

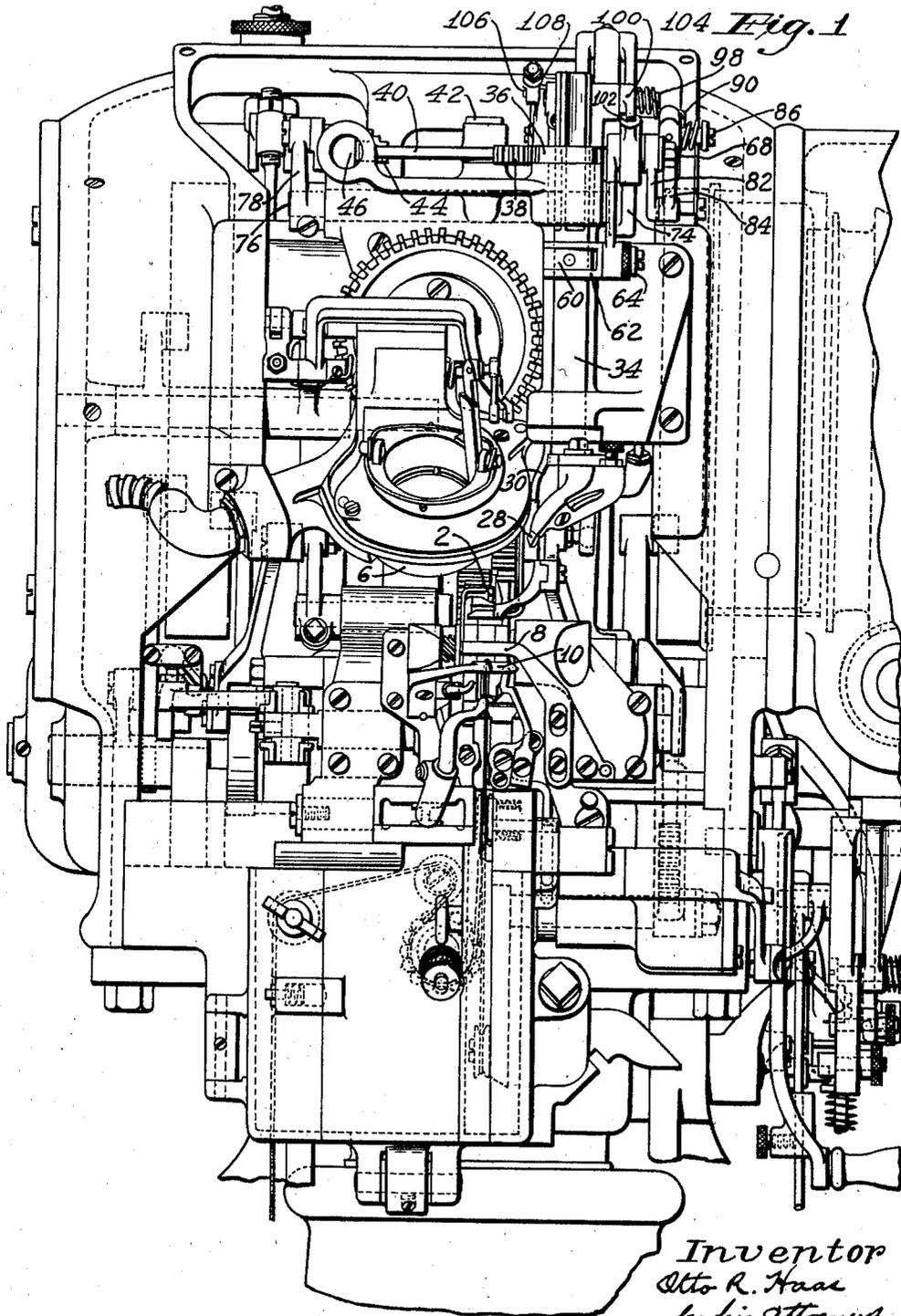
Dec. 24, 1940.

O. R. HAAS

2,226,401

WAX THREAD SHOE SEWING MACHINE

Original Filed Dec. 31, 1936 6 Sheets-Sheet 1



Inventor  
Otto R. Haas  
by his Attorney  
Fish, Hildreth, Cary & Jenney

Dec. 24, 1940.

