

April 23, 1935.

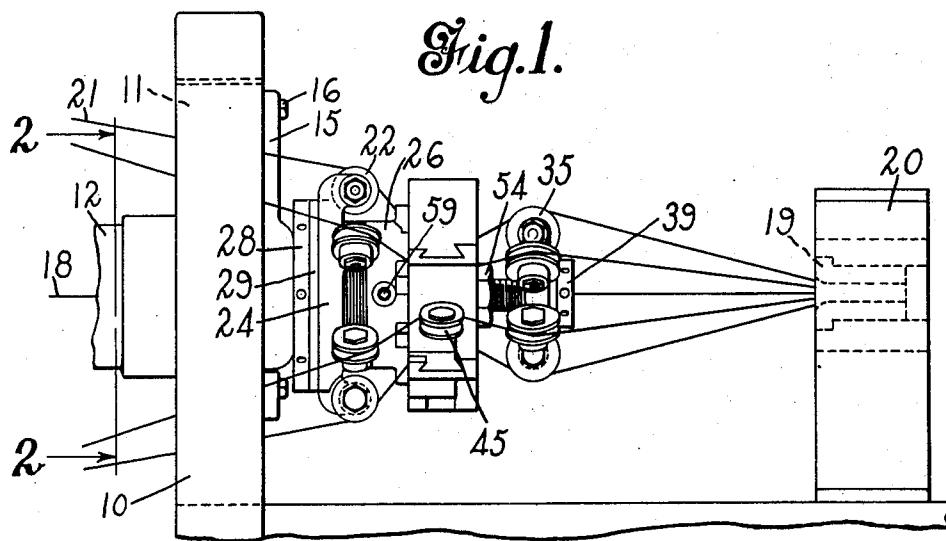
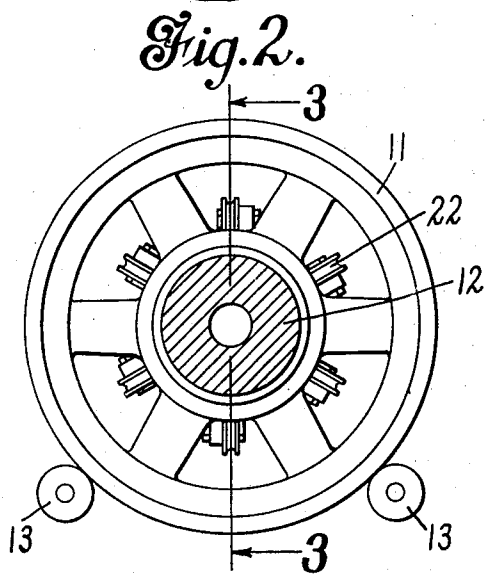
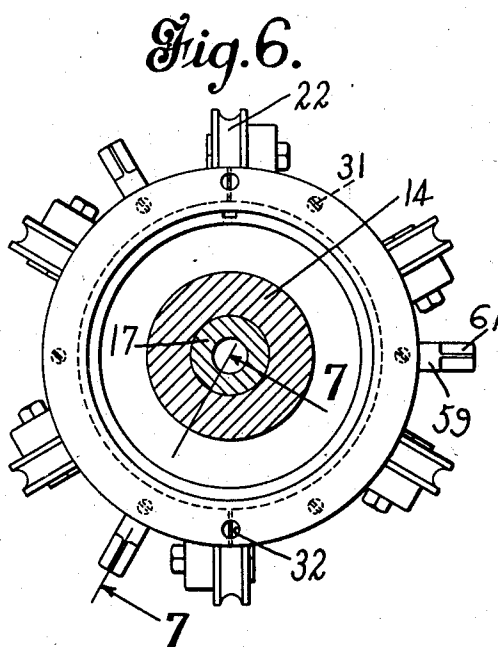
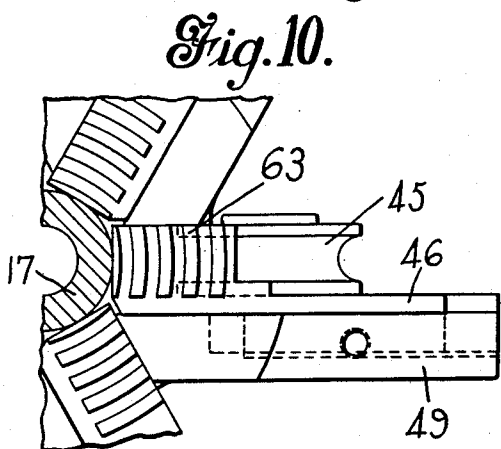
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1,998,430

