Nov. 17, 1953

H. HACKLANDER

2,659,806

ELECTRODE MOUNTING STRUCTURE FOR RADIO-FREQUENCY SEAMING MACHINES

Filed Oct. 16, 1952

4 Sheets-Sheet 1

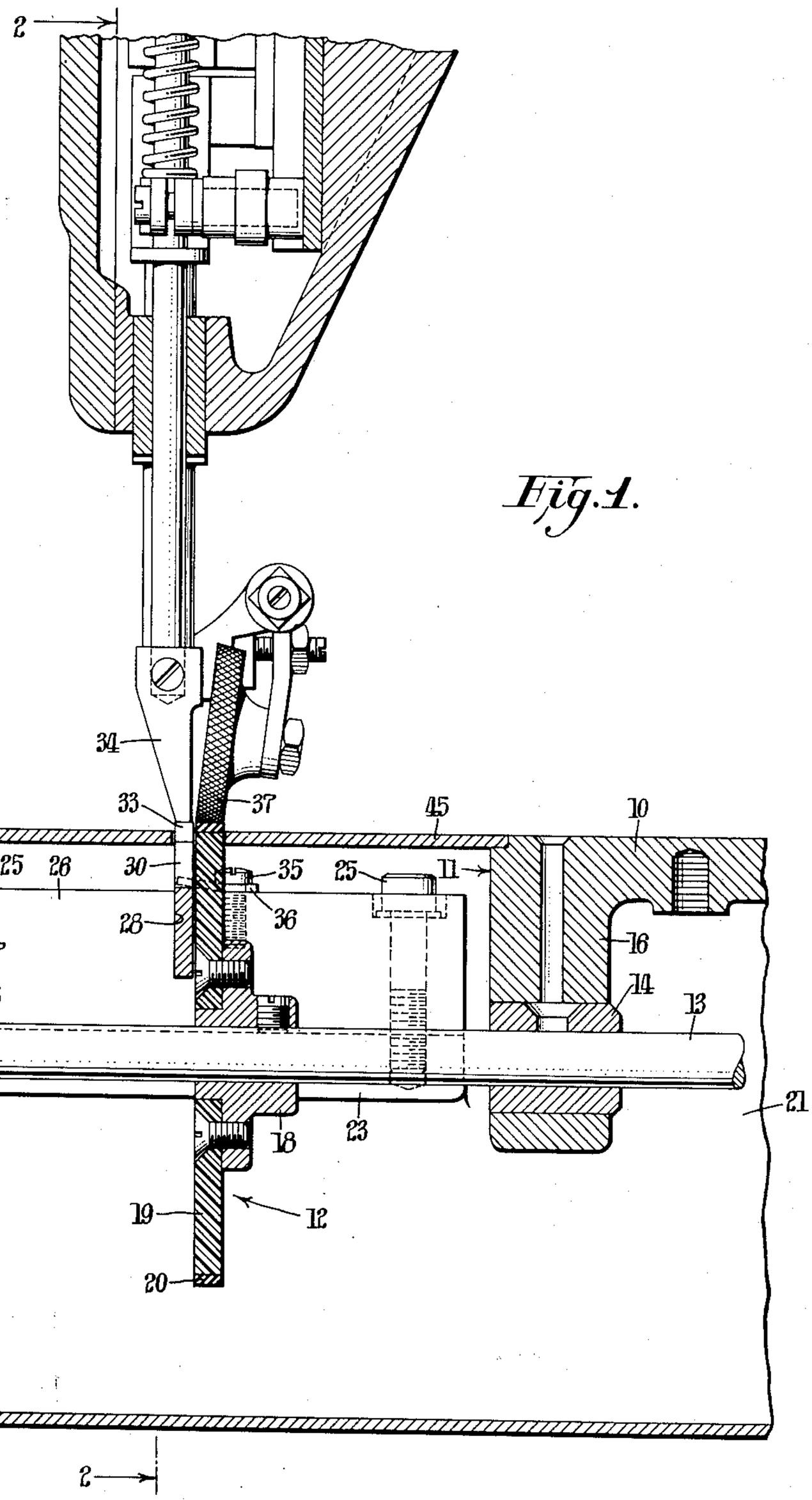

Fig. 1.

