Nov. 12, 1929. S. L. WILLIAMS 1,734,986

PICKLING APPARATUS

Filed March 22, 1929 3 Sheets-Sheet 1

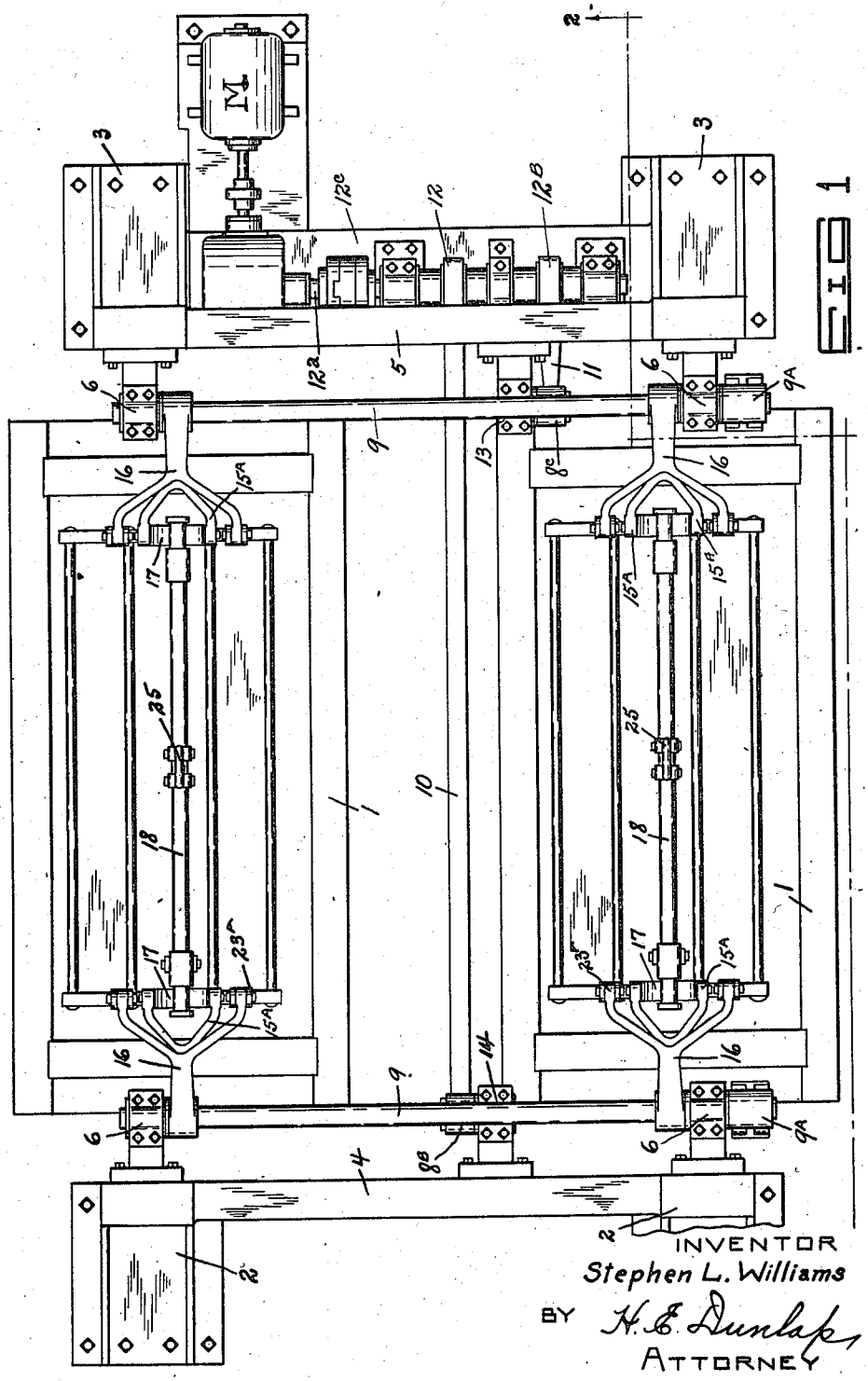


FIG 1