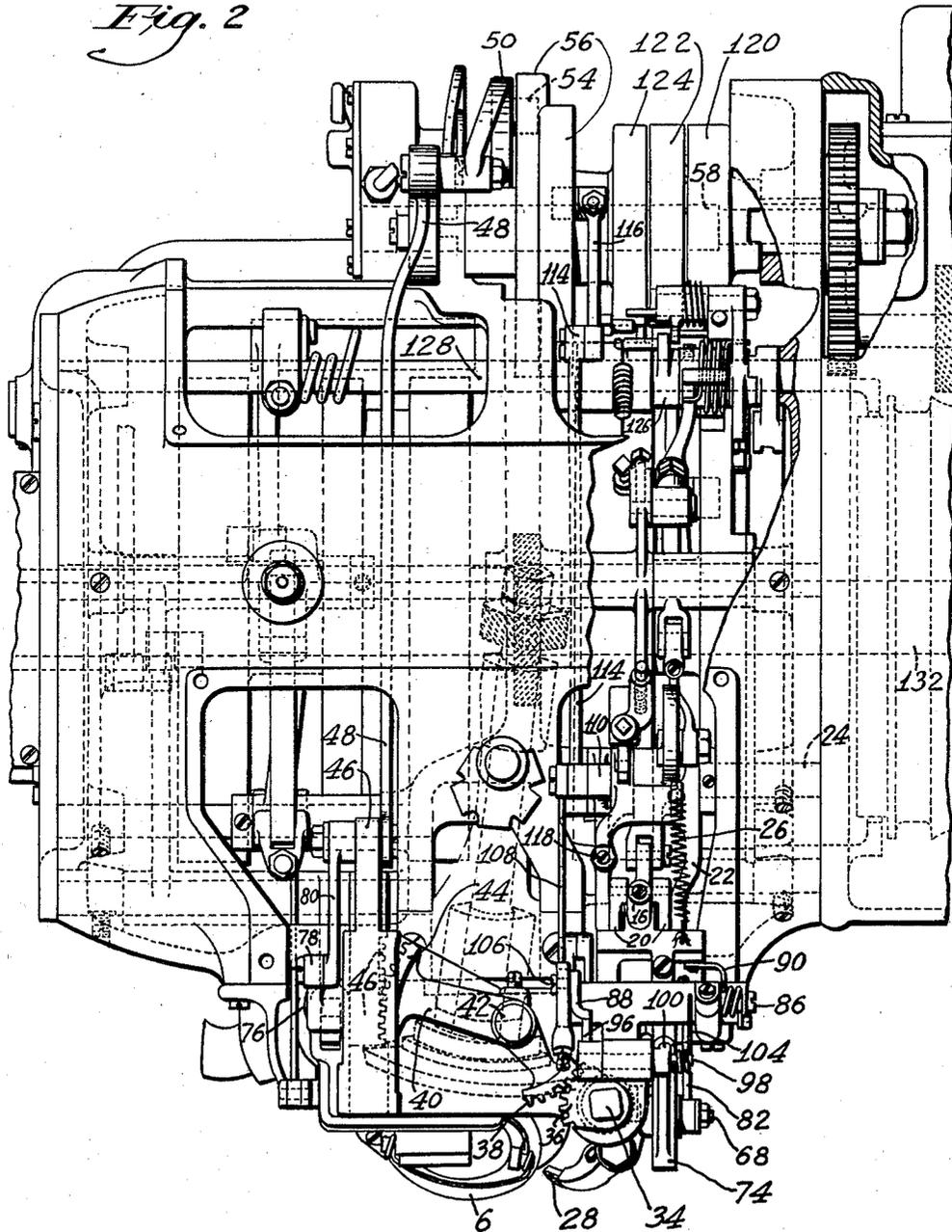
O. R. HAAS

2,226,401

WAX THREAD SHOE SEWING MACHINE

Original Filed Dec. 31, 1936 6 Sheets-Sheet 2

*Fig. 2*



*Inventor*  
*Otto R. Haas*  
*by his attorneys*  
*Fish, Aldrich, Cary & Jenney*

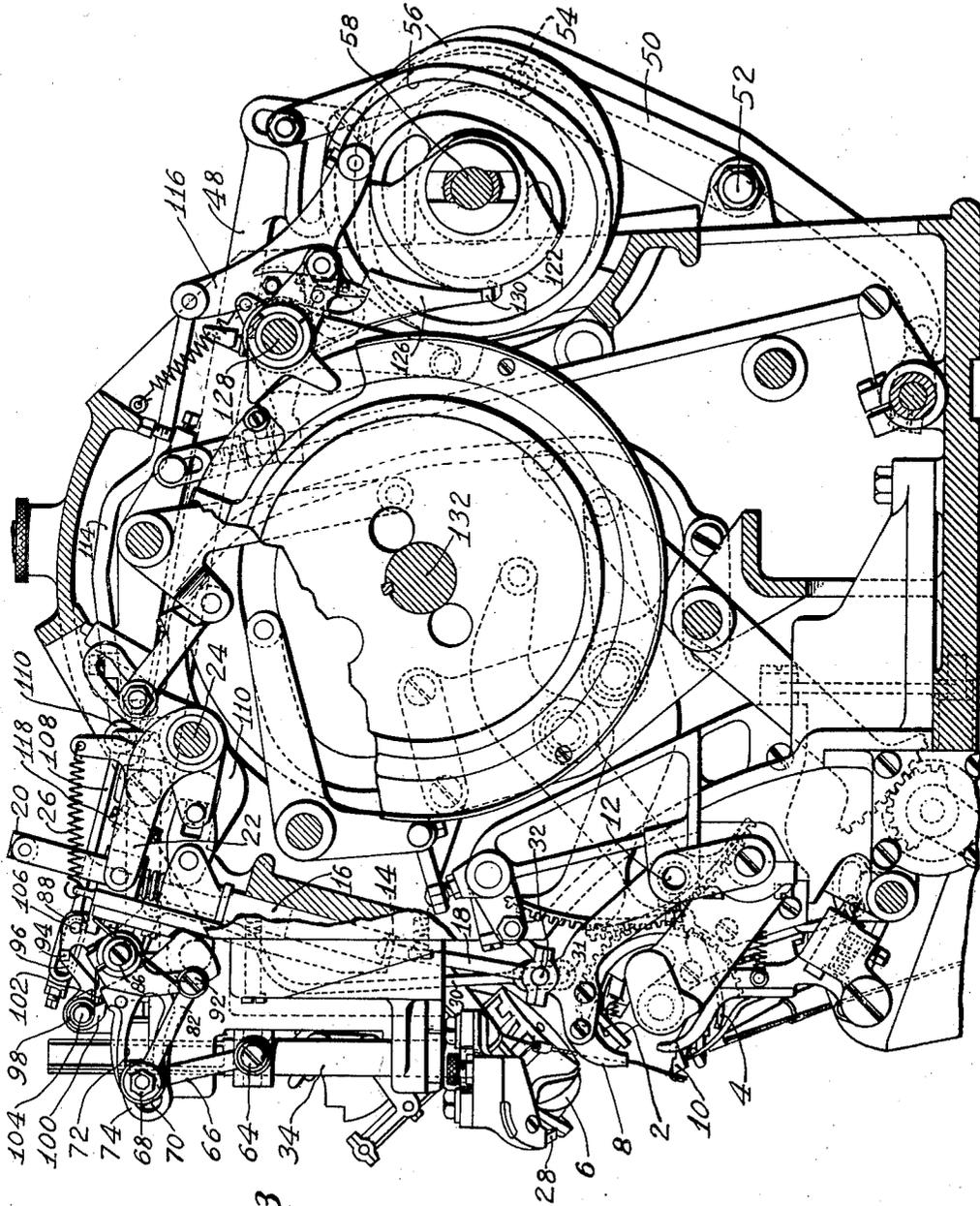
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O. R. HAAS