MACHINE FOR MAKING WIRE ROPE OR THE LIKE

Filed April 22, 1933

3 Sheets-Sheet 1



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MACHINE FOR MAKING WIRE ROPE OR THE LIKE

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3 Sheets-Sheet 2

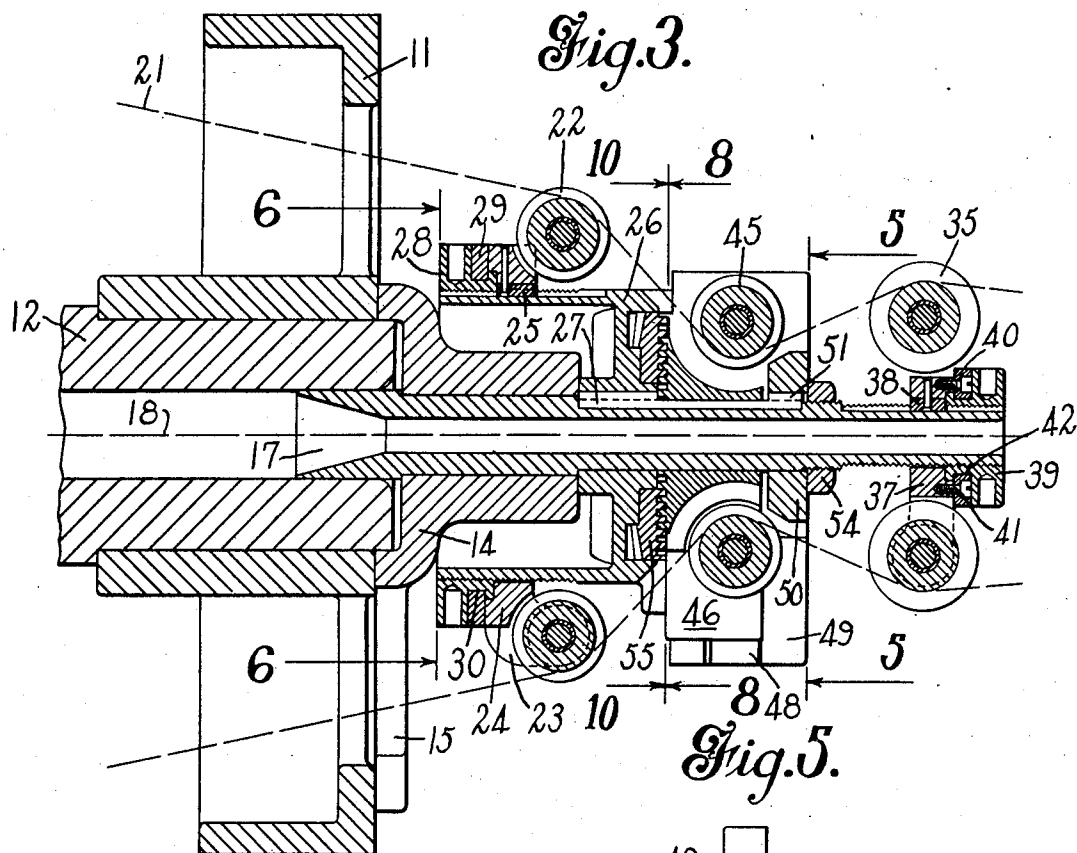
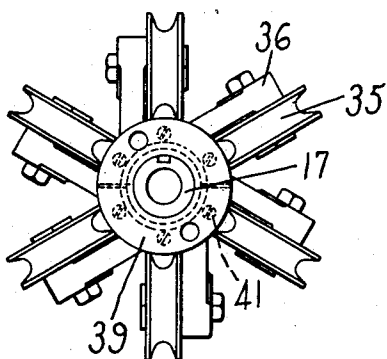
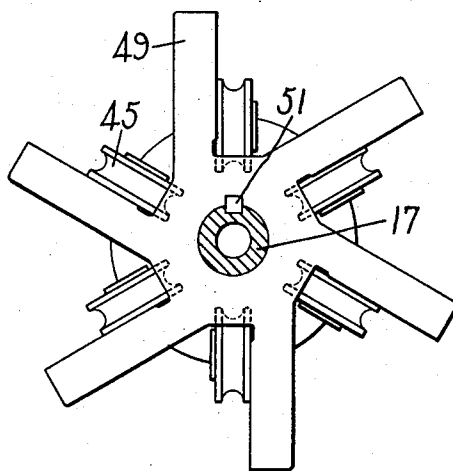