WITNESS =

William Martin

INVENTOR.
Hans Hacklander

BY

William P. Stewart

ATTORNEY

Nov. 17, 1953

H. HACKLANDER

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4 Sheets-Sheet 2

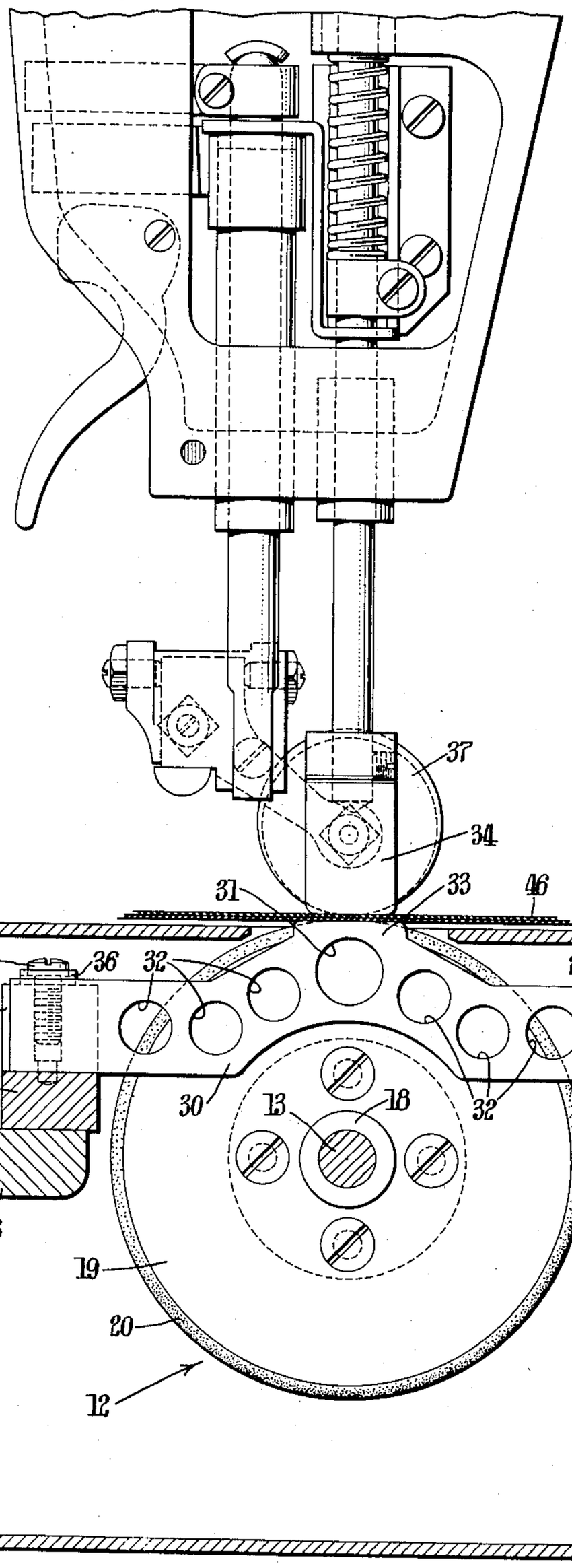

Fig. 2.