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WAX THREAD SHOE SEWING MACHINE

Original Filed Dec. 31, 1936 6 Sheets-Sheet 3



*Fig. 3*

*Inventor*  
*Otto R. Haas*  
*by his attorney*  
*Irish, Hildreth, Cary & Jenney*

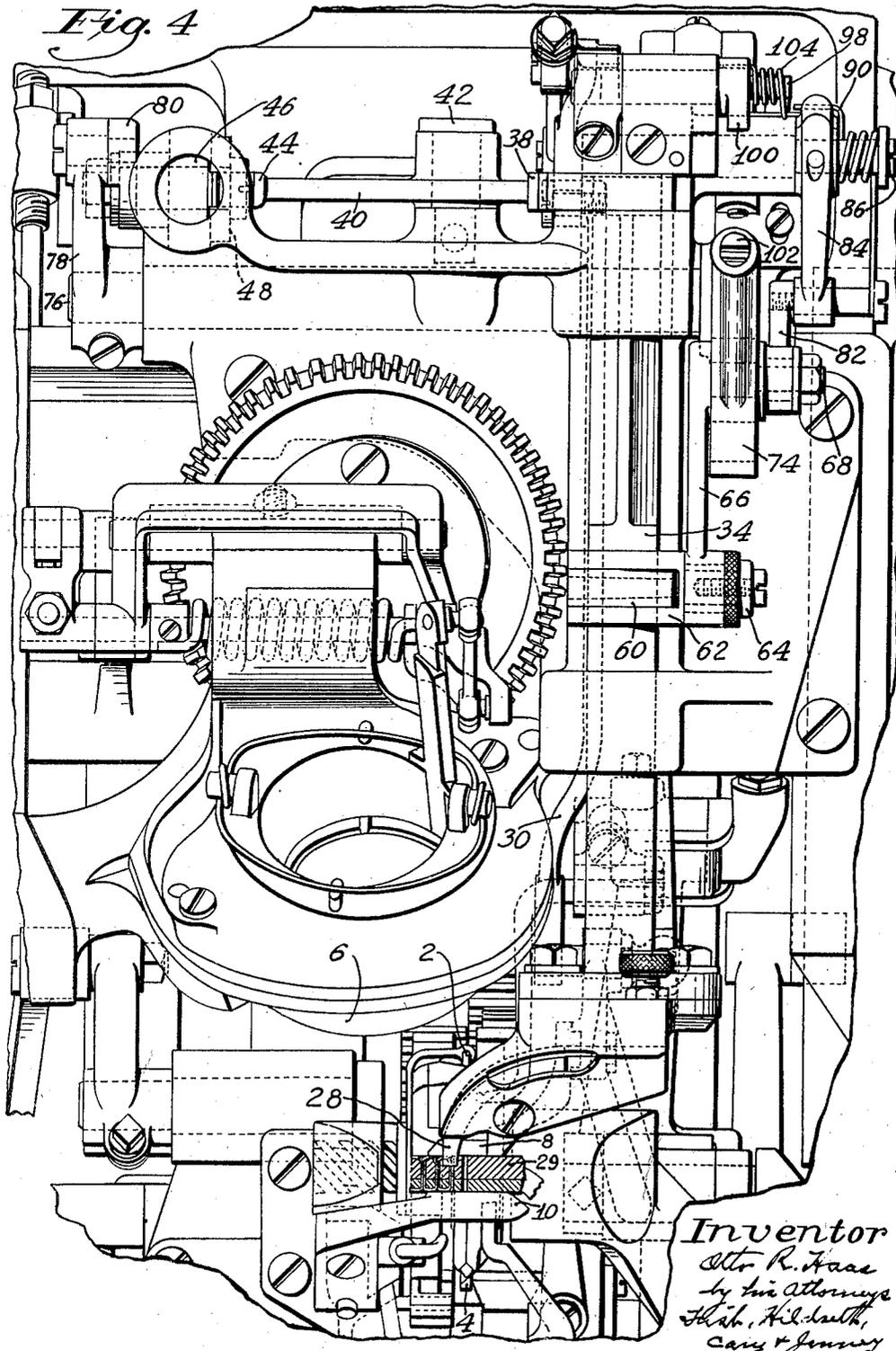
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O. R. HAAS

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WAX THREAD SHOE SEWING MACHINE

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Dec. 24, 1940.