Fig. 4.



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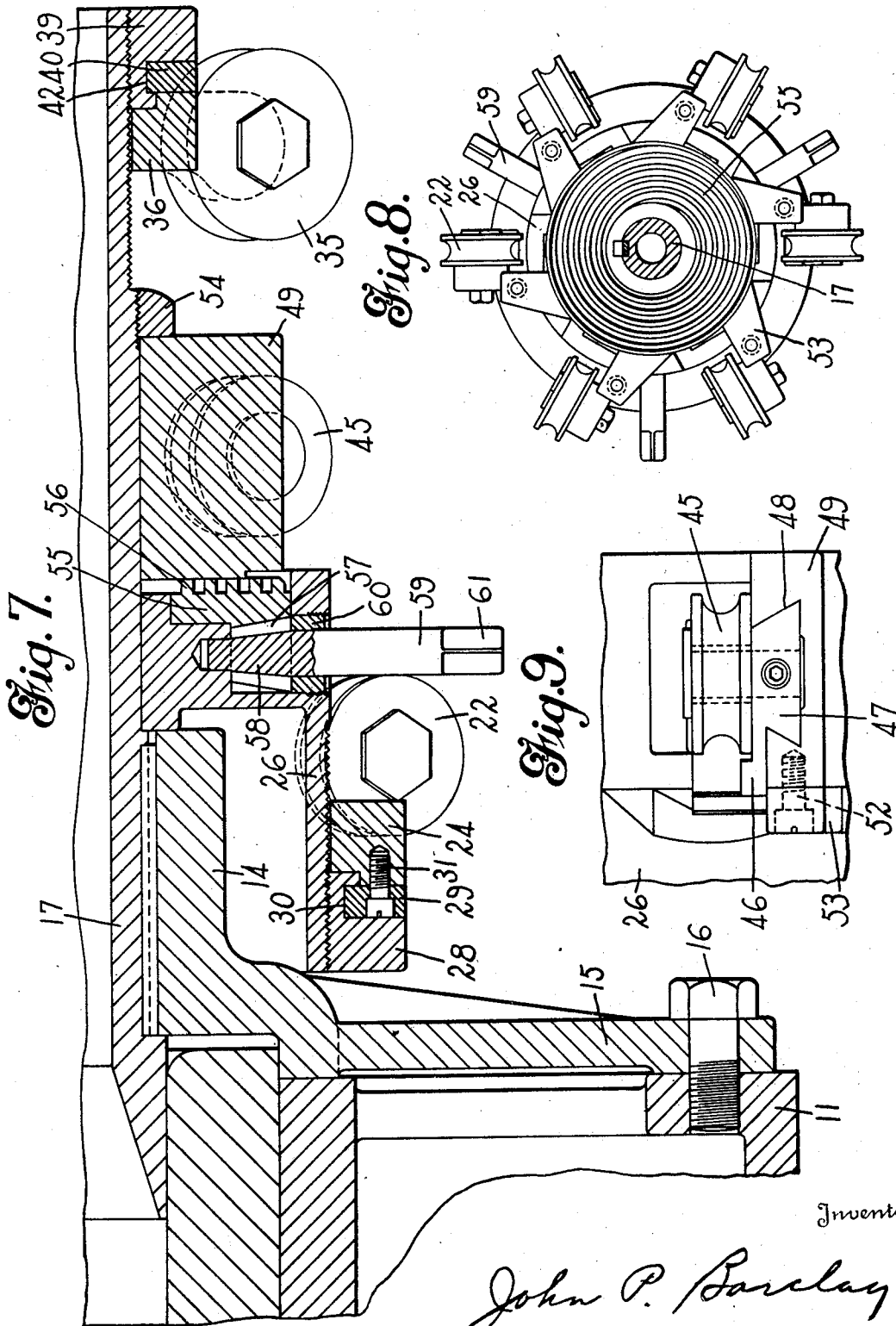
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MACHINE FOR MAKING WIRE ROPE OR THE LIKE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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MACHINE FOR MAKING WIRE ROPE OR
THE LIKE

