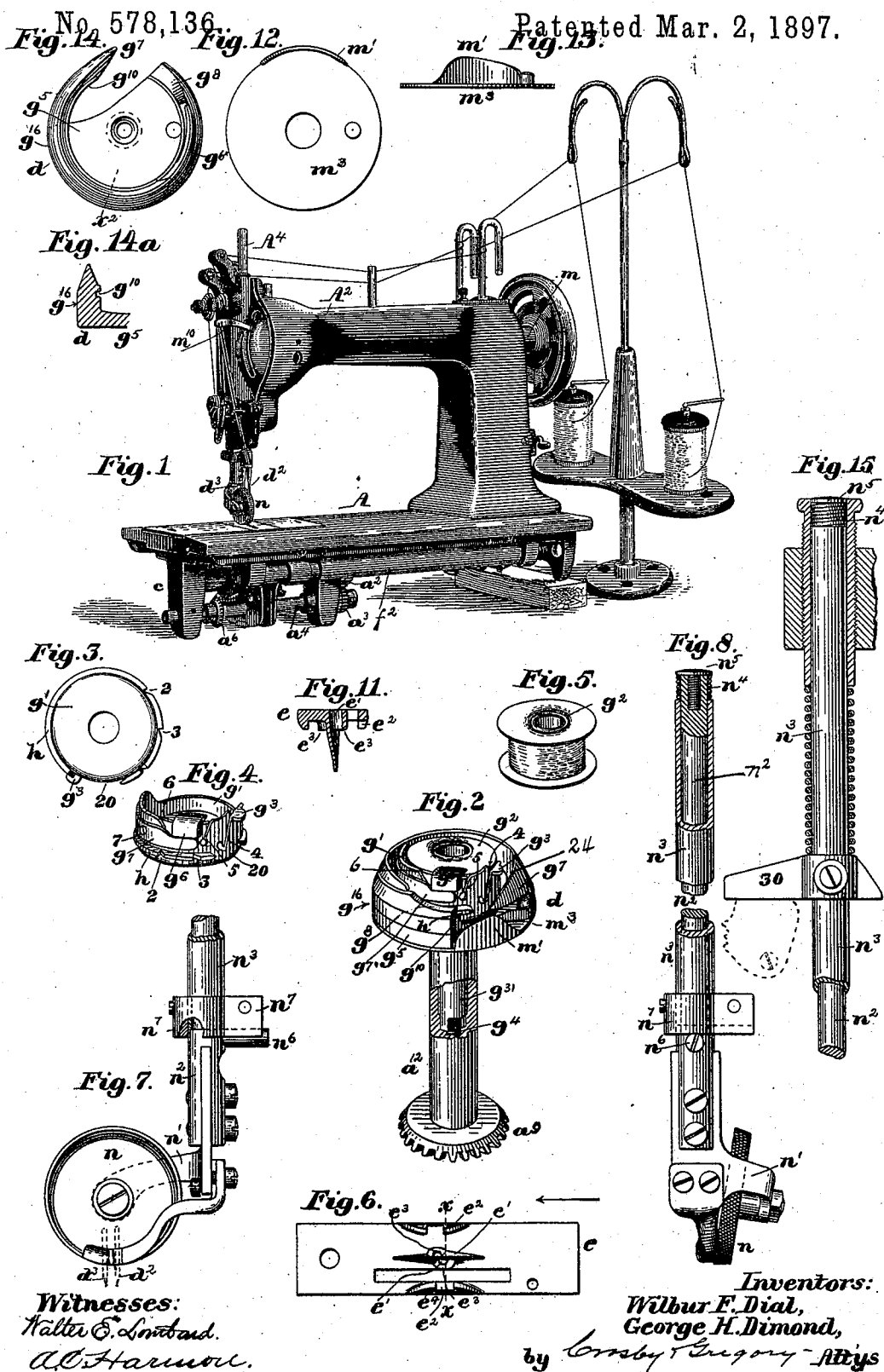


2 Sheets—Sheet 1.

SEWING MACHINE.