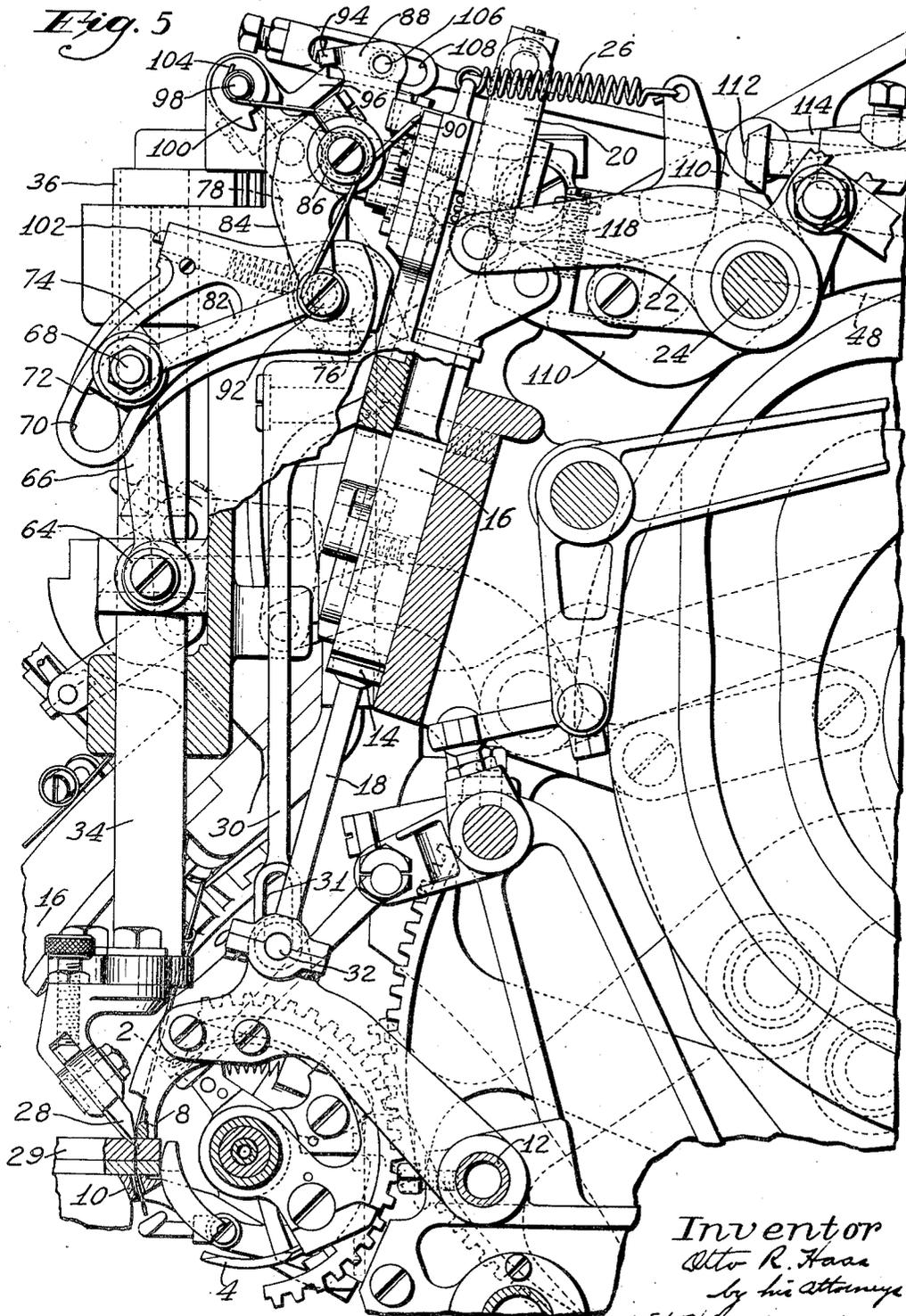
O. R. HAAS

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WAX THREAD SHOE SEWING MACHINE

Original Filed Dec. 31, 1936

6 Sheets-Sheet 5



*Inventor*  
*Otto R. Haas*  
*by his attorney*  
*Fisch, Wilderth, Coy & Jenney*