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Application April 22, 1933, Serial No. 667,378

17 Claims. (Cl. 117—20)

This invention relates to machines for making wire strands, ropes, or cables, and more particularly to the type of machine for laying strands in a rope, and is designed to provide improved means for delivering the strands to the closing die so that the strands will be in the proper position and condition to serve as components of the finished rope.

It has been common in machines of this character to pass the strands over a series of pulleys or sheaves, usually three, the strand passing over the two outside pulleys and below the intermediate pulley. Each of the three pulleys is one of a set of pulleys, the number in the set being equal to the number of strands being operated upon. For instance, if the rope consists of seven strands, one strand will usually act as the core, the remaining six being wound helically about the core strand. In laying the strands of such a rope there will be six pulleys in each of the three sets; or eighteen in all, each of the strands passing in contact with three of the pulleys or with one in each of the sets.

One object of the invention is to provide an improved forming head for use in connection with wire-making machines.

Another object of the invention is to provide a forming head with pulleys arranged in sets, the pulleys of each set being arranged opposite the same point on the axis of the head and to provide means for adjusting each set of pulleys simultaneously.

A further object of the invention is to provide a forming head with inner and outer sets of pulleys over which the stranded wire is passed, and an intermediate set of pulleys, the pulleys of the intermediate set being adjustable radially with respect to the axis of the head and also being simultaneously adjustable in a radial direction.

Another object of the invention is to provide a forming head having a set of radially adjustable pulleys thereon, and means to provide for adjustment of such pulleys equally and simultaneously so as to insure precisely the same adjustment of each one of the pulleys.

To these and other ends, the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevational view of a forming head, embodying my invention;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a sectional view on line 3—3 of Fig. 2;

Fig. 4 is an end elevational view of the forming

head, the view being taken at the right-hand end of the device, as shown in Fig. 1;

Fig. 5 is a sectional view on line 5—5 of Fig. 3;

Fig. 6 is a sectional view on line 6—6 of Fig. 3;

Fig. 7 is an enlarged fragmentary sectional view on line 7—7 of Fig. 6;

Fig. 8 is a sectional view on line 8—8 of Fig. 3;

Fig. 9 is a detailed view of the supporting means for one of the pulleys shown in Fig. 5, and

Fig. 10 is a partial sectional view on line 10—10 of Fig. 3.

In order to illustrate a preferred embodiment of my invention I have shown a standard 10, within which is mounted a head or drum 11, the head being secured to and rotated by a shaft 12 and being supported on rollers 13. It will be understood that the shaft 12 may be rotated from any suitable source of power and is preferably hollow so that it may carry the center or core strand of the rope being formed.