No. 578.136

Patented Mar. 2, 1897.



(No Model.)

2 Sheets—Sheet 2.

W. F. DIAL & G. H. DIMOND.
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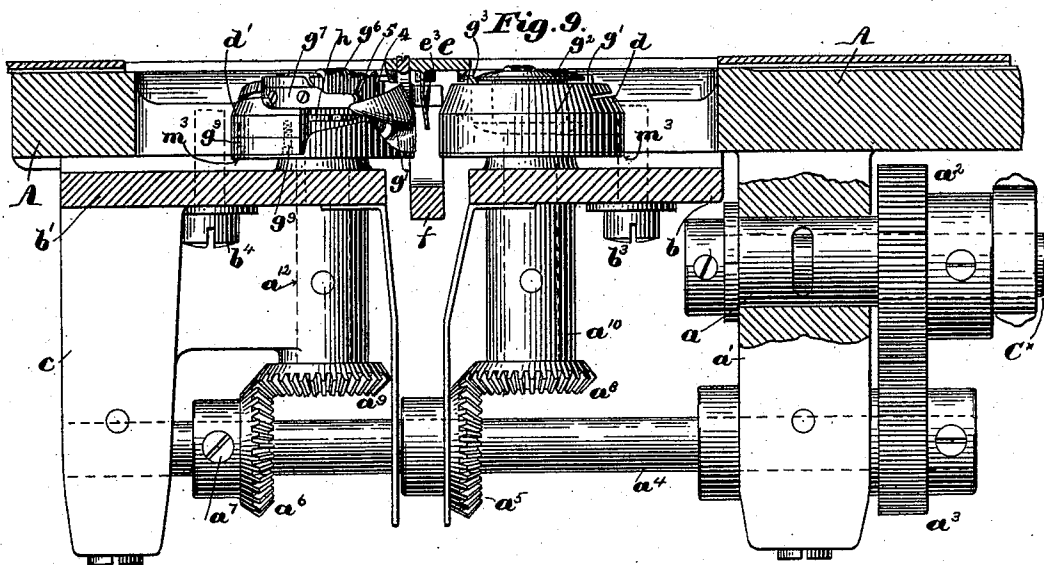
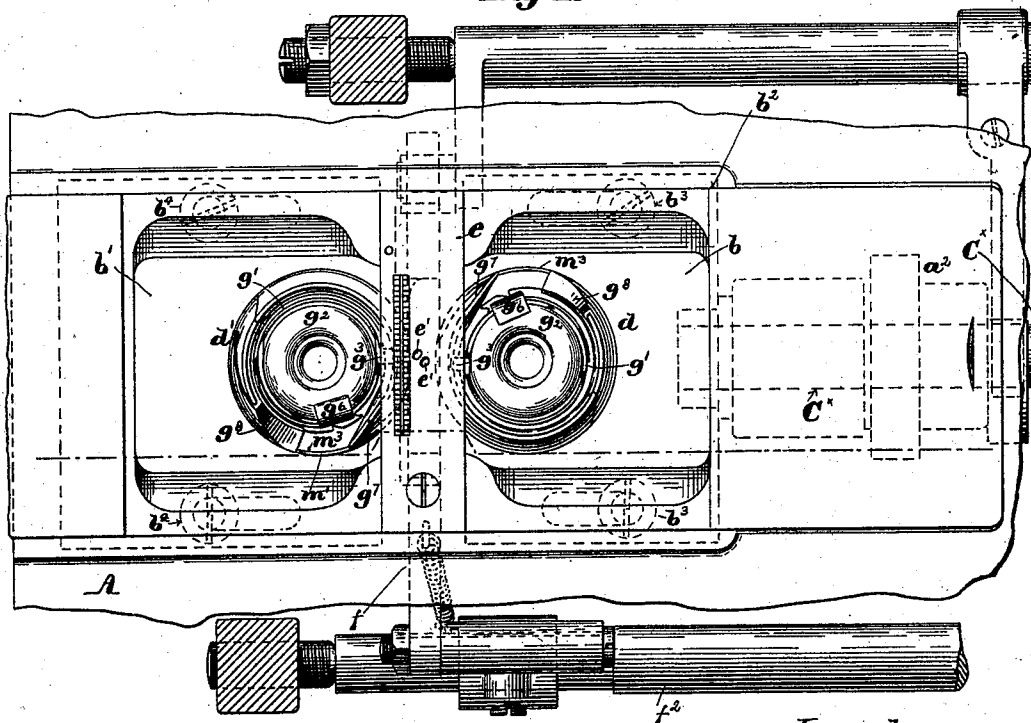


