Aug. 9, 1932. J. H. LARMUTH 1,870,290

STRANDING AND LAYING MACHINE

Filed Feb. 5, 1931 2 Sheets-Sheet 1

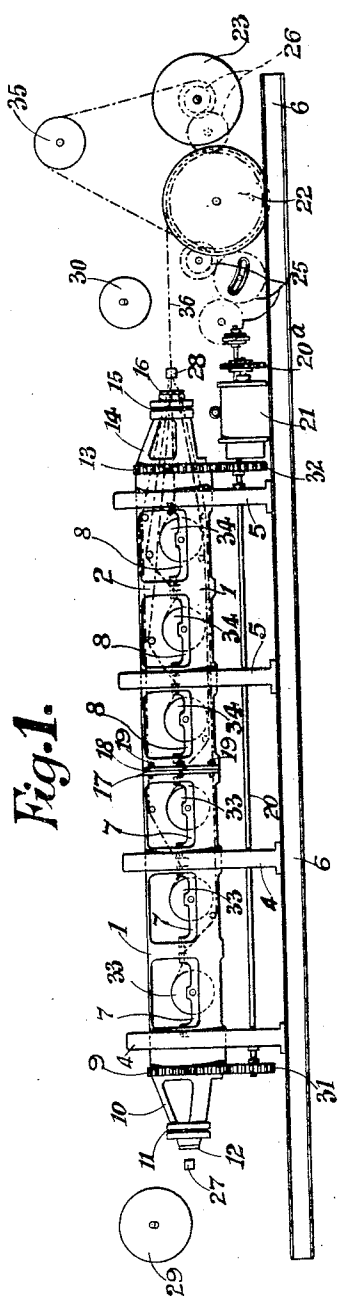


Fig. 1.

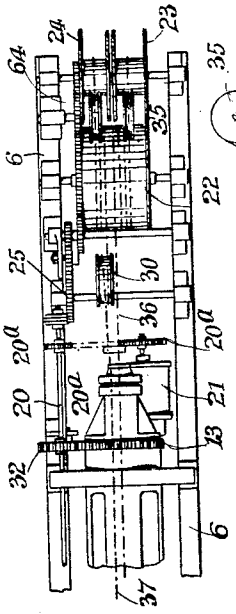


Fig. 4.

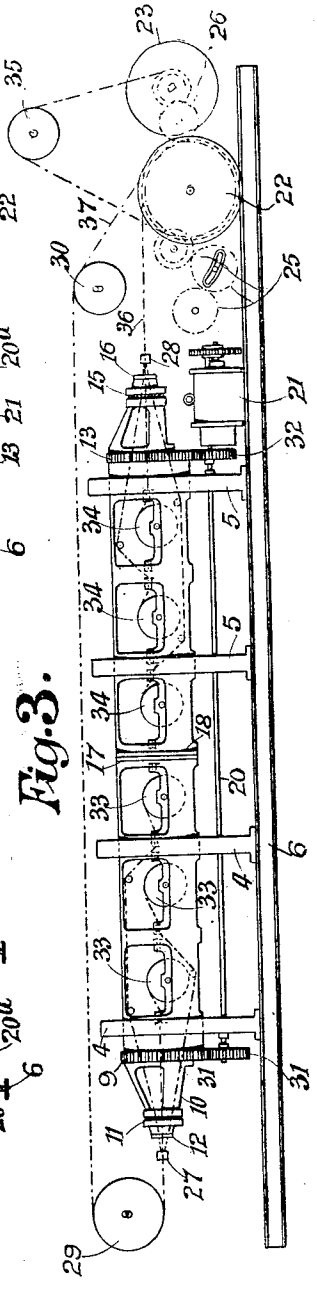


Fig. 3.

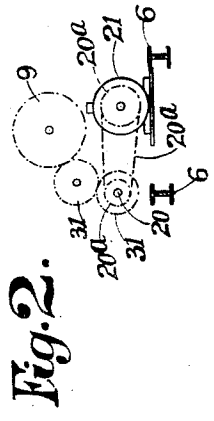


Fig. 2.