At the front face of the drum 11 is secured a supporting member 14. This member may be provided with a series of arms 15, secured to the drum by the bolts 16. As shown in Fig. 3, the supporting member 14 serves to support the hollow shaft 17 upon which, in turn, is mounted my improved forming head. The rear end of the shaft 17 is disposed within the bore of the hollow shaft 12 and the shaft 17 is also hollow so that the core wire or strand 18 may pass there-through.

The forming head comprises a number of sets of bending or crimping rollers which act to form crimps in the wires or strands passing thereover prior to their passage to the closing die, this die being shown at 19 in Fig. 1 mounted in the standard 20.

As shown, three sets of such rollers are employed, each set comprising a number of rollers equal to the number of wires or strands to be wound about the core wire 18. In the embodiment of my device shown in the drawings, there are six of such rollers in each set, one for each of the wires or strands 21, which as will be clearly understood by those skilled in the art, are drawn from spools or reels carried by the usual fly or cage, (not shown).

The rollers 22 of the first set are mounted upon arms 23 provided upon a carrier 24, this carrier being slidably keyed, as shown at 25, to a hub member 26, which is in turn keyed at 27 to the hollow shaft 17. An adjusting nut 28 is threaded upon the hub 26 and is rotatably connected to the carrier 24 by means of a split ring 29, se-

cured to the carrier and located within a groove 30, in the adjusting nut 28.

It will be understood that the ring 29 is made in halves so it may be inserted into the groove 30, after the adjusting nut has been placed upon the hub 26 against the carrier 24. The two halves of this ring are then secured in place by being bolted to the carrier 24 by means of the bolts 31, which may be inserted through openings 32 in the rear face of the adjusting nut. It will be apparent, therefore, that when the adjusting nut 28 is rotated upon the hub 26, it will, due to its threaded connection with the hub be caused to travel therealong and will move the carrier 24 and associated rollers 22 longitudinally of the hub member and of the shaft 17. The carrier will be prevented from rotating upon the hub 26 because of its keyed connection therewith, and the adjusting nut 28 will rotate with relation to the carrier in its movement longitudinally of the hub. This will tend to move the rollers 22 longitudinally of the shaft 17 relatively to the other sets of rollers presently to be described.

The set of rollers 22 which has just been described, is located nearest to the drum 11, and another set of rollers 35 is mounted on the shaft 17 in a manner similar to the rollers 22, the rollers 35 being the farthest from the drum 11. These rollers, as shown in Fig. 4, are mounted upon arms 36 supported by a carrier 37 which is keyed, as shown at 38, to the shaft 17. An adjusting nut 39 is threadedly mounted on this shaft and is rotatably secured to the carrier 37 by means of the split ring 40, secured to the carrier by the bolts 41 and located within a groove 42 of the adjusting nut, this construction being substantially the same as that described in connection with the carrier 24 and associated parts.

It will be apparent that rotation of the adjusting nut 39 will cause the rollers 22 to be moved longitudinally of the shaft 17 so that the desired crimping effect may be obtained. It will also be understood that the rollers 35 will be equal in number to the rollers 22 and in general will be the same as the number of wires or strands to be wound about the center core to form the completed strand, rope or cable, depending upon the use to which the machine is put.

Between the two sets of rollers just described, is a third set 45, there being a roller 45 between each of the rollers 22 and 35. It is desirable that these rollers be adjusted radially of the shaft 17, and it is moreover desirable that this adjustment of all of the rollers be made equally and simultaneously. It is particularly desirable that the adjustment of one roller be the same as that of another so that the effect upon each and all of the strands passings through the rollers will be the same.

To effect this result, the rollers 45 are rotatably mounted upon sliding supports 46, these supports having dovetailed portions 47 mounted in correspondingly shaped slideways 48 in arms 49 secured to a carrier 50, which is keyed upon the shaft 17, as shown at 51. The carrier 50 is secured to the hub 26 by means of bolts 52 passing through arms 53, secured to the hub and entering the arms 49 secured upon the carrier. These parts are held in position upon the shafts 17 by means of the nut 54 threaded upon the shaft, and holding the portion of the hub member 26 against the front face of the support 14.