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PICKLING APPARATUS

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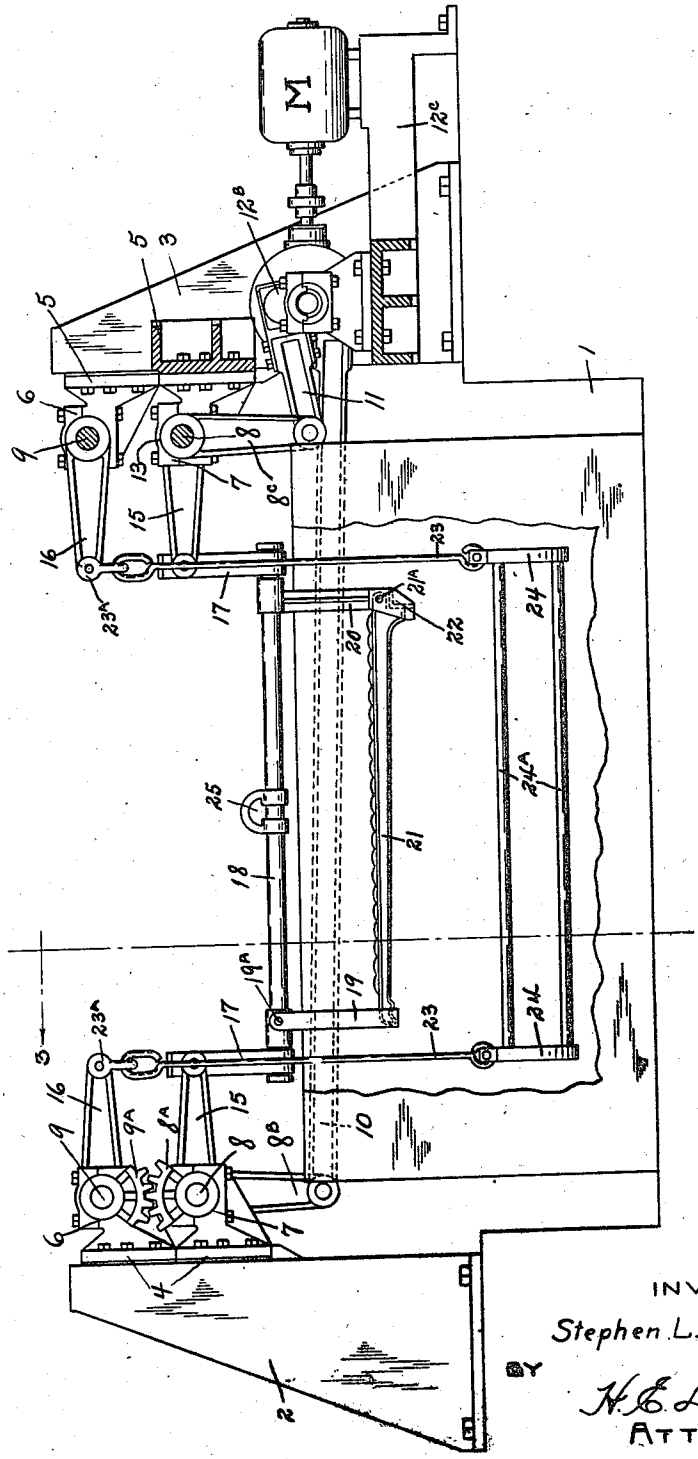