Fig. 10.



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UNITED STATES PATENT OFFICE.

WILBUR F. DIAL AND GEORGE H. DIMOND, OF BRIDGEPORT, CONNECTICUT,
ASSIGNORS TO THE WHEELER & WILSON MANUFACTURING COMPANY,
OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 578,136, dated March 2, 1897.

Application filed January 3, 1896. Serial No. 574,229. (No model.)

To all whom it may concern:

Be it known that we, WILBUR F. DIAL and GEORGE H. DIMOND, of Bridgeport, in the county of Fairfield, State of Connecticut, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

10 This invention has for its object the improvement of that class of sewing-machines making a lock-stitch and employing a rotary hook to pass the loop of needle-thread about a bobbin, the hook used being substantially of the form represented in United States Patent No. 480,181, dated August 2, 1892.

In that patent the hook is rotated in a vertical plane; but in this invention the hook is rotated in a horizontal plane, and to adapt it for use in this position we have been obliged to change the form of the hook and have materially modified the form of the bobbin or thread case.

We have herein shown our invention embodied in a machine adapted to sew parallel seams, and the two hooks are so mounted and supported that they may be separated more or less to determine the distance apart of the rows of stitching.

30 To advantageously employ a hook rotating in a horizontal plane, we have made improvements in the needle-plate, which is shown as arranged in stationary position between the two hooks. The said needle-plate has been provided with notches to receive projections from the bobbin-cases and restrain their rotation, and with grooves at its under side, through which travel the flanges of hooks, the said flanges acting on the under thread between the needle-plate and the bobbins and pulling from the latter thread to be used in the next stitch.

To insure correct meshing of the gears on the under shaft and the hook-operating shafts, we have mounted one of said shafts in an eccentric bearing, which may be turned as desired.

We have also improved the construction of the presser-foot bar, whereby the presser-foot may be readily turned aside when it is desired to examine the work or thread or set needles.

Figure 1, in perspective, shows a sewing-machine embodying our invention. Fig. 2 is an enlarged detail showing one of the hooks, bobbin-case, and bobbin. Figs. 3 and 4 show different views of the bobbin-case removed. Fig. 5 shows the bobbin for holding the under thread. Fig. 6 is an under side view of the throat-plate. Fig. 7 and 8 are details showing our improvements in the presser-foot bar. Fig. 9 is an enlarged side elevation, partially in section, of the stitch-forming mechanism located below the bed-plate and part of its driving mechanism. Fig. 10 is a plan view of the parts shown in Fig. 9, the cover-plates being partially withdrawn and the bed-plate being partially broken away. Fig. 11 is a section of the needle-plate on the irregular dotted line x , Fig. 6; Figs. 12 and 13, views of the needle-guard detached; Fig. 14, a top or plan view of the hook or loop-taker alone; Fig. 14^a, a partial section in the line x^2 , Fig. 14; and Fig. 15, a detail of the presser-foot bar and tube chiefly to show the lug 30.

