

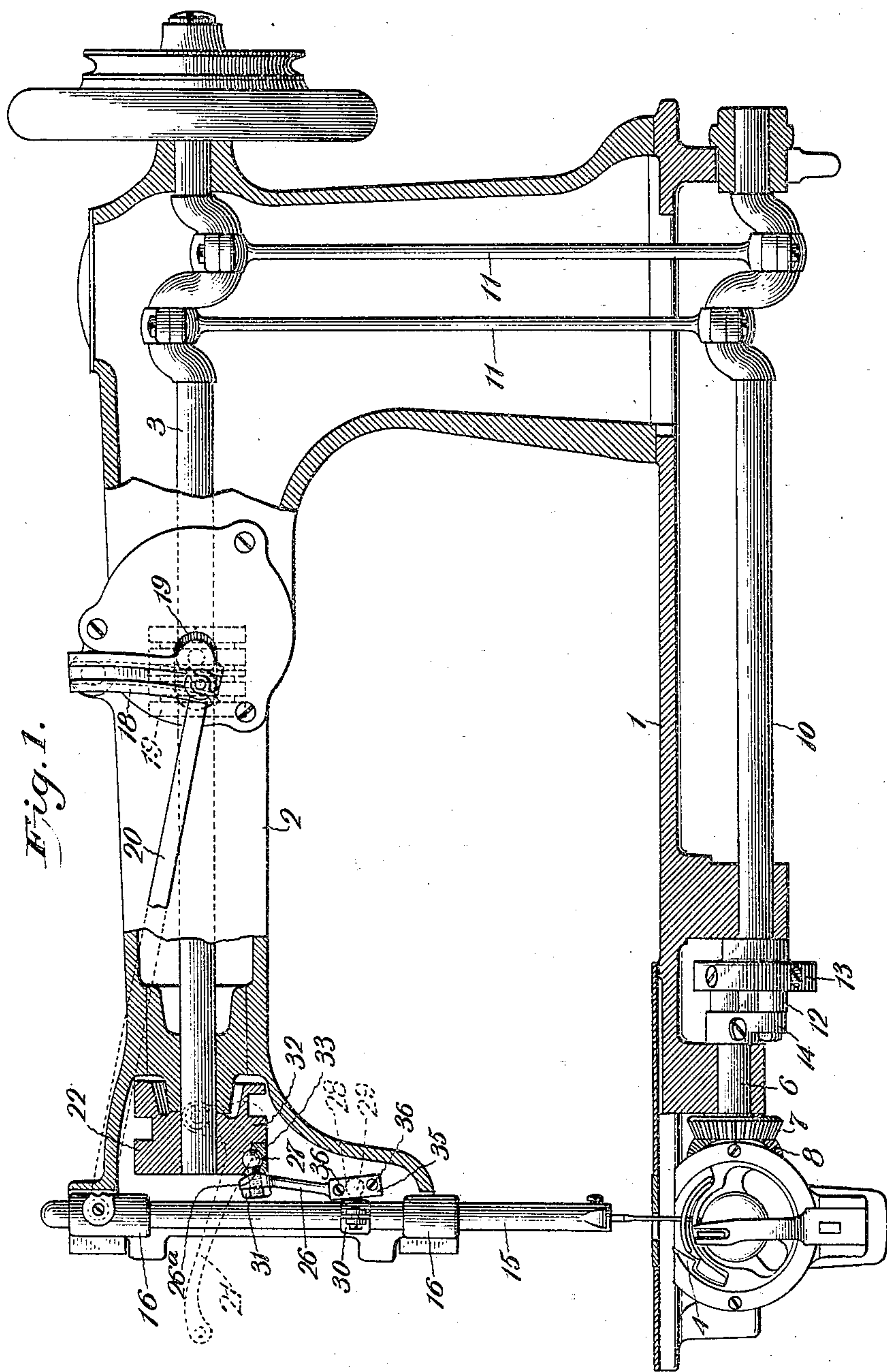
No. 792,547.

PATENTED JUNE 13, 1905.

D. NOBLE.
NEEDLE MOTION FOR SEWING MACHINES.

APPLICATION FILED FEB. 6, 1902.

