June 22, 1948. J. W. LITTLE 2,443,986

WINDING MACHINE

Filed April 1, 1946 2 Sheets-Sheet 1

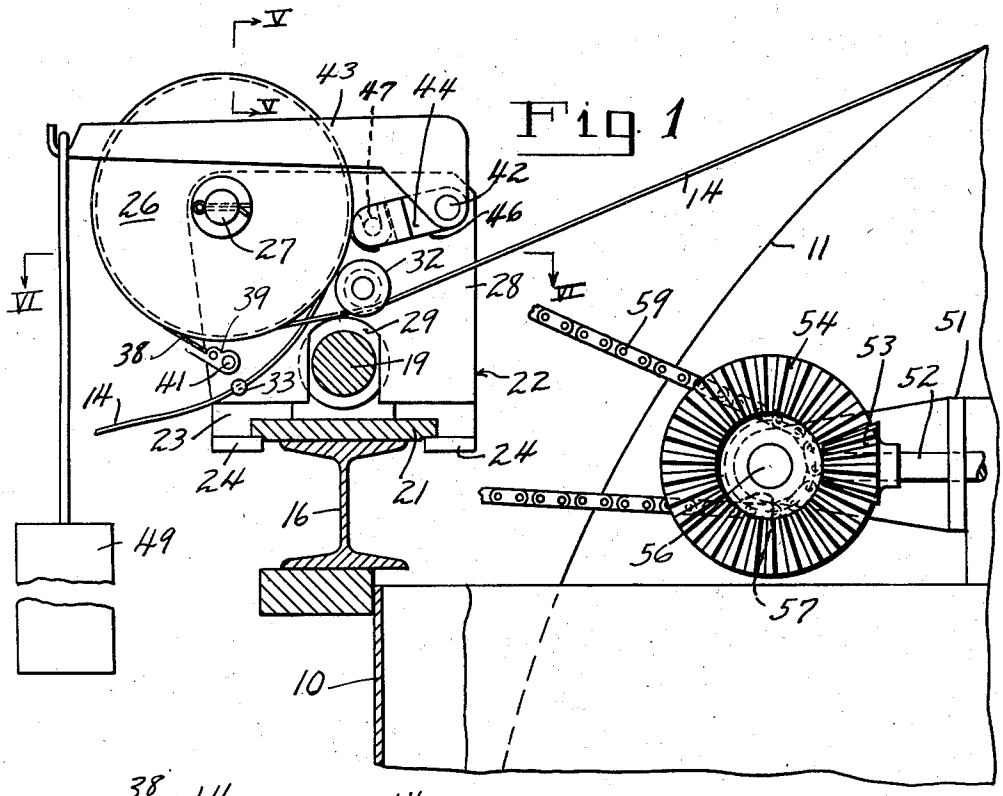


Fig. 1

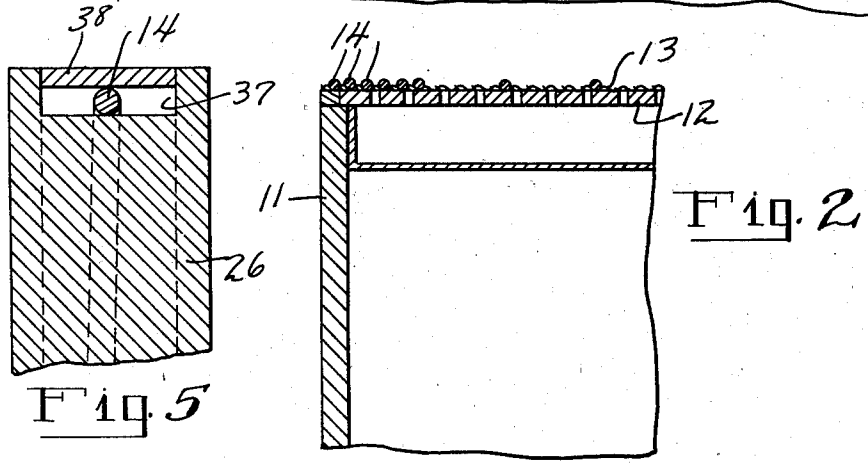