The needle-bar A^4 , the take-up m^{10} , the framework composed of a bed A and an overhanging arm A^2 , the hand-wheel fast on a needle-bar shaft m , having an attached link and cam for moving, respectively, the needle-bar and the take-up, the under shaft C^x , rotated by a link or links connected to a crank or cranks on the needle-bar shaft, and the feed-actuating rock-shaft f^2 , the feed-bar f , and connections between it and said rock-shaft are and may be all as represented in United States Patent No. 405,205, dated June 11, 1889, so need not be herein further described.

The front end of the under shaft C^x is mounted in an eccentric bearing a , set in a hole in the depending lug a' of the bed, and said shaft has a toothed gear a^2 , which engages a pinion a^3 of one-half its size on the hook-driving shaft a^4 , provided with two like bevel-gears a^5 and a^6 , each connected in an adjustable manner with the said shaft by suitable set-screws, as a^7 .

The turning of the eccentric bearing insures the correct meshing of the gear and pinion and makes a provision to compensate for wear. The bevel-pinions a^5 and a^6 engage

each a like bevel-pinion a^8 or a^9 , fast at the lower end of a vertical shaft a^{10} or a^{12} , (see dotted lines, Fig. 9,) each shaft having attached to its upper end a like hook, to be described. The shafts a^{10} and a^{12} have their bearings in saddles b and b' , fitted to slide in a guideway b^2 , made in the bed-plate, each stand being fixed, when properly adjusted in said guideway, by means of suitable binding-screws b^3 b^4 , screwed into the bed-plate and passed through slots in the saddles. These saddles are adjustable in order that the hooks d d' , connected to the upper ends of the vertical shafts a^{10} a^{12} , may be moved each toward or from the other to thus enable them to cooperate each one with its own eye-pointed needle d^2 or d^3 , both attached to and operated by the needle-bar, said needles being more or less separated, according to the distance desired between the parallel seams to be sewed. The saddle b' has a depending lug c , bored to receive one end of the hook-driving shaft a^4 .

The hooks, bobbin-cases, and bobbins are just alike, so we will specifically describe but one of them, and it will be understood that we may use either one or two hooks and needles, according to whether one or two seams are to be sewed, one and the same feeding device feeding the work whether one or two hooks are employed.

The needle-plate e , as shown best in Fig. 6, has two like needle-holes e' , and the under side of the said plate at one side of each needle-hole and between said hole and the nearest hook has a notch e^2 , in which enters loosely a projection g^3 (see Fig. 4) of the bobbin-case g' , the notch and projection preventing the rotation of the bobbin-case with the hook.

The needle-plate has extended downwardly from it about each needle-hole a boss e^3 , (see Fig. 11,) the boss being of such length that the flange or vertical wall of the hook in the rotation of the latter acts on the under thread close to and bends the thread over the edge of said boss, and in so doing acts to draw on said thread and pull it to a measured extent from the bobbin to form slack thread for the next stitch.

The part marked 24 of the vertical flange, commencing close to the root of the hook, is the part which acts upon the shuttle-thread between the boss and the bobbin-case to pull thread from the bobbin for the next stitch to be made, the pulling off of the shuttle-thread being fully effected before the take-up acts to set the stitch.

The stitch is not set by the action of the take-up until after the thread has been drawn from the bobbin, and when the stitch is being set the under thread occupies a position between the point and heel of the hook and is free from the action on it of the flange of the hook.

The hook does not enter and pass through a loop of needle-thread, as does the shuttle, but it merely takes a loop of needle-thread and casts it about a bobbin within a bobbin-

case held in the chamber at the face of the hook.

If the machine has but one hook, it will of course be understood that the needle-plate need have but one needle-hole, boss, and notch.

The bobbin or under thread is herein shown as wound on a deep disk bobbin g^2 ; but the particular method of holding the under thread is immaterial, as we may use balls, cops, or other usual or suitable thread masses.