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STRANDING AND LAYING MACHINE

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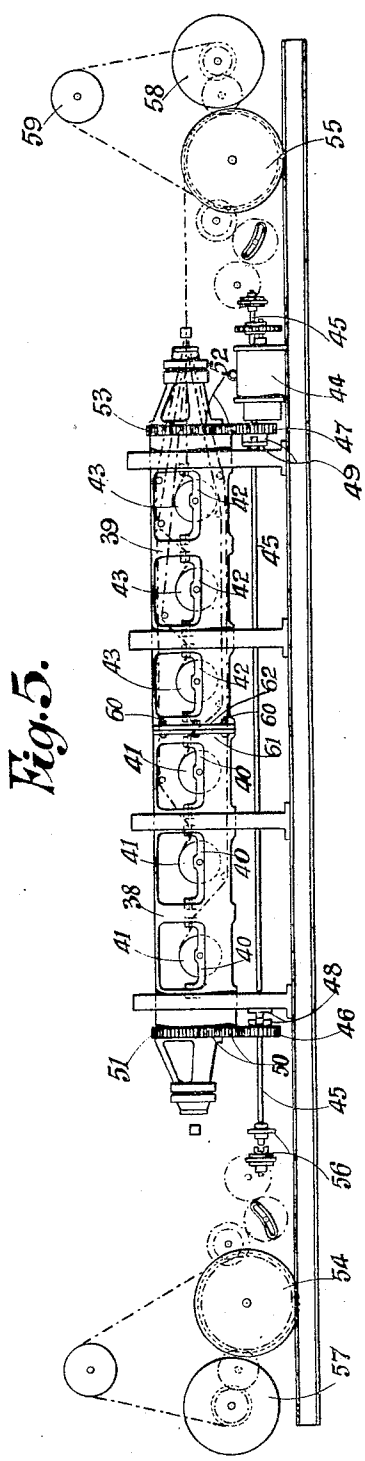


Fig. 5.

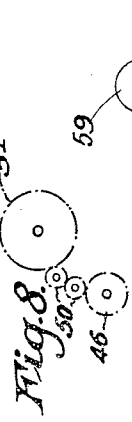


Fig. 8.

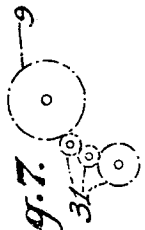


Fig. 7.

Fig. 6.

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UNITED STATES PATENT OFFICE

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STRANDING AND LAYING MACHINE

Application filed February 5, 1931, Serial No. 513,524, and in Great Britain February 26, 1930.

This invention relates to stranding and laying machines of the kind wherein bobbins are mounted in cradles the axes of which remain stationary whilst the machine is in operation.

Owing to the number of wires or the like to be stranded or the number of strands to be laid varying according to the required product and it being necessary to install machines which were capable of stranding a maximum number of wires or the like or laying a maximum number of strands when required, portions of such machines frequently ran idly when the required number of wires or the like or strands were less than the said maximum. The floor space occupied by the machines is very considerable and the idle running of portions of the machines results in a waste of power, an increase in the overhead, establishment and maintenance charges relative to the output and a loss of interest on the capital represented by the cost of that part of the machine which runs idly.

The main object of my invention is to overcome these disadvantages and also to enable an installation of any given size to produce an increased output of strands, ropes or cables comprising the smaller numbers of wires or the like or strands.

I attain this, and another object which will hereinafter appear, by the mechanism illustrated in the accompanying drawings and claimed in the hereinafter appearing claims.

In the drawings—

Figure 1 is a side view of a stranding or laying machine of one construction and illustrates one method of use.

Figure 2 is an end view in section regarded in the direction of the arrow of Figure 1.

Figure 3 is a similar view to Figure 1 but illustrates a second method of use.

Figure 4 is a fragmentary plan view of the machine and illustrates the second method of use.

Figure 5 is a side view of a stranding or laying machine of another construction and illustrates one method of use.

Figure 6 is a similar view to Figure 5, but illustrates a second method of use thereof.

Figure 7 is a fragmentary diagrammatic end view to assist in understanding the second method of use of the machine shown in Figures 1 to 4.

Figure 8 is a similar fragmentary diagrammatic end view to assist in understanding a second method of use of the machine shown in Figures 5 and 6.

For the purpose of illustration a machine provided with a cradle carrying member of tubular formation and having six cradles and therefore adapted to carry six bobbins is shown by way of illustration. It will be appreciated that there may be any desired number of cradles adapted to give the required combinations or maximum numbers of wires or strands.

Referring to the drawings, in the construction shown in Figures 1 to 4, 1 and 2 are two parts of a rotary, tubular cradle carrier divided at 3 so that each part is independent of the other. The part 1 is mounted on rollers carried in a suitable number of brackets 4 and the part 2 is carried on rollers provided in a suitable number of brackets 5, the brackets being mounted on a suitable base 6. The part 1 is provided with three cradles 7 having trunnions which are mounted in spiders concentrically with the part 1.

The part 2 has cradles 8 provided at each end with trunnions which are mounted in spiders in the part 2 so as to be coaxial with the said part.

The trunnions at both ends of the cradles 7 are formed hollow to provide eyes at each end of each cradle for the wire, strand or the like to pass through, whilst the trunnions at the right hand ends only of the cradles 8 are formed hollow to provide eyes for the wires, strands or the like to pass through. If desired the trunnions at the left hand ends of the cradles 8 may be also formed hollow.