Fig. 2

Fig. 5

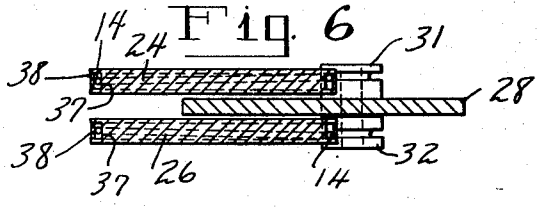


Fig. 6

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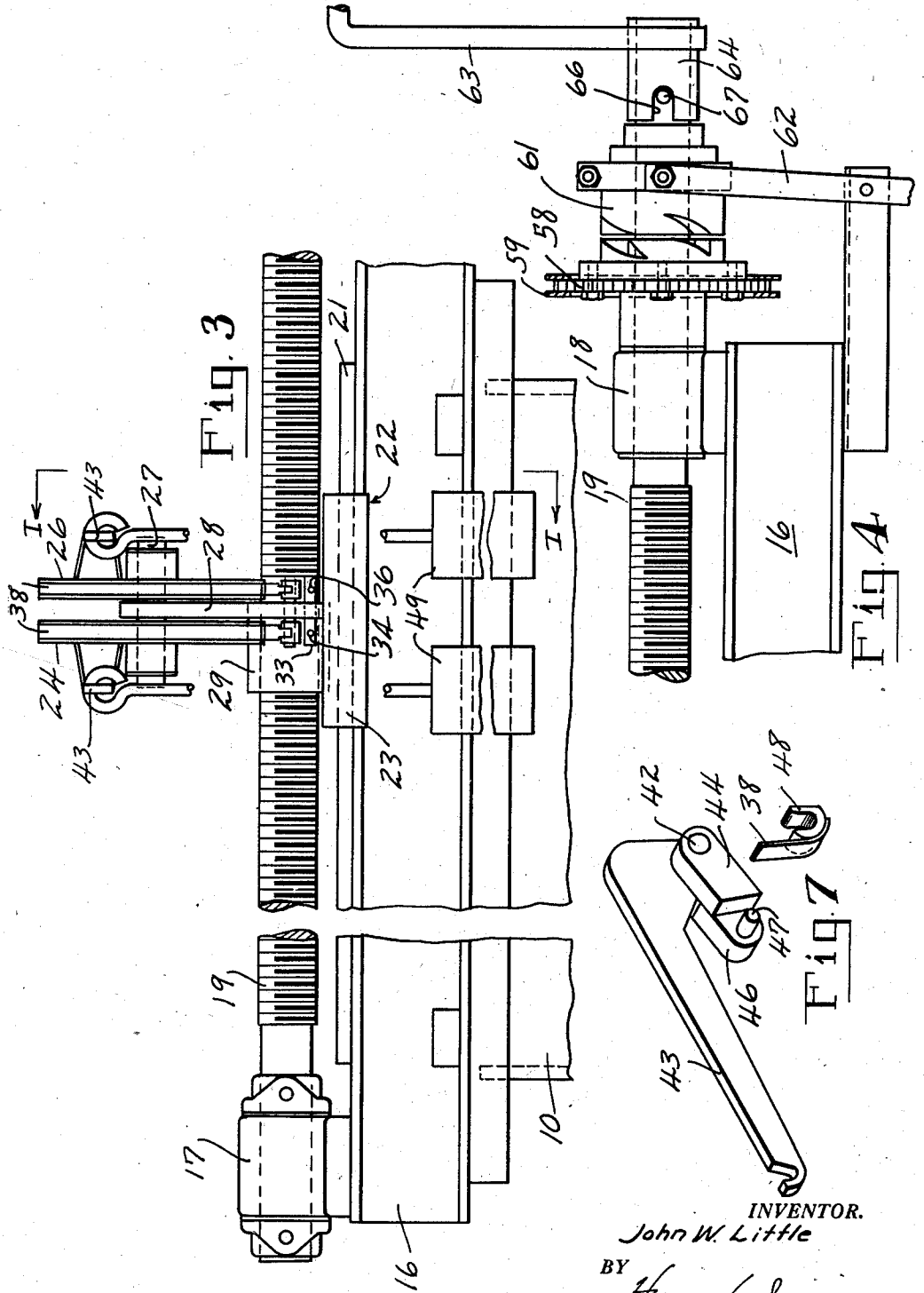