The vertical hook-shaft, as shown in Fig. 2, is bored centrally to receive the shank g^{31} of the hook, the hole to receive the shank and the shaft itself having suitable flattened portions to retain the hook in registered position, and the shank of the hook is also preferably bored for the reception of a screw g^4 , which enters a threaded part in the vertical hook-shaft.

The hook d is cup-shaped, substantially as described in said Patent No. 480,181, and has a lip or flange grooved at its inner side.

The circularly-moving hook d is composed of a shank or back g^5 and a flange g^{16} g^{6x} , made in two parts, one part—viz., the one g^{16} —made as a permanent part of the back, having a point g^7 , the other part of the flange having what we call the “heel” g^8 made on it, being connected to the back by suitable screws g^9 . (See Fig. 9.)

The flange is grooved at its inner side, as at g^{10} , from near the point of the hook through the heel to receive the annular projection h on the exterior of the bobbin-case g' , the said projection being cut out, as shown in Fig. 4, to leave a notch or opening 20, into which the point of the hook in engagement with the loop of needle-thread carries the inactive side of the loop, the said loop being retained in said notch, while the hook in its further rotation opens and spreads and casts the loop over and about the thread-case and the under thread, the said loop passing out of said notch as soon as the heel of the hook uncovers the notch, the take-up at that time acting and pulling the loop up into the material.

The projection has other notches, 23, which serve to receive the threads or loose ends thereof which may accidentally get into the space between the wall of the hook and its bobbin-case, which threads would seriously interfere with the proper rotation of the hook. The notches 23 in the projection h entering the groove in the inner wall of the hook are of such depth with relation to the depth of said groove that any loose ends of thread entering accidentally either of said notches will not be cut by being pinched between the said projection and the inner wall of the hook, but said thread will lie in said notch and be thereby kept out of the way and the movement of the hook will not be clogged, said loose ends escaping from said notches after the heel of the hook passes the notch. About one-half of the vertical wall of the bobbin-case is cut away down nearly to the said projection, the part of the wall left having the projection g^3 ,

the three thread-slots 4 5 6 and the lip g^6 extended inwardly to somewhat overlap the bobbin or other device carrying the under thread and keep the bobbin within the case, the said lip also serving the additional purpose of aiding the loop in passing over the edge of the bobbin and bobbin-case, the said wall having attached to it in an adjustable manner by suitable screws, as 7, a tension device g^7 , shown as a spring, the movement of the screw 7 in one or the other direction increasing or diminishing the tension on the bobbin-thread which is delivered from the bobbin-case through the rounded lower end of the slot 4.

The bobbin-case rests in the cavity at the face of the hook and it contains the bobbin or under thread, and this bobbin has frequently to be renewed to afford proper supply of thread, and by cutting away the wall of the bobbin-case, as stated, the operator may readily insert the finger into the thread-case and under the upper or head end of the bobbin and pick it out of the case. The removal of the wall of the bobbin-case is therefore of vital importance, for if it were not done the bobbin could neither be put in nor taken from the case.

To put a bobbin-case into the hook or to remove a case from the hook, it is necessary to take off the removable part of the flange having the heel.

At the under side of the back of the hook we apply a needle-guard, (see Fig. 12,) shown as a washer m^3 , having a cam-shaped flange m' , the said flange occupying such position as to meet the needle if deflected out of its true working vertical position, the said flange acting then upon the needle to put it properly in alinement to enable the point of the hook to unerringly enter the loop of needle-thread and prevent the breaking of the needle by the contact of the hook against it.

The foot n is herein shown as a roller attached to a shank n' , secured suitably to the lower end of a presser-foot bar n^2 and extended through and having its bearing in a tube n^3 , the upper end of the tube supporting a spring n^4 , which latter at its upper end acts against the under side of a screw-head or equivalent flange n^5 , fixed to the presser-foot bar, the said spring thus normally acting to draw the bar upwardly in the tube and to keep a pin or projection n^6 , fast on said bar, into a notch in a collar n^7 , secured to the lower end of the tube, the pin and notch constituting a locking device to keep the foot in operative position and yet permit the said foot to at desired times be turned aside to expose the sewing and to afford free access to the needles for threading and setting.