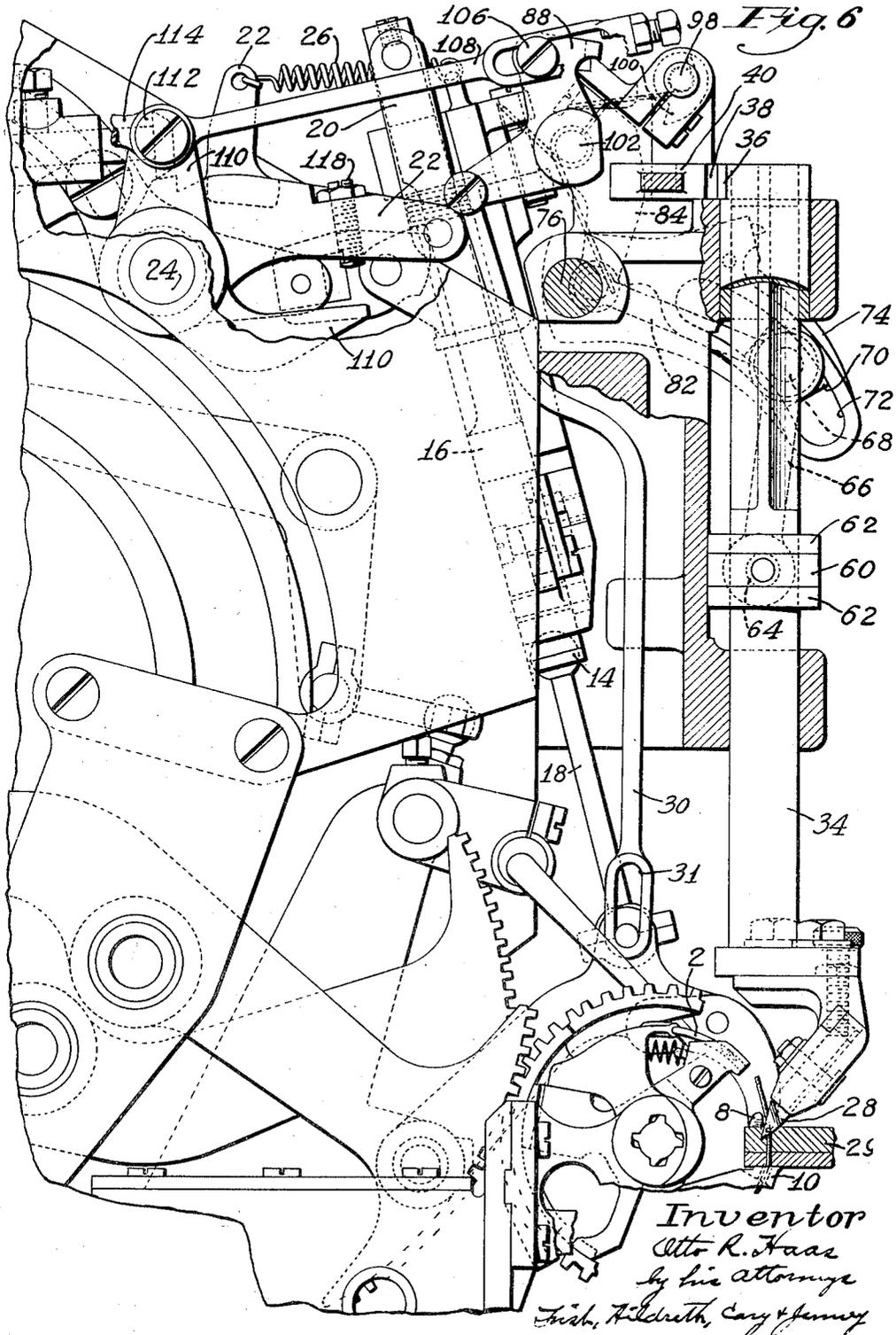
Dec. 24, 1940.

O. R. HAAS

2,226,401

WAX THREAD SHOE SEWING MACHINE

Original Filed Dec. 31, 1936 6 Sheets-Sheet 6



# UNITED STATES PATENT OFFICE

2,226,401

## WAX THREAD SHOE SEWING MACHINE

Otto R. Haas, North Beverly, Mass., assignor to  
United Shoe Machinery Corporation, Borough  
of Flemington, N. J., a corporation of New Jer-  
sey

Original application December 31, 1936, Serial No.  
118,622. Divided and this application Septem-  
ber 7, 1939, Serial No. 293,790

10 Claims. (Cl. 112—252)

The present invention relates to wax thread shoe sewing machines, and more particularly to thread cutters for a lockstitch machine of the type illustrated and described in U. S. Letters Patent to the present inventor No. 2,148,197 dated February 21, 1939, and co-pending application Serial No. 118,622 filed December 31, 1936, of which application the present application is a division.

The objects of the present invention are generally to improve the construction and to render more effective the operation of thread cutters for sewing machines, and to provide a novel and improved mechanism for actuating the same.

In inventor's prior U. S. Letters Patent No. 2,148,197 there is disclosed a sewing machine having a power actuated thread cutter comprising a knife which acts to sever the threads of a lockstitch seam while the work is clamped between the work support and presser-foot, the presser-foot being actuated yieldingly against the work. To regulate the cutting movement of the cutter, regardless of the thickness of the work, there is provided a feeler for engaging the presser-foot just before the threads are cut. Due to the rapidity with which the cutting action takes place, the feeler may strike the presser-foot with a substantial impact, causing the work to be displaced or to be damaged as a result.