3 SHEETS—SHEET 1.



WITNESSES:

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INVENTOR

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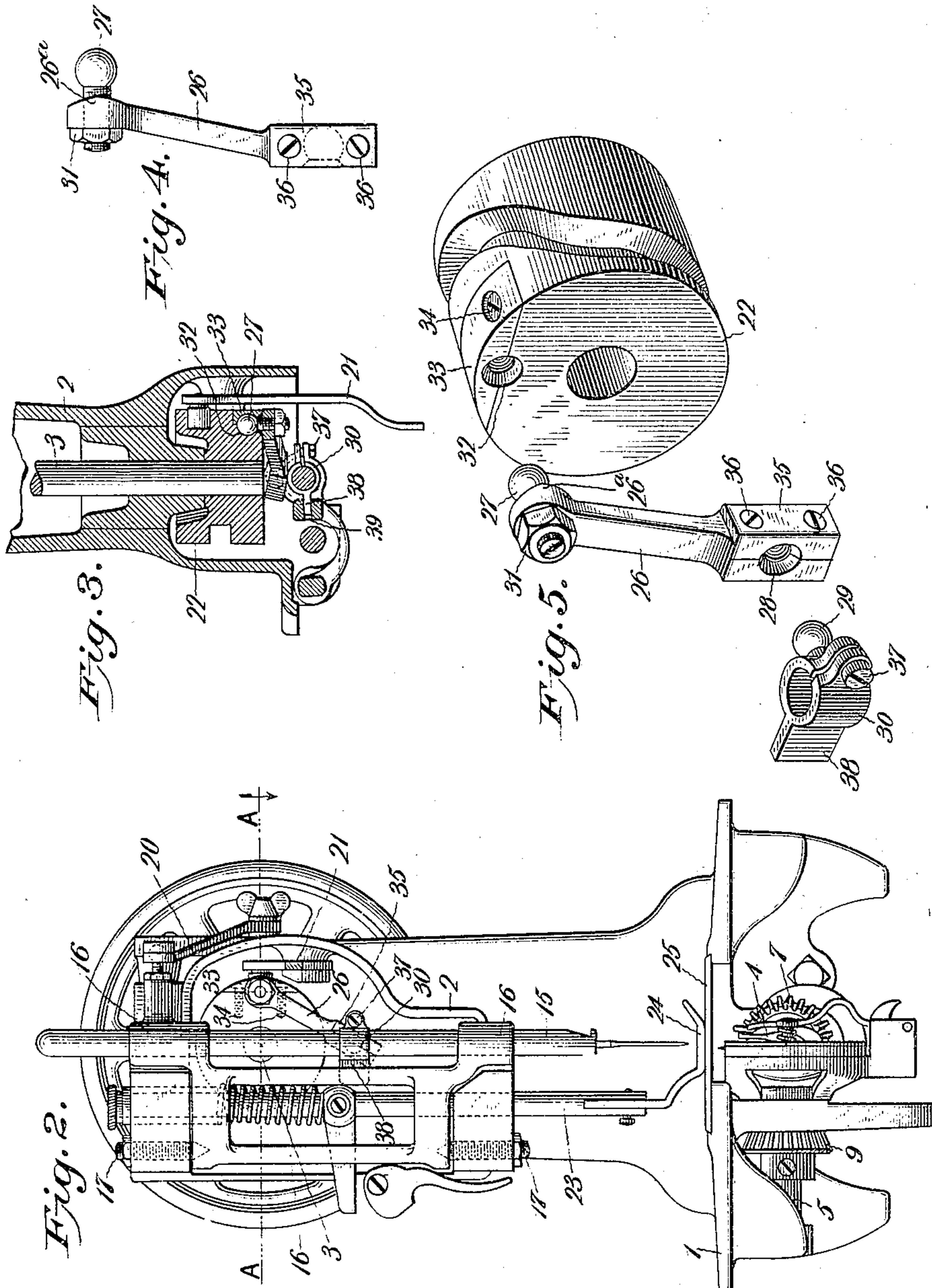
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3 SHEETS—SHEET 2.