Fig. 3

Fig. 4

Fig. 7

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UNITED STATES PATENT OFFICE

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WINDING MACHINE

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6 Claims. (Cl. 242—7)

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This invention relates to apparatus for winding the retaining wire about the rotary drum of a continuous filter and has for an object the provision of apparatus of the character designated which shall include an improved tension device adapted to impart a uniform pressure on the wire, together with means for manual feeding of the wire for close winding on the drum and automatic feed for the wire for wider spacing thereof.

A more particular object of my invention is to provide a winding machine which shall include a winding wheel having a recess in the periphery thereof for retaining the wire, a tension band surrounding the wheel and bearing against the wire in the peripheral recess, a weighted bell crank lever for exerting pressure on the band and means for detachably connecting the band to the lever.

As is well known in the art to which my invention relates, the drums of continuous rotary filters are covered with a suitable filter cloth which is retained in place by a continuous winding of wire about the drum. Inasmuch as these drums are of relatively large size, that is, several feet in diameter and in length, apparatus for winding such drums should include means whereby a uniform tension is applied to the wire as it is being wound. It is also important that the means for applying tension to the wire may be readily connected and disconnected to facilitate threading of the wire through the machine and in passing it around the winding wheel.

These and other objects are attained by means of the apparatus illustrated in the accompanying drawings and forming a part of this application, in which

Fig. 1 is a diagrammatic fragmentary end view of a filter with the winding apparatus of my invention shown in section taken along the line I—I of Fig. 3;

Fig. 2 is a fragmentary sectional view showing a portion of the filter drum;

Fig. 3 is a rear elevation of one end of the feed screw and winding mechanism;

Fig. 4 is a similar view showing the other end of the feed screw and the drive therefor;

Fig. 5 is a detail sectional view of a portion of one of the winding wheels taken along line V—V of Fig. 1 and showing the tension band bearing on the wires;

Fig. 6 is a detail sectional view of the winding wheels and carriage taken along the line VI—VI of Fig. 1; and

Fig. 7 is an exploded perspective view showing

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the weighting lever and its means of connection to the tension band.

Referring now to the drawings for a better understanding of my invention, I show in Fig. 1 a continuous filter embodying a tank 10 and a rotary drum 11 mounted in the tank. The rotary drum 11 embodies the usual perforated cover 12 about which is placed a suitable filter cloth 13, which is held in place on the cover by means of retaining wire 14. As will be seen in Fig. 2, the turns of retaining wire are closely spaced adjacent the end of the drum 11 and are more widely spaced remote from the end of the drum. Mounted on the tank and extending parallel to the drum 11 is an I beam 16. At the ends of the I beam 16 are bearings 17 and 18 in which is mounted for rotation a feed screw 19. Mounted on the I beam 16, beneath the feed screw 19, is a guide bar 21.