INVENTOR.
Hans Hacklander

WITNESS =
William Martins

BY
William P. Stewart
ATTORNEY

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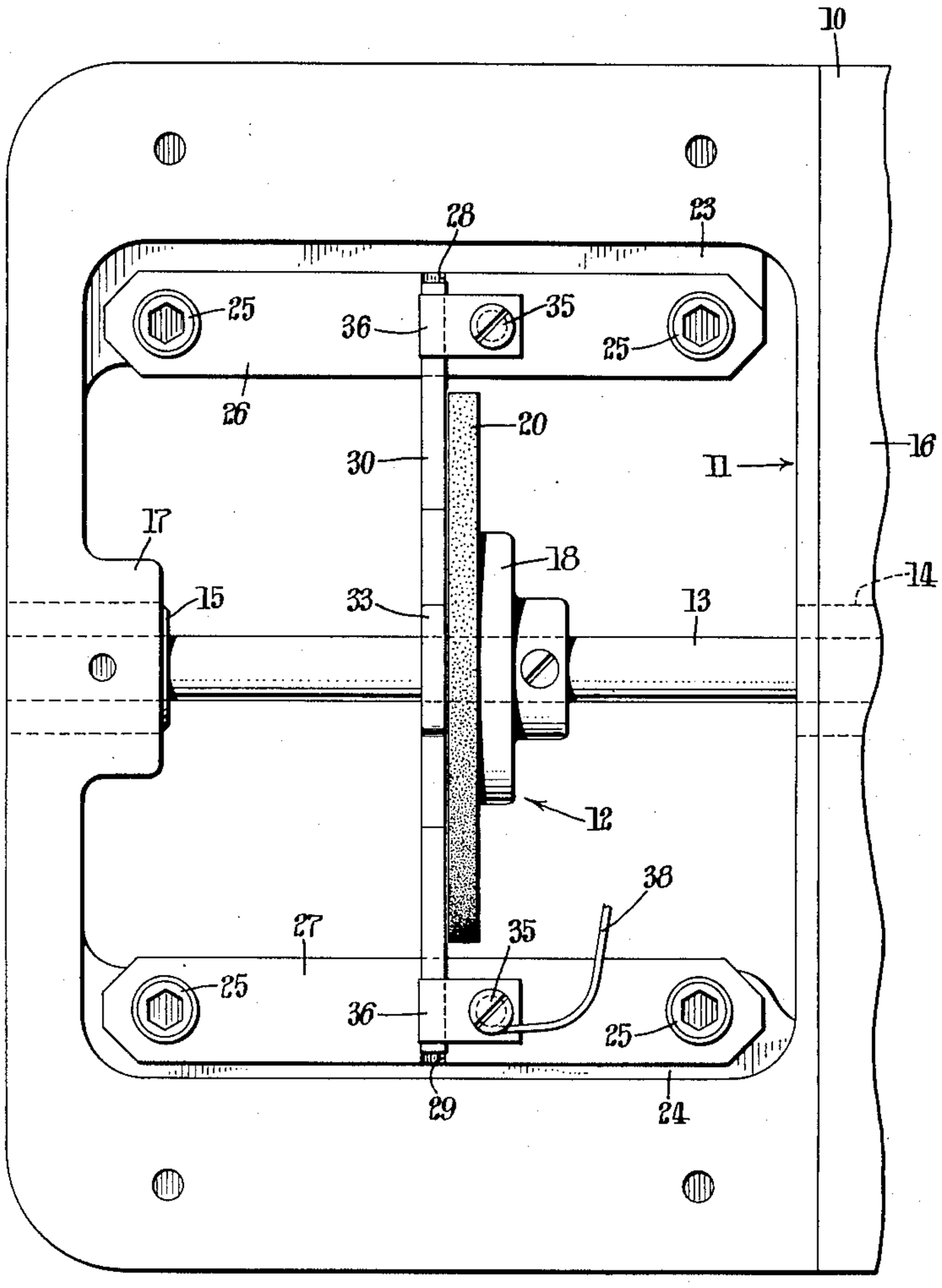

Fig. 3.