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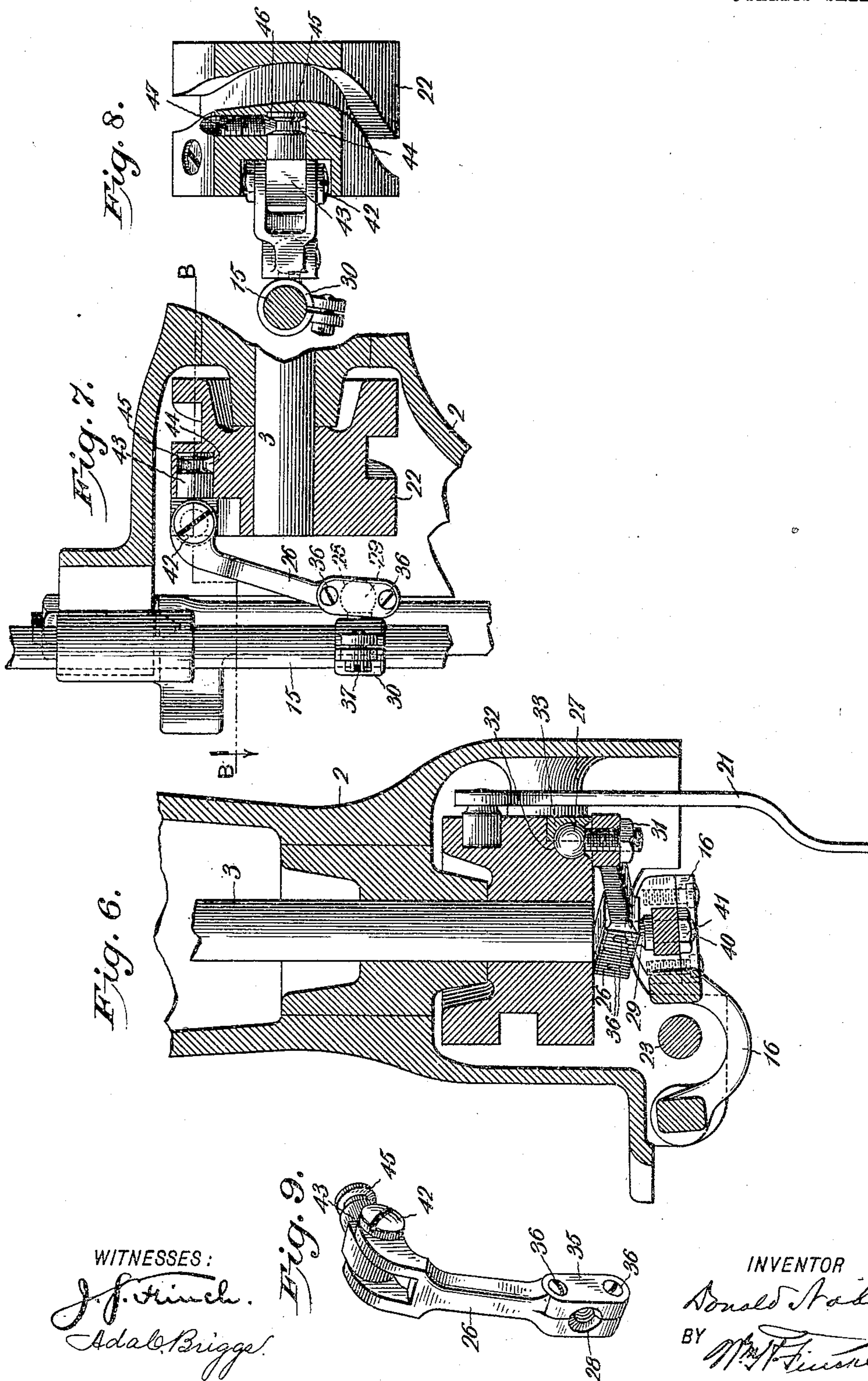
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

DONALD NOBLE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO WHEELER & WILSON MANUFACTURING COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

NEEDLE-MOTION FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 792,547, dated June 13, 1905.

Application filed February 6, 1902. Serial No. 92,874.

To all whom it may concern:

Be it known that I, DONALD NOBLE, a subject of the King of Great Britain, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented a certain new and useful Improvement in Needle-Motions for Sewing-Machines, of which the following is a full, clear, and exact description.