At 22 I show a carriage having a base 23 slidably mounted on the guide bar 21 and including flanges 24 engaging beneath the guide bar. Journalled on the carriage 22 are a pair of winding wheels 24 and 26. A shaft 27 for the winding wheels extends through an upwardly extending bracket 28 forming a part of the carriage. Also forming a part of the carriage is a sleeve 29 which is in threaded engagement with the feed screw 19 so that as the feed screw is rotated the carriage 22 with its winding wheels moves along the screw. Mounted in front of the winding wheels 24 and 26 are grooved guide rollers 31 and 32 respectively. Mounted in the upright bracket 28, beneath the winding wheels 24 and 26 is a guide bar 33 having guide eyelets 34 and 36 therein for receiving the winding wire 14 from a suitable reel, not shown. Each strand of the wire 14 is passed through one of the eyelets 34 and 36, thence around the superposed winding wheel 24 or 26, thence under the appropriate guide roller 31 or 32 and thence to the drum 11. In starting the winding of a drum, the wire is secured at one end of the drum and the drum rotated to pull the wire through the winding apparatus. In order to apply tension to the wire I provide in each of the wheels 24 and 26 a recess 37 in which the wire 14 rests. Surrounding the winding wheel in the recess 37 and bearing against the wire 14 is a tension band 38. The tension band is anchored at its lower end to the upstanding bracket 28 by means of a clamp 39 and pin 41. Pivotally mounted at 42 in the upstanding bracket 28 is a bell crank lever having a rearwardly extending long arm 43 and a short arm 44. The short arm 44 of each of the bell crank levers includes an

offset portion 46 having a pin 47 therein disposed directly in front of the groove 37 in each of the winding wheels. The adjacent end of the tension band 38 has secured thereto a hook 48 which may readily engage with or be disengaged from the pin 47. Suspended from the long arm of the bell crank lever is a weight 49. By the means shown, it will be seen that an even tension is placed on the wire 14 by the band 38.

Mounted on one end of the tank 10 is a bracket 51 in which a shaft 52 is mounted for driving the drum 11 in a manner well understood in the art and which is not shown in detail in this drawing. On the outer end of the shaft 52 is a pinion 53 which meshes with a gear 54 mounted on a shaft 56 carried by the bracket 51. At the rear of the gear 54 is a sprocket 57 (shown in dotted lines). Loosely mounted on the end of the feed screw 19 (see Fig. 4) is a sprocket 58 which is connected to the sprocket 57 by means of a chain 59. A clutch 61 operated by means of a lever 62 serves to engage the sprocket 58 with the feed screw 19 to turn it from the drum 11. On the extreme outer end of the feed screw 19 is a crank 63 having a hub 64 with a slot 65 therein which is adapted to engage a pin 67 carried by the feed screw whenever it is desired to turn the feed screw 19 manually. The manually operable crank 63 is employed when the retaining wire 14 is first started to be wound on the drum 11 as shown in Fig. 2 of the drawing, whereby the turns of wire are closely spaced with respect to each other. As soon as the first few turns of wire are applied to the drum, the clutch 61 is engaged with the sprocket 58 and thereafter the feed screw 19 is turned from the sprocket 57 and the power drive for the drum 11.

From the foregoing, it will be seen that in starting the winding of a drum, the wires 14 are threaded through the eyelets 34 and 36 in the bar 33 and are then passed around the winding wheels 24 and 26 and under the guide rollers 31 and 32 and thence to the drum 11 where they are secured at one end. The tension band 38 is then wrapped around the winding wheels with the hook ends 48 engaged in the pins 47 of the bell crank lever. The weights 49 are then hooked onto the long arms 43 of the bell crank levers and a uniform pressure is thereby applied to the wires in the grooves 37. As the drum 11 is rotated, the wire is pulled through the winding apparatus with a uniform tension, the spacing at first being produced manually by means of the crank 63 and thereafter from the drum through the gearing, sprockets, and sprocket chains already described. The band 38 is made of flexible steel and it will be seen, with the connection to the bell crank lever described, it may be quickly attached and detached without necessity of bending the band and weakening it.

From the foregoing, it will be seen that I have devised an improved winding machine for winding the rotary drums of continuous filters, which is simple and sturdy of design, reliable in operation, and one by means of which a uniform tension is applied to the wire being wound.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In apparatus for winding retaining wire about the rotary drum of a continuous filter, a feed screw mounted alongside the drum, means for turning the feed screw, a winding wheel mounted to travel along the feed screw and having a recess in the face thereof for receiving the retaining wire, and a weighted tension band detachably mounted in the recess.