WITNESS =

William Martinez

INVENTOR.
Hans Hacklander

BY

William P. Stewart

ATTORNEY

Nov. 17, 1953

H. HACKLANDER

2,659,806

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4 Sheets-Sheet 4

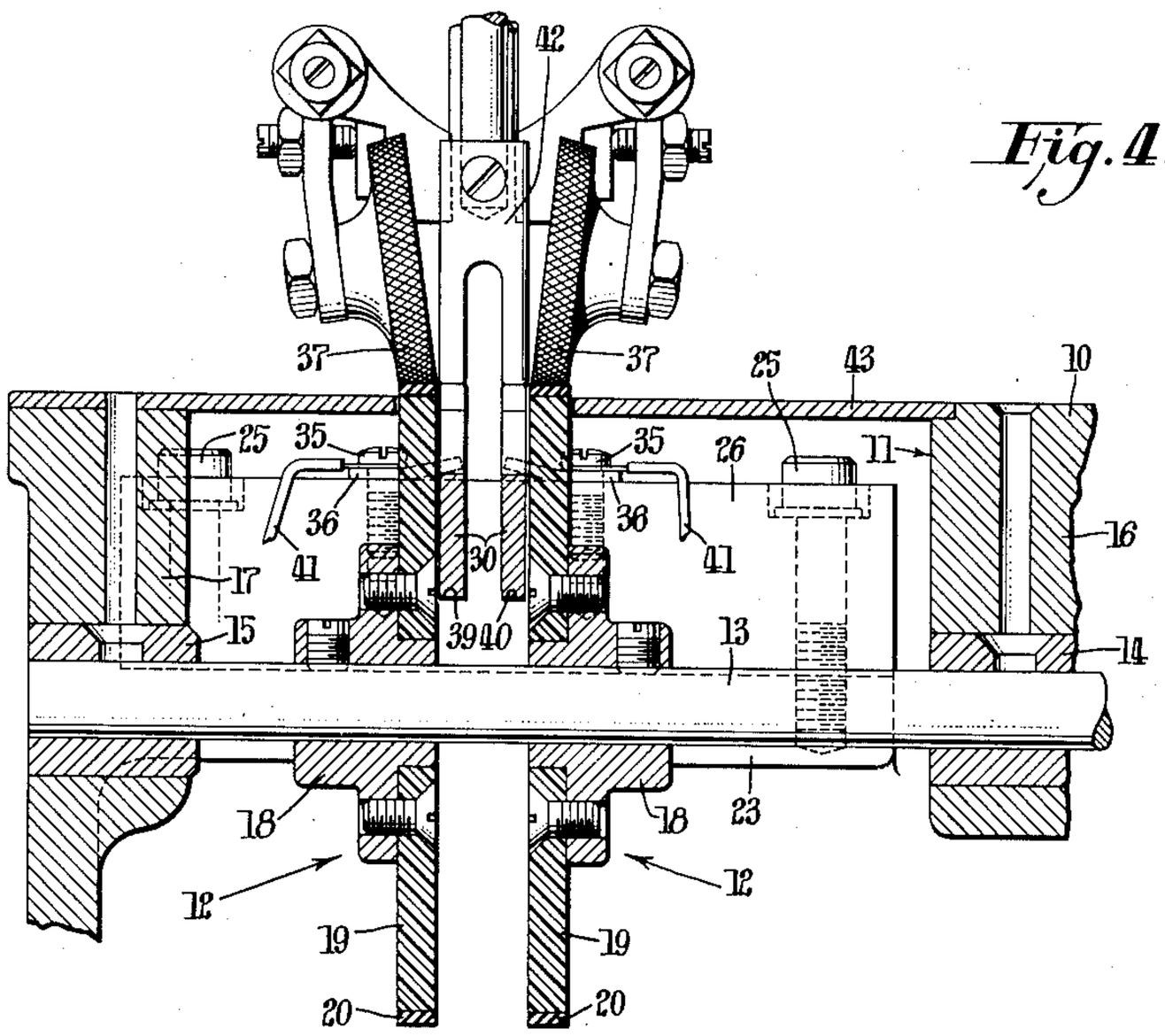

Fig. 4.

Fig. 5.

INVENTOR.
Hans Hacklander

WITNESS =
William Martins

BY
William P. Stewart
ATTORNEY

Patented Nov. 17, 1953

2,659,806

UNITED STATES PATENT OFFICE

2,659,806

ELECTRODE MOUNTING STRUCTURE FOR RADIO-FREQUENCY SEAMING MACHINES

Hans Hacklander, South Sterling, N. J., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application October 16, 1952, Serial No. 314,985

10 Claims. (Cl. 219—47)

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This invention relates to radio-frequency seaming machines and more especially to structure for mounting the electrodes therefor.

It is desirable, with seaming machines having electrodes supplied with radio-frequency energy, to modify such machines readily on occasion in order to make several parallel seams simultaneously or to provide parallel feeding instrumentalities for better control of the work. Due to the normal proximity of the electrodes, which are at radio-frequency potential to the feeding instrumentalities, which are at ground potential, there is great difficulty in preventing excessive loss of energy through leakage paths between the elements at different potentials especially when these elements are multiplied, such as is the case with multiple-electrode or multiple-feed machines.

It is, therefore, an object of this invention to provide a novel electrode structure in relation to the feeding means which permits relatively easy interchange of parts to adapt a seaming machine for use with different arrangements and numbers of electrodes and/or feeding elements.

