to cool the various parts within it and to keep them free from lint, said means including a suction pump, and a tube leading from the pump and terminating within the enclosure adjacent the rotary hook.

11. In a sewing machine, cooperating stitch-forming instrumentalities; a transmitter comprising a power pulley, a secondary pulley coordinated by belt with the sewing machine, and clutch means for controlling connection and disconnection of the secondary pulley to and from the power pulley; and suction means to create a flow of air in the vicinity of the stitch-forming instrumentalities to cool them and keep them free of lint, said suction means including a rotary pump with an air displacing fan mounted on the secondary pulley of the transmitter, and a suction tube leading from the pump and terminating adjacent said stitch-forming instrumentalities.

12. In a sewing machine, cooperating stitch-forming instrumentalities; a power transmitter unit with a power shaft, a drive wheel coordinated with the sewing machine, and a clutch whereby the wheel can be connected and disconnected from the power shaft; and suction means for creating a flow of air in the vicinity of the stitch-forming instrumentalities to cool them and keep them free of lint, including a suction pump built into the power transmitter unit and actuated by the drive wheel of the latter, and a suction tube leading from the pump and terminating at the stitch-forming instrumentalities aforesaid.

13. In a sewing machine, cooperating stitch-forming instrumentalities; a power transmitter unit with a power shaft, a drive wheel coordinated with the sewing machine, and a clutch whereby the wheel can be connected and disconnected from the power shaft; and suction means for creating a flow of air in the vicinity of the stitch-forming instrumentalities to cool them and keep them free of lint, including a rotary suction pump built into the power transmitter unit with its rotor actuated by the drive wheel aforesaid, and a suction tube leading from the pump and terminating at the stitch-forming instrumentalities of the sewing machine.

14. In a sewing machine, a work support; cooperating stitch-forming instrumentalities for sewing fabric fed along the work support; a power transmitter below the work support having a power shaft, a drive wheel coordinated with the sewing machine, and a clutch whereby the wheel can be connected and disconnected from the power shaft; and suction means for creating a flow of air in the vicinity of the stitch-forming instrumentalities including a suction pump built into the power transmitter unit and actuated by the drive wheel of the latter, and a suction tube leading from the pump and terminating at the stitch-forming instrumentalities aforesaid.

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