An important feature of the present invention contemplates the provision in a sewing machine of the type referred to having a work support, a thread cutter for severing the threads while the work remains on the work support and feeler adjusted mechanism for actuating the cutter, of yielding means, which in the present embodiment of the invention is the presser-foot, arranged to be locked in position while engaging the work at the time the feeler is rendered operative so that no movement of the presser-foot can take place and no damage or displacement of the work from impact of the feeler is possible. In the illustrated form of this feature, the feeler acts in a direction tending to decrease the pressure of the presser-foot on the work when brought against the presser-foot.

A further feature of the invention relates to mechanism for actuating the cutter towards the work and across the threads. A more or less rapid rate of movement towards the work relatively to the rate of movement across the thread is imparted to the cutter so that the path of movement of the cutter will intersect the thread further from the work support with thick work than with thin work.

Other features of the invention relate to certain novel and improved constructions and arrangements of parts, as hereinafter described in the following detailed specification taken in connection with the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings, Fig. 1 is a view in front elevation of a portion of the head of the machine embodying the features of the present invention; Fig. 2 is a plan view of the head shown in Fig. 1, parts having been broken away and shown in section; Fig. 3 is a view in vertical side section illustrating parts on a somewhat reduced scale within the main frame of the machine; Fig. 4 is a view in front elevation of a portion of the machine illustrating the thread cutter as it acts to sever the threads; Fig. 5 is a view in side elevation, and in section, looking towards the right of the machine, with the parts in the positions shown in Fig. 4; and Fig. 6 is a view of the front portion of the machine in vertical section, looking from the left, with the parts in similar positions.

The machine illustrated in the drawings is a high speed lockstitch outsole shoe sewing machine, similar in many respects to that disclosed in inventor's patent and pending application above referred to.

Starting and stopping of the machine is effected by a treadle controlled driving and stopping mechanism which is not illustrated in detail since its specific construction is immaterial. The stitch-forming and work feeding devices of the machine include a curved hook needle 2 (see Fig. 3), a curved awl 4, a shuttle or loop taker 6 within which is mounted a locking thread case, a presser-foot 8 for clamping the work, and a work support 10. The work is fed continuously by alternate feeding movements of the presser-foot and work support as one unit and of the needle as another unit while engaging the work.

The presser-foot 8 is fulcrumed on a horizontal shaft 12 (see Fig. 5) in the frame of the machine and is intermittently locked against the work. The lock for the presser-foot comprises a pair of locking wedge blocks 14 and 16, the lower one of which is connected to the presser-foot by a link 18 and the upper one of which has a rod portion connected by a pair of links 20 to a lifting lever 22 fulcrumed on a horizontal shaft 24. To move the presser-foot against the work, the lever 22 is connected to one end of a tension spring 26, the other end of which is secured to the machine frame. The arrangement is such

that the presser-foot may be moved towards the work support by the spring 26 but the presser-foot is locked from movement away from the work until the wedge block 16 is actuated by connections to the sewing shaft described more fully in inventor's Patent No. 2,148,197.

The illustrated machine is provided with power driven auxiliary mechanism for performing certain final operations at the end of a seam, such as severing the threads while the work remains supported between the work support and presser-foot, and raising the presser-foot. To sever the threads, there is a thread cutter in the form of a curved knife edged member 28 of angular cross section arranged to move towards and from the work, indicated at 29 in Figs. 4, 5 and 6, as the projecting edge of a shoe outsole, and to sever both threads beneath the surface of the work, which cutter, except as hereinafter pointed out, is of substantially the construction and mode of operation as disclosed in inventor's Patent No. 2,148,197. To change the path of movement of the knife in the machine of the patent when the thickness of the work varies, the mechanism for actuating the knife is adjusted by the position of the presser-foot. The knife actuating mechanism is connected to a feeler which is set by yielding engagement with the presser-foot before the threads are severed. With this construction, when the knife mechanism is actuated rapidly, it sometimes happens that the feeler engages the presser-foot with such an impact that the work is indented or marked in an undesirable manner by the blow of the feeler on the presser-foot.

In order to avoid marking the work by the presser-foot, in the present machine when the thread cutter adjusting feeler is set, the feeler, indicated at 30 in Figs. 3, 5, and 6, is in the form of a link having a lost motion connection with the presser-foot and is moved in a direction tending to decrease the pressure of the presser-foot on the work while being set. The feeler link 30 is raised to adjust the thread cutter mechanism and is provided with an elongated slot 31 formed at its lower end through which passes a pin 32 connecting the link 18 with the presser-foot, the presser-foot 8 being held by the inter-action of the locking wedge blocks 14 and 16, against the force of the link while the thread cutter acts. With this construction, the impact of the feeler link 30 is entirely absorbed by the locking blocks without disturbing the position of the presser-foot on the work.

The thread cutter of the present machine, like the thread cutter of Patent No. 2,148,197 is moved through a helical path by its actuating mechanism, the central axis of which path is at right angles with the surface of the work and substantially parallel to the length of locking thread extending between the shuttle and the work. The cutter knife member 28 is secured in a holder at the lower end of a vertical shaft 34 mounted for reciprocating and rotary movement in bearings on the machine frame. To rotate the cutter shaft 34, it is connected to be operated by the auxiliary mechanism comprising the squared upper end of the shaft 34 and a gear segment 36 (see Fig. 2) having a squared hole for receiving the upper end of the shaft and meshing with a corresponding segment 38 formed on one arm of a lever 40. The lever 40 is fulcrumed on a vertical stud 42 and is provided with a gear segment 44 meshing with teeth on a rack bar 46 slidably mounted in a horizontal bearing in the frame.