FIG 2

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PICKLING APPARATUS

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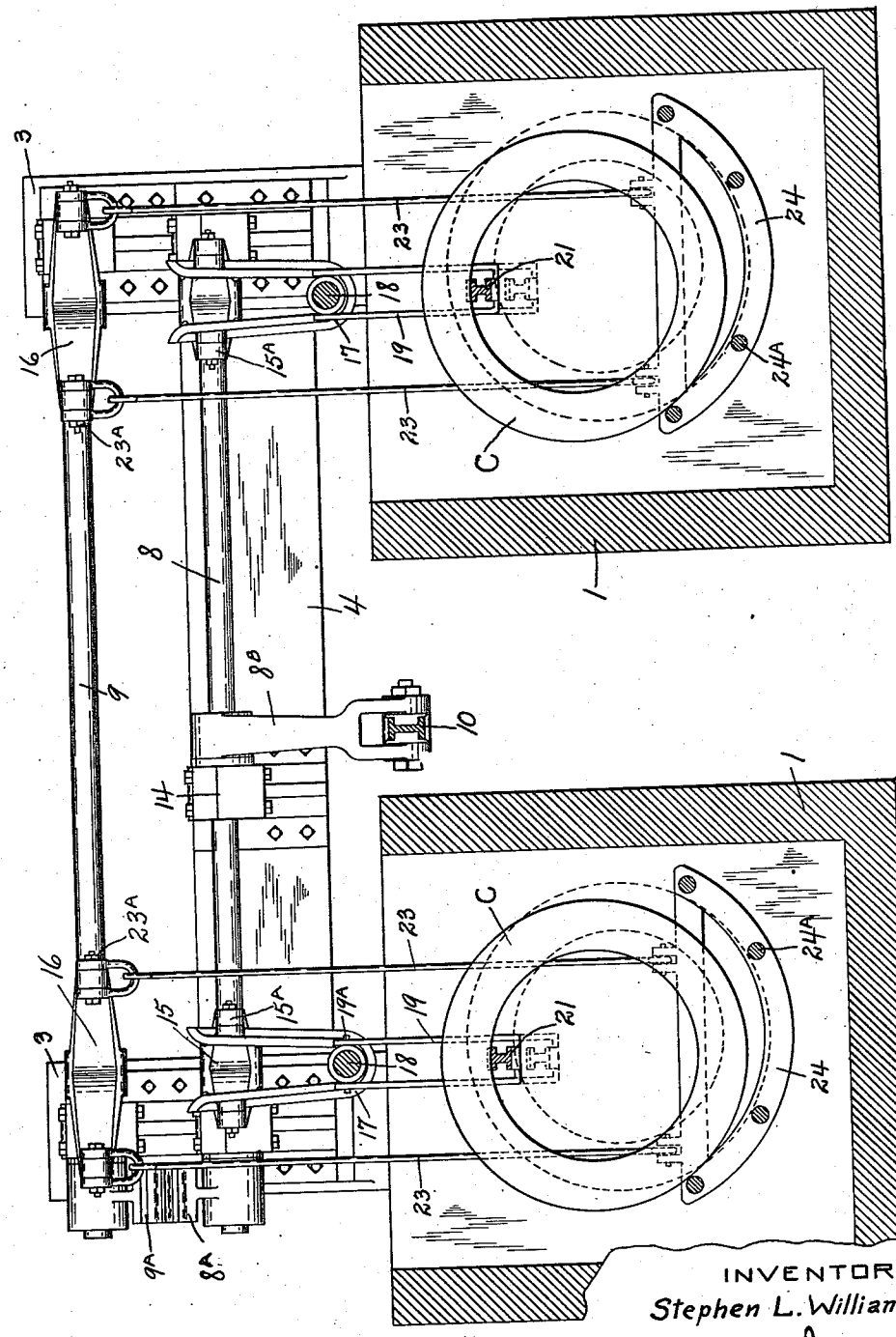


FIG 3

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Patented Nov. 12, 1929 1,734,986

UNITED STATES PATENT OFFICE

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PICKLING APPARATUS

Application filed March 22, 1929. Serial No. 349,066.

This invention relates to pickling apparatus and more particularly to an apparatus for use in the pickling of coils of wire and the like.

The primary object of the invention is to provide an apparatus for effecting thorough and expeditious pickling of the wire, and more specifically to impart a bodily movement to the coils of wire in a curved path in the pickling fluid.

A further object of the invention is to provide a pickling apparatus in which means is provided for opening or spreading the convolutions or coils of the wire during the bodily movement of the coils in a curved path, thereby to expose the entire circumference of the wire to the action of the pickling fluid.

In describing the invention in detail, reference is herein had to the accompanying drawings, in which—

Fig. 1 is a top plan view of the invention;

Fig. 2 is a section on the line 2—2, Fig. 1; and

Fig. 3 is a section on the line 3—3, Fig. 2.

As shown in the drawings, a pair of tanks 1 are employed for containing the pickling fluid, said tanks being mounted in side by side and parallel relation. A pair of supporting columns 2 are disposed in spaced relation to one of the ends of the tanks 1, while a similar pair of spaced supporting columns 3 are located adjacent to the opposite ends of the tanks 1. The columns 2 are connected by a horizontal girder 4 and a similar horizontal grider 5 connects the columns 3. Upper and lower spaced bearings 6 and 7 are connected to the girders 4 and 5 and have upper and lower horizontal shafts 9 and 8 respectively journaled therein. Bearings 13 and 14 have the lower shafts 8 journaled therein for supporting said shafts intermediate the columns 2 and 3, said bearing 13 being connected to the girder 5 and said bearing 14 being connected to the girder 4. A segmental gear 8^a is rigidly secured to each of the shafts 8 adjacent an end thereof while a similar segmental gear 9^a is rigidly secured to each shaft 9, and with the teeth of the two gears intermeshing, by means of which it will be noted that the shafts will be rotated in opposite directions. The shaft 8, which is to the left in Fig. 2 has a depending arm 8^b rigidly secured thereon. A long link 10 is pivoted to the lower end of the arm 8^b and has its opposite end connected to an eccentric 12 which is mounted on a drive shaft 12^a. The other shaft 8 has a similar depending arm 8^c affixed thereto, while a short link 11 is pivoted to the lower end of the arm 8^c and is connected to an eccentric 12^b also mounted on the drive shaft 12^a. The shaft 12^a may be driven in any suitable manner, as by means of a motor M which is suitably connected thereto as shown in Figs. 1 and 2. The crank shaft is mounted on a suitable base 12^c which latter also serves as a support for the motor M.