The tube has a lateral projection 30, against which acts the usual cam-shaped presser-bar lifter, so that in this instance the tube is lifted and the bar with it.

The under thread leaves the bobbin-case and is led upwardly and at an angle to and against the boss, however made, beneath the

throat-plate, and near the needle-hole, and in this angular position of the thread it is acted upon by the said flange or vertical side wall of the hook or by a part attached to and moving therewith, thus drawing the under thread off, as described.

The hook-driving shaft and hook-shaft are rotated twice while the under and needle-actuating shaft are rotated once, so that while the needles make one complete reciprocation the hooks rotate twice. By this difference in speed it becomes possible to rotate the hooks at a uniform speed and to enable them to take the loop of needle-thread and cast it about the under thread in proper time for the take-up and feed mechanism to act.

This invention is not limited to the exact construction of the novel features herein described, for the same may be varied in detail by only the exercise of the skill of the mechanic and without invention.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. An eye-pointed needle, and a hook having a circular movement in a horizontal plane and provided with a point to take a loop of thread from the needle, and a thread-case open at its outer end for the reception of a bobbin, and having at its outer edge an inturned fixed lip overhanging the open end of the thread-case, the wall of said thread-case being cut away opposite said fixed lip, combined with a bobbin adapted to be inserted in said thread-case at its cut-away portion by a lateral and downward movement, said bobbin being thus put under said lip, substantially as described.

2. An eye-pointed needle, and a hook having a circular movement in a horizontal plane to take a loop of thread from the needle, a bobbin and a thread-case having an open outer end for the reception of the bobbin, said case having extended outwardly from its outer end a lug g^3 and at a short distance therefrom having an inwardly-turned fixed lip overhanging the space in the thread-case, the wall of the thread-case being cut away opposite said fixed lip, combined with means to cooperate with said outwardly-turned lug to restrain the thread-case from rotation, substantially as described.

3. A throat-plate having a needle-hole, a boss extended downwardly near said hole, a thread-case having a thread-guide, and a bobbin of under thread therein, a hook carrying said thread-guide arranged to be rotated in a horizontal plane and having a point and an upwardly-extended flange forming a continuation thereof, said thread-guide being located below the plane of the flange, whereby the said flange, at the root of the point, acts in the movement of the hook against the under thread between the said boss and the thread-case to draw from the thread-case some under thread, preparatory to the action of the take-up, to be used in the next stitch, combined with a take-up and means to actuate it at a

time when the bobbin-thread is off the said flange and lies between the said point and the heel of the hook, substantially as described.

4. A needle, a needle-bar, means to move
5 it, a circularly-moving hook having a flange provided at its inner side with a groove, combined with a bobbin-case having an annular projection entering said groove and provided with a notch or opening into which the loop
10 of needle-thread is put by rotation of the hook during the action of casting the loop about the bobbin-case, the said projection having other notches in which loose ends of thread may be caught to thus prevent said loose ends
15 from clogging the movement of the hook, substantially as described.

5. The tube extended up through the head of the machine, means to lift said tube and

the presser-foot bar located within said tube and extended above its open upper end, and 20 a presser-foot secured to the lower end of said bar, combined with a spring to normally act on said bar between the shoulder at its top and the top of said tube to enable the spring to lift the bar within the tube, and with a 25 locking device cooperating with said bar, tube and spring to lock the foot in its operative position, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of 30 two subscribing witnesses.

WILBUR F. DIAL.
GEORGE H. DIMOND.

Witnesses:

ISAAC HOLDEN,
T. W. CUTTING.