The rearward end of the rack bar 46 is connected by means of a link 48 with a lever 50 (pivotally mounted at its lower end on a stud screw 52 (see Fig. 3) and provided with a cam roll 54 engaging a slot in a cam 56. The cam 56 is mounted on an auxiliary shaft 58 at the rear of the machine and is arranged to be rotated one complete revolution at the end of a seam.

The cutter shaft rotating mechanism is also connected to reciprocate the shaft 34 at the same time that it is rotated, thus imparting the helical movement to the cutter knife. In the machine of the Patent No. 2,148,197 the point of intersection of the cutter knife with the threads is changed in a direction towards and from the work support by providing more or less lost motion between the shaft rotating mechanism and the reciprocating connections. When operating at high speeds, the lost motion of these connections is a source of excessive impact and vibration which tends to produce irregular results. In the present machine such lost motion between the cutter shaft rotating mechanism and the connections for reciprocating the shaft is avoided.

To change the length of reciprocating movement of the cutter shaft 34 so as to compensate for different thicknesses of work in the machine illustrated, the relative rate of reciprocating movement of the cutter shaft lengthwise of the locking thread is increased or decreased so as to cause the intersection with the threads at the required point. For reciprocating the shaft there is pinned to an intermediate part of the shaft a collar 60 (Figs. 4 and 6) surrounding which is loosely mounted a perforated yoke 62. At one side of the yoke is a hole threaded to receive a screw 64 passing through the lower end of a link 66. The upper end of link 66 is pivotally connected with a bolt 68 passing through a block 70 engaging an arcuate slot 72 in an oscillating arm 74. The arm 74 is secured to the right end of a shaft 76 rotatable in bearings in the machine frame. The left end of the shaft 76 carries an arm 78 connected by means of a link 80 (Figs. 2 and 4) with the forward end of the link 48 of the cutter shaft rotating mechanism. By shifting the position of the block 70 in the slot 72 of arm 74, the effective length of this arm in reciprocating the shaft is changed. The curvature of the slot 72 is such that when the cutter shaft is raised (Fig. 3) the center of its curvature will be concentric with the screw 64, thus insuring that the cutter shaft 34 will always be raised to the same position.

To shift the block 70 in the slot 72, of the arm 74, the bolt 68 is connected by a link 82 with an arm 84 clamped to the right end of a horizontal shaft 86, rotatable in suitable bearings in the machine frame. The left end of the shaft 86 carries a lever 88 on one arm of which the feeler link 30 is pivotally mounted. When the feeler link 30 is raised into cooperative relation with the presser-foot, the shaft 86 is rocked in a direction tending to move the block 70 towards the rear of the machine (Fig. 5), thus decreasing the length of reciprocating movement imparted to the cutter shaft 34 by the amount required for the thickness of the work.

To raise the feeler link 30 to the limit of its upward movement until stopped by the presser-foot, the shaft 86 is surrounded by a spring 90 (see Figs. 2, 5 and 6), one end of which bears on the frame of the machine, and the other end of which bears on a screw 92 forming a pivotal

connection between the link 82 and the arm 84. To prevent the spring 90 from raising the feeler link 30 while the machine is running, one arm of the lever 88 is formed with a lug 94 arranged to be engaged by a latch 96 secured to one end of a pin 98 rotatably mounted in the machine. The pin 98 is formed with an enlarged head provided with a shoulder 100 cooperating with a detent at the end of a spring pressed plunger 102 mounted in the arm 74 at the cutter shaft reciprocating mechanism. The latch 96 is normally held in a position where it will prevent rotation of the lever 88 by a spring 104 wound about the pin 98 having a rearwardly extending end resting on the machine frame. The other end of the spring 104 engages an opening in the head of the pin 98. When the arm 74 moves downwardly as the cutter begins to operate, the detent 102 engages the shoulder 100 (Fig. 3) and swings the latch 96 out of engagement with the lug 94. The feeler link 30 then is raised until stopped by the pin 32 on the presser-foot.

To reset the feeler link, the lever 88 carries a headed screw 106 passing through a slot in the enlarged forward end of a horizontal link 108, the rearward end of which is pivotally connected to the vertical arm of a lever 110 (see Fig. 5) on the shaft 24, by a pin 112. The pin 112 also forms a connection with a link 114 and a cam lever 116 (see Fig. 3) at the rear of the machine actuated by a slot in the cam 56. After the thread cutter has operated and the cutter shaft 34 has been raised to its highest position, the lever 116 operates through the connections just described to move the feeler link 30 downwardly to a position where it is held by the latch 96. The lever 110 is also provided with a horizontal arm which, when the cam 56 is rotated, engages a set screw 118 on the presser-foot lock lifting lever 22 so as to raise the presser-foot from engagement with the work after the threads have been severed.