A further object of this invention is to provide an electrode structure for use with closely adjacent feeding elements such that the electrode structure has sufficient positional stability consistent with a low capacity coupling to the feeding elements to minimize the loss of energy through said coupling.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations, and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings,

Fig. 1 is an enlarged vertical section through part of the head end of a seaming machine and showing an electrode structure embodying the invention.

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1 and showing material between the electrodes.

Fig. 3 is a top plan view of the bed of the machine shown in Fig. 1 with the cover-plate removed.

Fig. 4 is a partial view similar to Fig. 1 except that it is modified by the addition of another lower electrode and another feed wheel.

Fig. 5 is a partial view similar to Fig. 1 except that it is modified by the addition of another feed wheel.

Referring now to Fig. 1, there is shown an electrode assembly embodying the invention as applied to a seaming machine of the type disclosed in my U. S. Patent No. 2,432,412, of December 9, 1947, and to which reference may be had for a more complete description of the entire machine.

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A machine bed 10 is formed with an apertured portion 11, within which is positioned a feed wheel 12 secured for rotation to a feed shaft 13 journaled in bearings 14 and 15 secured in bosses 16 and 17 depending from the bed 10. The feed wheel comprises preferably a metallic hub 18 secured to the shaft 13, a wheel 19 of insulating material secured to said hub, and a rim 20 of rubber bonded to said wheel. The apertured portion 11 is covered by a removable plate 45.

Vertical side rails 21 and 22 of the bed, as seen in Fig. 2, are formed with horizontally shouldered portions 23 and 24 located on diametrically opposite sides of the feed wheel. Secured to the shouldered portions 23 and 24 by screws 25 are blocks 26 and 27 of insulating material, preferably Mycalex or Bakelite, having a substantial insulation resistance at radio frequencies. The screws 25 are readily accessible from the top through the apertured portion 11 as seen best in Fig. 3.

Matching slots 28 and 29 in the blocks 26 and 27 provide supporting seats for receiving the end portions of an electrode 30 which is thus positioned to straddle the feed shaft 13. The electrode 30 is a relatively thin metallic plate formed generally in the shape of an arch as seen best in Fig. 2, and has material removed therefrom leaving apertured portions 31 and 32 to provide a girder type structure with its substantial positional stability and reduced mutual capacitance with the feed wheel 12. The electrode 30 is formed with a crown portion 33 which projects above the work surface of the bed 10 to cooperate with the regular reciprocatory upper electrode 34 in applying pressure and a radio-frequency field to the work 46 which is held between and is fed past said electrodes.

It will be noted that the electrode 30 may be moved laterally of the bed in the slots 28 and 29, which permits ready adjustment thereof relative to the upper electrode, after which the electrode 30 may be locked in position by taking up on hold-down screws 35 which are threaded into the insulated blocks 26 and 27, and urge fingers 36 downwardly to retain frictionally the respective ends of the electrode 30 within the slots 28 and 29. The screws 35 are readily accessible from the top through the apertured portion 11 as clearly shown in Fig. 3.

A spring-pressed roller-presser 37 cooperates with the feed wheel 12 in the usual manner to feed material between and past the electrodes 30 and 34 with a progressive intermittent motion transmitted thereto by the feed-shaft 13.

It is clear that the electrode 30, because of

its arched form and relatively large vertical dimension, will have negligible vertical deflection under the pressure loading of the upper electrode **34**. Further, due to the fact that the ends of the electrode **30** are seated deeply in the slots **28** and **29**, there can be no appreciable lateral movement after screws **35** are taken up. This means greater positional rigidity for the electrode which permits closer spacing to the feed wheel and thus affords better control of the work

It will be understood, of course, that the opposed electrodes **30** and **34** are supplied with radio-frequency energy in the same manner as disclosed in my above-mentioned Patent No. 2,432,412. Electrical conductor **38** (Fig. 3), connected to the lower electrode **30** at one of the screws **35**, is connected to one side of a supply (not shown) of radio-frequency energy, while the bed **10** itself is connected as usual to the other or grounded side of said supply. There is a tendency for leakage of energy from the electrode **30** to the nearest parts conductively connected to the machine bed. To constitute a loss, this leakage must occur in paths other than the regular working path between the electrodes and through the material being seamed.