2. In apparatus for winding retaining wire about the rotary drum of a continuous filter, a feed screw mounted alongside the drum, means for turning the feed screw, a winding wheel mounted to travel along the feed screw and having a recess in the face thereof for receiving the retaining wire, a flexible tension band partially surrounding the wheel and bearing against the wire in the recess, means for securing one end of the band, a weighted lever for pulling the band about the wheel and a hook on the other end of the band detachably engaging the lever.

3. In apparatus for winding retaining wire about the rotary drum of a continuous filter, a feed screw mounted on the filter and extending lengthwise of the drum, means to rotate the feed screw selectively from the drum and manually, a winding wheel having a recess in its periphery for the retaining wire, a carriage for the winding wheel mounted to travel along the feed screw as it is rotated, a flexible tension band secured at one end to the carriage and partially surrounding the winding wheel, a bell crank lever pivotally mounted on the carriage and having one arm detachably connected to the tension band, and a weight on the other arm of said lever.

4. In apparatus for winding retaining wire on the drum of a continuous filter including a tank and a rotary drum mounted in the tank, a feed screw mounted for rotation on the edge of the tank adjacent the drum, a carriage mounted to travel along the screw as it is rotated, guide means for the carriage mounted on the tank, a pair of winding wheels mounted on the carriage each having a groove in the periphery thereof for receiving the retaining wire, a guide for the retaining wire mounted on the carriage beneath each of the winding wheels, a grooved roller wire guide mounted on the carriage between each of the winding wheels and the drum, a retaining wire being passed from each of the first mentioned guides around its associated winding wheel to the second mentioned guide and thence to the drum, a flexible metal tension band partially surrounding each winding wheel and anchored to the carriage beneath each winding wheel, and weight means for applying tension to the said band.

5. In apparatus for winding retaining wire on the drum of a continuous filter including a tank and a rotary drum mounted in the tank, a feed screw mounted for rotation on the edge of the tank adjacent the drum, a carriage mounted to travel along the screw as it is rotated, guide means for the carriage mounted on the tank, a pair of winding wheels mounted on the carriage each having a groove in the periphery thereof for receiving the retaining wire, a guide for the retaining wire mounted on the carriage beneath each of the winding wheels, a grooved roller wire guide mounted on the carriage between each of the winding wheels and the drum, a retaining wire being passed from each of the first mentioned guides around its associated winding wheel to the second mentioned guide and thence to the drum, a flexible metal tension band partially surrounding each winding wheel and anchored to the car-

riage beneath each winding wheel, a bell crank lever pivotally mounted on the carriage alongside each of the winding wheels and having an offset short arm disposed in front of it sassociated winding wheel, a detachable connection between said offset arm and said tension band, a relatively long arm on each of the bell crank levers extending rearwardly past the winding wheels, a weight suspended from each of the relatively long arms, and means to rotate the drum and the feed screw in unison.

6. In apparatus for winding retaining wire on the drum of a continuous filter including a tank and a rotary drum mounted in the tank, a feed screw mounted for rotation on the edge of the tank adjacent the drum, a carriage mounted to travel along the screw as it is rotated, guide means for the carriage mounted on the tank, a pair of winding wheels mounted on the carriage each having a groove in the periphery thereof for receiving the retaining wire, a guide for the retaining wire mounted on the carriage beneath each of the

winding wheels, a grooved roller wire guide mounted on the carriage between each of the winding wheels and the drum, a retaining wire being passed from each of the first mentioned guides around its associated winding wheel to the second mentioned guide and thence to the drum, a flexible metal tension band partially surrounding each winding wheel and anchored to the carriage beneath each winding wheel, a bell crank lever pivotally mounted on the carriage alongside each of the winding wheels and having an offset short arm disposed in front of its associated wheel, a detachable connection between said offset arm and said tension band, a relatively long arm on each of the bell crank levers extending rearwardly past the winding wheels, a weight suspended from each of the relatively long arms, means to rotate the drum and the feed screw in unison, and selective means for turning the feed screw manually and from the rotary drum.

JOHN W. LITTLE.