The outer end of the part 1 is provided with an externally toothed ring 9 and a conical end 10 acted on by an annular ball thrust bearing 11 and adapted to be provided with a lay plate 12.

The part 2 is provided at its outer end with an externally toothed ring 13, a conical part 14 acted on by an annular, ball thrust bear-

ing 15 and adapted to carry a lay plate 16. The bearings 11 and 15 are mounted in suitable stationary, annular parts.

The inner ends of the parts 1 and 2 are provided with flanges 17 and 18 respectively and bolts 19 or other disconnectable or removable connecting devices are provided for the purpose of disengageably securing the flanges 17 and 18 together.

An electric motor 21 is provided on the base 6 and a hauling off drum 22 and removable take-up bobbins 23 and 24 are provided on the base 6 at the right hand end of the machine, the usual change speed gearing 25 being provided to drive the drum 22 and the usual transmission gearing 26 being provided to drive the take-up bobbins 23 and 24. Die means 27 is provided at the outer end of the part 1 and die means 28 is provided at the outer end of the part 2.

A suitable guide pulley 29 is mounted in stationary bearings at the left hand end of the machine and another guide pulley 30 is mounted in stationary bearings at the right end of the machine.

The motor 21 is connected to the gear ring 9 by means of a lay shaft 20 and intermediate gearing 31 which is provided with change wheels whereby the transmission ratio and the direction of rotation of the part 1 can be changed at will and the drive to the part 1 can be interrupted by removal of one of the said change wheels. The lay shaft 20 is similarly geared to the gear ring 13 by intermediate gearing 32. Figure 2 illustrates one form of gearing in which the gears 31 can be changed for gears of different sizes to produce different transmission ratios and in which one of the gear wheels 31 can be replaced by two smaller gear wheels, as shown in Fig. 7, to change the direction of rotation of the part 1, or can be removed when it is not desired to drive the part 1 through the gearing 31. The lay shaft is rotated from the motor 21 by means of chain and sprocket gearing 20*a*.

When it is desired to produce a strand or rope or cable having as many wires as there are bobbins, less that bobbin which carries the core, the wires or strands from all of the bobbins 33 mounted in the cradles 7 and from the two innermost bobbins 34 mounted in the cradles 8 are led through the eyes at the right hand ends of the trunnions and over suitable guide pulleys in the usual manner to the lay plate 16, the bobbin 34 in the outermost cradle 8 supplying the core. After passing through the die 28 all of the wires, strands or the like pass in the usual manner round the haul off drum 22 and over a guide pulley 35 onto one or other of the take-up bobbins 23 and 24. The flanges 17 and 18 are bolted together to solidly unite the two parts 1 and 2 of the cradle carrier.

Thus the machine works up to its full capacity as is usual when a machine works with the maximum number of bobbins for which it is designed.

Assuming now that the manufacturer wishes to carry out an order which entails the production of a strand having a core and two wires stranded thereon, or a rope having a core with two strands laid thereon, instead of running a machine as hitherto with three of the cradles empty or containing bobbins from which no material is drawn, the operative disconnects the parts 1 and 2 from each other by removing the bolts 19 from the flanges 17 and 18 or disconnecting or disengaging suitable equivalent connecting means, placing in position the required two smaller gear wheels in the gearing 31, as shown more particularly in Fig. 7 and leading the wires or strands from the innermost two bobbins 33 towards the left hand side of the machine together with the core wire or strand on the outermost bobbin 33 and passing them through the die 27 over the pulleys 29 and 30 and around the hauling off drum 22. The wires, strands or the like from the bobbins 34 are drawn through the die 28 and pass around the hauling drum 22 in the hereinbefore described manner. The strand, rope or cable 36, produced from the contents of the bobbins 34, after passing round the hauling off drum 22 passes over the pulley 35 onto the bobbin 23, whilst the strand, rope or cable 37 produced from the contents of the bobbins 33 after passing over the guide pulleys 29 and 30 and around the haul off drum 22, passes over a guide pulley 64, see Figure 4, onto the take-up bobbin 24. This method of using the machine is illustrated more particularly in Figures 2, 3 and 4. When the motor 21 is set in operation the left hand half of the machine produces another strand, rope or cable similar in twist to that produced by the right hand half of the machine.

Therefore not only is the advantage obtained of having the whole machine working productively but with the one machine the manufacturer's output of strand, rope or cable having the smaller number of wires, strands or the like is doubled. The change over from one method to the other is simple and is effected very quickly.

In the alternative construction shown in Figures 5 and 6, the two-part, rotary cradle carrier 38, 39 is supported in a similar construction and of similar manner to the carrier 1, 2 of Figure 1. The carrier part 38 has cradles 40 to support bobbins 41, whilst the carrier part 39 has cradles 42 to support bobbins 43.