According to the invention, the leakage paths are minimized by removing material from the body of the electrode **30** leaving the apertured portions **31** and **32**, so that the mutual capacitance of the electrode with the grounded parts of the machine will be lessened. This is particularly effective in reducing the leakage loss to the metallic hub **18** which, for good control of the seam line, must be located very close to the lower electrode **30**.

When it is desired to adapt the machine for making dual seams, as seen in Fig. 4, a longitudinally-spaced parallel pair of slots **39** and **40** is formed in each of the blocks **26** and **27** and a lower electrode **30** may be secured in each of the slots by means of a finger **36**, urged by a screw **35** to secure the ends of the electrodes in the blocks. One of the screws **35** associated with each electrode is used for making electrical connection with a conductor **41** which leads to a source of radio-frequency energy (not shown) as set forth and described in the U. S. Patent No. 2,583,128 of Robert L. Stevenson et al., January 22, 1952, and to which reference may be had for a more complete disclosure of a suitable supply circuit for a dual electrode machine.

A dual upper electrode **42** having limbs spaced to match the two lower electrodes **30—30** must of course be provided as shown, and may be an element fully interchangeable with the single electrode **34**. A cover-plate **43** having a suitable aperture for the dual electrodes is also provided.

Fig. 5 indicates the condition when the machine of Fig. 1 is modified to include a second feed wheel **12** mounted on the feed shaft **13** and cooperating with a second roller presser **37** to produce a dual, symmetrical feed by applying traction to the material on both sides of the single upper electrode **44**. It will be noted that no modification of the lower electrode structure is necessary, due to the lower electrode supports being removed to a position where they cannot interfere with any possible modified positions of the feed wheel along the feed shaft. A cover-plate **47** having a suitable aperture for the dual feed wheels is also provided.

In view of the foregoing description, it is apparent that I have provided a simple, inexpensive structure for mounting electrodes for electronic seaming machines, which structure permits ease of adapting said machines for multiple-electrode and/or multiple-feed use.

Having thus set forth the nature of the invention, what I claim herein is:

1. In an electronic seaming machine, a bed providing a work-support having an apertured portion, a driven feed wheel positioned within the bed but having a peripheral portion thereof extending through said apertured portion and above said work-support, a lower electrode assembly comprising spaced blocks of insulating material secured to said bed on diametrically opposite sides of said feed wheel, and an electrode spanning the space between and having end portions removably secured to said blocks.

2. Apparatus as set forth in claim 1, in which the spaced blocks are slotted to receive the end portions of said electrode.

3. Apparatus as set forth in claim 1, in which the electrode is arch shaped and has a top portion thereof extending through said apertured portion to lie closely adjacent to said feed wheel.

4. Apparatus as set forth in claim 1, in which there are two feed wheels, positioned one on either side of the electrode.

5. Apparatus as set forth in claim 1, in which there are two spaced electrodes positioned in said blocks and a separate feed wheel associated with each electrode.

6. Apparatus as set forth in claim 2, in which material is removed from said electrode to provide a girder type structure with a minimum of mutual capacitance with said feed wheel.

7. In an electronic seaming machine, a bed providing a work-support having an apertured portion, an upper electrode mounted for vertical reciprocation above the work-support, a feed wheel positioned within the bed but having a peripheral portion thereof extending through said apertured portion and above said work-support, a driving shaft connected to said feed wheel, a lower electrode assembly comprising spaced slotted blocks of insulating material secured internally to said bed on diametrically opposite sides of the feed wheel, and a stationary electrode formed from a single plate with spaced apertures to provide a girder effect and to reduce its mutual capacitance with the feed wheel, said stationary electrode having its ends removably seated in the slots of said blocks in a position astride the feed shaft, with a portion of said electrode extending above the work-support in intermittent work-clamping relation with said upper electrode.

8. Apparatus as set forth in claim 7 in which extra slots are provided in said blocks for additional electrodes.

9. Apparatus as set forth in claim 7 in which screws, accessible from the top through the apertured portion of the work-support, secured the blocks to the bed.

10. Apparatus as set forth in claim 7 in which screws, accessible from the top through the apertured portion of the work-support, removably secure the end portions of the electrode in the slots of the blocks.

HANS HACKLANDER.

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Number	Name	Date
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