As shown in Figs. 1 and 2 of the drawings, the shafts 8 have horizontally disposed radial lifting arms 15 connectel thereto, while the upper shafts 9 have corresponding lifting arms 16 affixed thereto. It may be here stated that as many tanks as desired may be employed, and accordingly the shafts 8 and 9 are equipped with upper and lower pairs of lifting arms, so as to provide a pair of such arms at each end of each tank. The lower lifting arms 15 have vertically disposed yokes 17 secured to their outer ends, the outer or free ends of the yokes being pivoted to the furcations of the arms 15^a. The arms 15 and 16 are disposed directly over the pickling tanks and confront each other and have a wire coil carrier or holder secured thereto. The wire coil carrier is composed of a horizontal bar 18 the ends of which rest in and on the closed bottoms of the yokes 17 as shown in Fig. 3. The bar 18 is provided adjacent its ends with depending members 19 and 20, the member 19 being pivoted at its upper end at 19^a to the bar 18 and being of substantially U-shape, as shown in Fig. 3. A horizontal member 21 is pivoted at 21^a to the member 20 while its opposite end is free and rests upon the closed bottom of the U-shaped member 19. The pivoted end of the member 21 is shouldered at 22 and engages a corresponding shoulder formed on the bottom of the member 20, so as to hold the member 21 rigidly in position by the weight of the

wire coils C. Preferably, the upper face of the member 21 is of undulating formation so as to provide seats to receive the inner circumferences of the wire coils to thereby hold the latter against shifting longitudinally of the member 21, an eye or loop 25 being secured to each of the bars 18.

Vertically extending rods 23 are pivoted at 23ª to the bifurcated outer or free ends of the arms 16, as shown in Fig. 3. The lower ends of the rods 23 project within the tanks 1 and are secured to cradles 24 which latter are disposed within the tanks. As shown in Figs. 1 and 3 of the drawings, the cradles 24 are offset or are disposed to one side of the members 21.

It will be noted that the cradles are provided with longitudinally extending bars 24ª which latter are disposed in spaced relation and in the formation of a curve the latter corresponding generally to the curvature of the wire coils.

Referring to Fig. 2 of the drawings, it will be seen that in order to load the carrier, the latter being disconnected from the apparatus, the free end of the bar-like member 21 is raised and the member 19 swung outwardly to the left of Fig. 2, which enables the coils C to be moved onto the bar 21. After the coils have been positioned upon the bar 21, the latter and the member 19 are brought into the position shown in Fig. 2, whereupon a lifting crane is connected to the carrier by means of the eye 25 thereof and is then moved to a position to lower the carrier so that the bar 18 of the latter is engaged in the yokes 17. Power is then applied through the motor M, causing the shafts 8 and 9 to oscillate in opposite directions, through the medium of the intermeshing segmental gears 8ª and 9ª, thus causing the arms 15, the yokes 17 and the wire carrier to move downwardly as the arms 16 and the rods 23 together with the cradle 24 carried by such rods move upwardly.

From the foregoing, it will be noted that the wire coils and the cradle are caused to reciprocate or move toward and away from each other and as they move toward one another, it will be seen that the coils C will be given a rolling movement as they strike the cradle, due to the latter being offset from the carrier. At the same time the impact as well as the weight of the coils will cause the convolutions to spread or open up, thereby giving the pickling fluid access to the entire circumference of the wire, with the result that thorough and complete pickling of the wire is had. It will be noted that the cradle is mounted so that same can swing laterally of the tanks as well as longitudinally thereof, which dual movement facilitates the rolling movement of the wire coils and also the spreading of the convolutions thereof.

It will be understood that the number of the tanks can be increased or decreased at will, and that other changes and modifications may be resorted to within the scope of the following claims.

Due to the fact that the cradle as well as the wire coil carrier reciprocate, coils of various diameters can be pickled, which would not be possible were the cradle held stationary.