The shaft 58 on which the cam 56 is mounted supports a one-revolution clutch having a driving part 120, best shown in Fig. 2, and relatively movable driven parts 122, 124. The driven parts 122 and 124 of the clutch are held from rotation with the driving part 120 by a pawl 126 (see Fig. 3) loosely mounted on a supporting shaft 128 at one side of the sewing shaft near the upper part of the machine. The pawl 126 is yieldingly held in the path of an abutment 130 on the clutch part 122 and during the latter part of the reverse rotation of the main sewing shaft indicated at 132 at the end of the seam, the pawl is released from the abutment to throw the clutch into action, as described more particularly in inventor's Patent No. 2,078,942, and in the co-pending application above referred to, so that the threads of the seam are cut and the presser foot raised each time the machine is brought to rest.

The nature and scope of the invention having been indicated, and a construction embodying the several features of the invention having been specifically described, what is claimed is:

1. A sewing machine having, in combination, stitch forming devices, a work support, means for severing the thread at the end of a seam while the work remains on the work support comprising a knife edged member, adjustable mechanism for actuating the knife member towards and from the work support in a path intersecting the thread, yieldingly actuated means engaging the surface of the work, a lock for

preventing separation of the yieldingly actuated means from the work, and a feeler for adjusting the knife actuating mechanism arranged to be set at the end of a seam by the position of the yieldingly actuated means on the work and to act against said lock in adjusting the knife actuating mechanism.

2. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife edged member, an adjustable mechanism for actuating the knife member towards and from the work support in a path intersecting the thread, a lock for preventing separation of the presser-foot from the sole, a feeler for adjusting the knife actuating mechanism arranged to be set at the end of a seam by the position of the presser-foot on the sole and to act against the presser-foot lock in adjusting the knife actuating mechanism.

3. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser-foot comprising a knife edged member, an adjustable mechanism for actuating the knife member towards and from the work support in a path intersecting the thread, a lock for preventing separation of the presser-foot from the sole, a feeler for adjusting the knife actuating mechanism at the end of a seam, a spring for moving the feeler into cooperative relation with the presser-foot in a direction to act against the presser-foot lock, and means for holding the feeler out of cooperative relation with the presser-foot during sewing.

4. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser-foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser-foot comprising a knife edged member, an adjustable mechanism for actuating the knife member towards and from the work support in a path intersecting the thread, a lock for preventing separation of the presser-foot from the sole, a feeler for adjusting the knife actuating mechanism at the end of a seam, a spring for moving the feeler into cooperative relation with the presser-foot in a direction to act against the presser-foot lock, and a latch arranged to be released as the stitch forming devices are being brought to rest for holding the feeler out of cooperative relation with the presser-foot during sewing.

5. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and the presser foot comprising a knife edged member, an adjustable mechanism arranged to actuate the knife member towards and from the work support in a path intersecting the thread, adjusting connections for changing the path of movement im-

- parted by the actuating mechanism to the knife member, and a feeler connected with the adjusting connections to be set at the end of a seam by the position of the presser foot on the work and
- 5 arranged to act in a direction tending to decrease the pressure of the presser-foot on the work when brought into cooperative relation with the presser-foot.
- 10 6. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser-foot for clamping between them the projecting edge of a shoe sole, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser-foot comprising a knife edged member, mechanism for actuating the knife member through a path extending towards the surface of the work and across the thread, and connections controlled by the thickness of the sole for changing the rate of movement across the thread to adjust the point of intersection of said path with the thread further from the work support with a thick sole and closer to the work support with a thin sole.
- 15 7. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of a shoe sole, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife movable towards the surface of the work and across the thread, a knife actuating mechanism comprising an oscillating arm, and connections for moving the knife towards the work, and means controlled by the thickness of the shoe sole for changing the effective length of the arm to adjust the point of intersection of the knife with the thread further from the work support with a thick sole and closer to the work support with a thin sole.
- 20 8. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of a shoe sole, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser-foot comprising a knife movable towards the surface of the work and across the thread, a cam and suitable connections for moving the knife across the thread, mechanism actuated from said connections for moving the knife towards the surface of the work comprising an oscillating arm, and means controlled by the thickness of the shoe sole for changing the effective length of the arm to adjust the point of intersection of the knife with the thread further from the work support with a thick sole, and closer to the work support with a thin sole.
- 25 9. An outsole shoe sewing machine having, in combination, stitch-forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser-foot comprising a knife edged member, a knife supporting shaft, mechanism for rotating said shaft to cause the knife member to be actuated in a path intersecting the thread and at the same time for reciprocating said shaft lengthwise to move the knife member towards and from the work support, and connections controlled by the thickness of the sole for adjusting the rate of reciprocating movement of the shaft to cause the path of the knife member to intersect the thread further from the work support with thick soles and closer to the work support with thin soles.
- 30 10. An outsole shoe sewing machine having, in combination, stitch-forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser-foot comprising a knife edged member, a knife supporting shaft disposed with its axis forming an angle with the sole of the shoe, mechanism for rotating the shaft at the end of a seam, an arm oscillated by said mechanism for reciprocating said shaft towards and from the shoe sole during rotary motion, and connections controlled by the thickness of the sole for changing the effective length of the arm to adjust the reciprocating movement imparted to the shaft.
- 35 40 45

OTTO R. HAAS.