An electric motor 44 is coupled to a shaft 45 which is provided with gear wheels 46 and 47 which are free to rotate on the shaft 45 and are adapted to be coupled to the shaft 45 by disengageable clutches 48 and 49 re-

spectively. The gear wheel 46 is connected by the aid of a pair of change gear wheels 50, see more particularly Fig. 8, to an externally toothed driving ring 51 provided on the part 38. The gear wheel 47 is connected through a change gear wheel 52 to the externally toothed driving ring 53 provided on the part 39.

A haul off drum 54 is provided at the left hand end of the machine whilst another haul off drum 55 is provided at the right hand end of the machine. The shaft 45 is connected to the shaft of the motor 44 and serves to actuate the haul off drum 54 from the motor 44 which also serves to actuate the haul off drum 55. A suitable clutch or coupling 56 is provided to enable the haul off drum 54 to be disconnected from the shaft 45. A take up bobbin 57 is provided at the left hand end of the machine and is actuated from the haul off driving gears, whilst a take up drum 58 is provided at the right hand end of the machine and is actuated from the driving gears of the haul off drum 55.

Figure 5 illustrates one method of using the machine, which method consists in leading all of the wires or the like or strands from the bobbins 41 and 43 to the right hand end of the machine, round the haul off drum 55, over the guide pulley 59 onto the take up bobbin 58. The coupling 49 is engaged so that the motor 44 rotates the carrier part 39 through the counter shaft 45 and the coupling 48 is disengaged so that the gear wheel 46 is not driven by the lay shaft 45 and therefore does not drive the ring 51. The coupling 56 is also disconnected so that the haul off drum 54 and take up bobbin 57 remain stationary. The two carrier parts 38 and 39 are suitably secured together at their opposed ends, for example by means of bolts 60 passed through the flanges 61 and 63 of the parts 38 and 39 respectively. It will be observed that the whole drum capacity of the carrier 38, 39 is utilized.

Figure 6 illustrates another method of using the machine, which consists in leading the wires or the like or strands of the bobbins 43 in a right hand end direction over the haul off drum 55 and guide pulley 59 onto the take up bobbin 58, and leading the wires or the like or strands from the bobbins 41 to the left hand, round the haul off drum 54 and over a guide pulley 63 onto the take up bobbin 57. The bolts 60 or other coupling means are disengaged and the carrier parts 38 and 39 are thus free to be rotated independently of each other. The clutch 49 is engaged and the gear wheel 47 therefore drives the part 39 in a given direction. The clutch 48 is also engaged and the gear wheel 46 therefore rotates the part 38, which owing to the interposing of the two change gears 50 rotates in opposite direction to the carrier part 39. The coupling 56 is also engaged and therefore the haul off drum 54 and take up bobbin 57 are also rotated in the requisite direction. When the machine is used in this way, two strands, ropes, cables or the like having the same direction of twist are produced simultaneously and the bobbin capacity of the carrier 38, 39 is again fully utilized. Therefore when the manufacturer is producing strands, ropes or cables having less wires or the like or strands than there are bobbins in the whole machine, he is able to make productive all of the bobbins which can be carried by the carrier.

I claim—

1. A stranding or laying machine comprising bobbin cradles, bobbins mounted in the said cradles with their axes of rotation arranged horizontally, a carrying member divided into two parts, means on each part of the carrying member for carrying a plurality of bobbin cradles coaxially with the carrying member, disconnectable securing means on the two parts of the carrying member for positively securing the two parts together to form a single unit at will, and separate driving means for rotating the two parts in different directions at will.

2. In a stranding or laying machine according to claim 1 a tubular carrying member divided at or near the centre into two parts and arranged with open, abutting ends, flange means on the said abutting ends, means for positively securing the flanges together at will, change gearing for driving the two parts in different directions at will, cradles mounted in the carrying member coaxially therewith, and axial eyes in both ends of at least some of the said cradles.

3. A stranding or laying machine according to claim 1, comprising a tubular carrying member consisting of two equal parts, open opposed ends on the said parts adapted to abut against each other, means for locking the abutting ends directly together and unlocking the said ends from each other, and means for driving one part in opposite direction to the other when the said ends are unlocked from each other.

4. A stranding or laying machine of the hereinbefore specified kind comprising two aligned, rotary, cradle carrier parts each provided at its outer end with an externally toothed ring and each provided at its inner end with a flange for solid attachment to the other part and each adapted to be driven separately in different directions by toothed change gearing.

In testimony whereof, I have signed my name to this specification at Manchester in the county of Lancaster, England, this 22nd day of January, 1931.

JOHN HAMILTON LARMUTH.