What is claimed is:—

1. In a pickling apparatus, a pickling tank, a pair of upper and a pair of lower shafts at the upper part and adjacent to the ends of the tank, a radial arm carried by each shaft, a wire coil carrier secured to the arms of the lower shafts, a cradle within the tank connected to the arms of the upper shafts and having its axis disposed off center with respect to the axis of the cradle, intermeshing segmental gears carried by the upper and lower shafts so as to cause the latter to oscillate in opposite directions, and operating means for the shafts, said cradle having a curved part to engage the wire coil as the two approach so as to impart a rolling movement to the coil and to cause the convolutions of the coil to spread.

2. In a pickling apparatus, a pickling tank, a pair of upper and a pair of lower shafts at the upper part and adjacent to the ends of the tank, a radial arm carried by each shaft, a wire coil carrier secured to the arms of the lower shafts, a cradle within the tank connected to the arms of the upper shafts and having its axis disposed off center with respect to the axis of the carrier, and means to oscillate the shafts in opposite directions thereby to cause the coil and cradle to approach and recede, the cradle having a curved part to engage the wire coil as the two approach so as to impart a rolling movement to the coil and to cause the convolutions thereof to spread.

3. In a wire coil pickling apparatus, a pickling tank, a cradle in the tank, a wire coil carrier having its axis disposed to one side of the axis of the cradle, and means to effect approaching and receding movements of the carrier and cradle thereby to cause the coils to be impacted against the cradle and their convolutions spread apart, said cradle being formed so as to impart a rolling movement to the coils.

4. In a wire coil pickling apparatus, a pickling tank, a wire coil carrier, means to impart vertical reciprocatory movement to the carrier, means in the tank to engage the coils and to impart a rolling movement thereto, and means to vertically reciprocate the coil engaging means thereby to cause impact with the coils so as to spread the convolutions thereof and to effect said rolling movement of the coils.

5. In an apparatus for pickling wire coils, a tank, carrier means for the wire coils adapt-

ed to extend through the open centers thereof so as to enable the coils to rotate relative to the carrier means, means to vertically reciprocate the carrier, means to engage the coils and cause same to rotate, and means to vertically reciprocate the coil engaging means.

6. In an apparatus for pickling wire coils, a pickling tank, carrier means for the wire coils adapted to extend through the open centers thereof so as to enable the coils to rotate relative to the carrier means, means to vertically reciprocate the carrier, means to engage the coils and to cause same to rotate, and means to vertically reciprocate the coil engaging means so as to cause impact between the coil engaging means and the coils thereby to effect spreading of the convolutions of the coils.

7. The hereindescribed method of pickling wire coils, which resides in reciprocating the coils in a pickling bath and in a plane fixed with respect to the bath and in imparting an independent movement to the coils in said plane to impart a rolling movement thereto and to cause spreading of the convolutions of the coils.

8. The hereindescribed method of pickling wire coils, which resides in reciprocating the coils in a pickling bath and in a plane fixed with respect to the bath and in imparting an independent reciprocal movement to the coils to impart a rolling movement thereto and to cause spreading of the convolutions of the coils.

9. In a pickling apparatus, a pickling tank, a pair of upper and a pair of lower shafts at the upper part of the tank, a radial arm carried by each shaft, a wire coil carrier connected to the arms of one of the pairs of shafts, a cradle within the tank connected to the arms of the other pair of shafts, and means to oscillate the shafts in opposite directions.

10. In a pickling apparatus, a wire coil carrier, means to reciprocate the carrier, a wire coil engaging cradle underlying the carrier, and means to mount the cradle for swinging movement relative to the carrier.

11. In a pickling apparatus, a wire coil carrier, means to reciprocate the carrier, a wire coil engaging cradle underlying the carrier, means to mount the cradle for swinging movement relative to the carrier, and means to reciprocate the cradle toward and away from the carrier.

12. In a pickling apparatus, a pickling tank, a pair of upper and a pair of lower shafts at the upper part of the tank, a wire coil carrier, means to suspend the carrier from one of the pairs of shafts, a wire coil engaging cradle underlying the carrier, means to suspend the cradle from the other pair of shafts, and means to oscillate the shafts in opposite directions.

13. The hereindescribed method of pickling wire coils, which resides in reciprocating the coils in a pickling bath and in imparting an independent reciprocal movement to the coils during said reciprocation thereof.

14. The hereindescribed method of pickling wire coils, which resides in vertically reciprocating the coils in a pickling bath, and in effecting upward movement of the coils from beneath the same upon downward movement of the coils.

In testimony whereof, I affix my signature.

STEPHEN L. WILLIAMS.