My invention relates to that class of sewing-machines used for making ornamental stitches, buttonholes, eyelets, overseaming, &c., and in which the needle-bar is caused to descend in different vertical lines; and the invention has especial reference to the construction of the needle-bar-actuating link. In machines of the character mentioned, wherein the needle-bar is mounted in a pivoted frame or gate oscillated so as to cause the needle to descend in different vertical lines, as ordinarily constructed a considerable cramping or binding is frequently caused between the needle-bar-actuating link and its connections, largely due to the impracticability of maintaining a proper alinement of these parts. In the operation of some machines (as, for instance, my machine illustrated in United States patent dated August 13, 1901, No. 680,665) such cramping action is fatal to the work being done; and it is the object of my invention to provide means for operatively connecting the needle-bar with its driving mechanism, so as to overcome this objection.

My invention consists in a link or pitman swiveled at opposite ends, respectively, to the needle-bar and to the cam or crank-arm or other device on the needle-shaft from which the needle motions are derived, so as to permit it to swing in directions transverse to each other, whereby said link may readily accommodate itself to the movements of the pivoted gate within which the needle-bar reciprocates, thus avoiding all liability of cramping action between said link and its coöperating parts when the needle-bar is positioned for reciprocating in different vertical lines, all as I will proceed now more particularly to set forth and finally claim.

In the accompanying drawings, illustrating

my invention, in the several figures of which like parts are similarly designated, Figure 1 is a vertical longitudinal section, partly broken, illustrating a Wheeler & Wilson overseaming or "zigzag" machine equipped with my improvement. Fig. 2 is a front end elevation of said machine, the face-plate being removed. Fig. 3 is a horizontal section taken in the plane of line A A, Fig. 2. Fig. 4 is a side elevation of the needle-bar-actuating link. Fig. 5 is a detail perspective view of the needle-bar-actuating link and its connections. Fig. 6 is a view similar to Fig. 3, on a larger scale, illustrating my improvement in connection with a needle-bar of rectangular shape in cross-section. Fig. 7 is a vertical sectional elevation taken in a plane similar to Fig. 1, but broken away and illustrating a modified form of my improvement. Fig. 8 is a horizontal section taken in the plane of line B B, Fig. 7. Fig. 9 is a perspective view of the link and crank-pin shown in Fig. 7.

In this specification only such limited reference will be made to the well-known parts of a sewing-machine as may be necessary for a proper understanding of my invention.

1 is the frame or bed-plate. 2 is the overhanging arm mounted thereon.

3 is the driving-shaft.

4 is the loop-taker, of any suitable construction, operatively connected with the driving-shaft in the usual or any approved manner. In the present instance said loop-taker is driven by a short transverse shaft 5, to which motion is transmitted by a counter-shaft 6 through a train of bevel-gears 7 8 9, said counter-shaft 6 being driven from a shaft 10, operated from the driving-shaft 3 by the connecting-rods 11, the usual variable-motion link 12 and its connections 13 14 being interposed between the shaft 10 and counter-shaft 6.

15 is the needle-bar, mounted in a frame or gate 16, pivoted between screw-threaded pintles 17, tapped in the end of the overhanging arm 2.

18 is a segment-lever pivoted on the arm 2 and in operative connection with a cam 19, fast on the driving-shaft 3.

20 is a link or pitman, one end of which is pivotally attached to the pivoted gate 16, while the opposite end is pivoted to the segment-lever 18.

21 is the take-up lever, pivoted on the arm and engaged by the usual take-up cam 22, fast on the end of the shaft 3.

23 is the presser-bar, 24 is the presser-foot, and 25 is the throat-plate.

All of the above-mentioned parts are of the usual or may be of any approved construction and are common to the well-known Wheeler & Wilson zigzag sewing-machine.

26 is the needle-bar-actuating link, which has a ball-stud 27 tapped within its upper end and provided at its lower end with a spherical recess or ball-socket 28, which incloses a ball-stud 29, formed on the needle-bar collar 30. The threaded end of the stud 27 is nicked to receive a screw-driver for adjusting said stud to take up wear and for other purposes.

31 is a jam-nut by means of which the stud is secured in its adjusted position.

The ball-stud 27 enters and is inclosed within a spherical recess or ball-socket 32, formed in the take-up cam 22. The socket 32 to receive the ball-stud 27 is formed in the take-up cam and in two sections, one half of said socket being milled in the cam, while the other half is milled in a block 33, which is detachably secured upon the cam by screws 34, and in like manner the ball-socket 28 is formed in the end of the link 26, one half of said socket being milled in the link, while the other half is milled in a block 35, detachably secured in place by screws 36. The upper end of the link 26 adjacent to the face of the take-up cam is beveled or crowned, as shown at 26^a, the apex of the crown being adapted to contact with the face of the take-up cam to prevent the link from twisting or turning on its longitudinal axis without interfering with the outward swinging movement of said link when the needle-bar frame or gate 16 is oscillated, as will be readily understood by reference to Figs. 1, 3, 4, and 5.

The collar 30 is slotted and secured upon the needle-bar by a pinch-screw 37.

38 is a tongue or feather formed integral with the collar 30 and projecting rearwardly therefrom within a vertical groove or slot 39, formed in the gate 16 in order to prevent the needle-bar from turning in its bearings.

The gate 16 is actuated by the cam 19 to cause the needle to descend in different vertical lines, and it will be evident that the link 26, by reason of the character of joints formed at each end thereof, will be free to accommodate itself to the movements of said gate without causing the slightest cramping action.

In Fig. 6 I have shown my improvement in connection with a needle-bar of rectangular shape in cross-section, wherein the ball-stud 40 is tapped within the needle-bar and a jam-nut 41 run on the end of said stud to prevent

the latter from working loose. The operation of this modified structure is the same as that of my preferred construction previously described.

In Figs. 7, 8, and 9 I have shown a modified form of the joint at the upper end of the link, the latter being pivoted by a shouldered screw 42 to a crank-pin 43, journaled within a recess 44 in the take-up cam 22. The pivot-screw 42 is secured at right angles to the axis of the crank-pin 43, so that the driving end of the link will, as before, be free to swing in the directions of the oscillations of the needle-bar and accommodate itself thereto. The crank-pin 43 has an annular groove 45, within which the beveled nose of a screw 46 projects, whereby said crank-pin is secured within the cam, but is free to turn after the manner of a swivel. 47 is a jam-screw which backs up the screw 46 to prevent the latter from getting loose. The operation of this modified construction is similar to that of my preferred construction, and a further reference thereto in this respect is deemed unnecessary.

The take-up cam 22 merely serves as a convenient member whereby the link 26 is operatively connected with the driving-shaft, and in machines where no take-up cam is employed, such as single-thread or chain-stitch machines, an ordinary crank-arm equipped with a socket or recess to receive the ball 27 or crank-pin 43 may be substituted for said take-up cam, as is obvious.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a sewing-machine, the combination of a stitch-forming mechanism provided with a needle and a needle-bar, a gate pivoted to the overhanging arm and supporting the needle-bar, a loop-taker cooperating with said needle-bar, a driving-shaft from which the needle-bar and loop-taker are both operated, and means for effecting the horizontal oscillation of said pivoted gate, whereby the needle-bar is positioned for reciprocating in different vertical lines, and a connection between said needle-bar and driving-shaft comprising a link or pitman provided at one end with a ball-socket, a ball-stud rigid with the needle-bar and engaged by said ball-socket, a universal-joint connection applied to the upper end of said link or pitman, a take-up cam for receiving said connection, and means for adjusting the connection between the upper end of the link and the cam and thereby holding the upper face of the link in intimate rocking connection with the said cam, substantially as described.

2. In a sewing-machine, the combination of a stitch-forming mechanism provided with a needle and a needle-bar, a gate pivoted to the overhanging arm and supporting the needle-bar, a loop-taker cooperating with said needle-

dle-bar, a driving-shaft from which the needle-bar and loop-taker are both operated, and means for effecting the horizontal oscillation of said pivoted gate, whereby the needle-bar is positioned for reciprocating in different vertical lines, and a connection between said needle-bar and driving-shaft comprising a link or pitman provided at one end with a ball-socket, a ball-stud rigid with the needle-bar and engaged by said ball-socket, a threaded ball-stud tapped within the opposite end of

said link or pitman, a take-up cam, a ball-socket formed in the take-up cam, the face of said link adjacent to and in contact with the take-up cam being crowned, and a jam-nut on said ball-stud, substantially as set forth.

In testimony whereof I have hereunto set my hand this 28th day of January, A. D. 1902.

DONALD NOBLE.

Witnesses:

G. I. VAN HORN,
C. N. WORTHEN.