Within a recess in the front end of the hub 26 is rotatably mounted a scroll member 55, this scroll member having teeth 56 upon the front

face thereof. Upon the rear face of the member are gear teeth 57, adapted to be engaged by a pinion 58, formed integrally with a short shaft 59, mounted in the hub member 26 and in a collar 60 threaded into an opening in the hub member. The shaft 59 is provided with wrench faces 61 adjacent its end so that the shaft may be rotated, this serving to rotate the pinion 58 and the scroll member 55 by reason of the engagement of the teeth of the pinion with the gear teeth 57 on the rear face of the scroll member.

As shown more especially in Fig. 10, the slidably mounted members 46, which serve to support the rollers 45, are provided upon their rear faces with teeth 63, engaged with the teeth 56 of the scroll member 55. It will be apparent that with this construction when the scroll member is rotated the supporting members 46 will, due to the engagement of the teeth 63 thereof with the scroll teeth of the member 55, be moved radially within the dovetailed slot 48, of the arms 49, and serve to move the rollers outwardly or inwardly in a radial direction relatively to the hollow shaft 17. Moreover, it will be clear that the movement of all of the rollers 45 is effected simultaneously and that this movement or adjustment will be equal for all of these rollers and in the same direction. If, therefore, the rollers are originally set at the same distance from the axis of the shaft 17, they will always be maintained equidistant from this shaft regardless of the actual distance from the shaft to which they may be adjusted.

It will also be understood that as the set of rollers 35 are mounted on a single carrier, and likewise, as the set of rollers 22 are mounted on a single carrier, the adjustment of each of these sets of rollers will take place simultaneously and equally longitudinally of the shaft 17. It will, therefore, be seen that as each of the strands 21 passes over a roller 22, under a roller 45, and over a roller 35, the forming or crimping effect of these rollers on one strand will be the same as any other series of rollers on another strand, due to the fact that the adjustment of all the rollers must be made equally.

It will be understood that in the operation of the machine, the core wire or strand 18 is led through the shaft 12 and shaft 17 to the closing die 19, and that each of the strands 21 is led from the usual fly (not shown) located at the left of the machine, as shown in Fig. 1, through openings in the drum 11, over a roller 22, under a roller 45, over a roller 35 and thence to the closing die 19 to be wound helically around the core wire or strand 18. During the operation of the machine, the shaft 12 and therefore the shaft 17, is rotated from any suitable source of power which effects rotation of the forming head, including the sets of rollers over which the strands pass. This rotation is provided at the proper speed to lay the strands 21 helically about the core 18, and the series of rollers are properly adjusted to give the strands the desired crimping effect.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to the details shown but is capable of modification and variation within the spirit of the invention and the scope of the appended claims.

What I claim is:

1. A machine for making wire strands or ropes comprising a rotatable member, carriers on said member, each carrier having a set of strand-engaging members thereon, the members on one of said carriers being adjustable radially of said

rotatable member, and means for effecting simultaneous adjustment of said adjustable members.

2. A machine for making wire strands or ropes comprising a rotatable member, carriers on said member, each carrier having a set of strand-engaging members thereon, the members on one of said carriers being adjustable radially of said rotatable member, and means for insuring equal adjustment of said adjustable members.

3. A machine for making wire strands or ropes comprising a rotatable member, carriers on said member, each carrier having a set of strand-engaging members thereon, the members on one of said carriers being adjustable radially of said rotatable member, and an adjusting device engaged with all of said adjustable members to effect simultaneous adjustment thereof.

4. A machine for making wire strands and ropes comprising a rotatable member, carriers on said member, a series of strand-engaging rollers mounted on one of said carriers and adjustable thereon radially of said member, an adjusting member mounted rotatably with respect to said carrier, and means for effecting simultaneous adjustment of said rollers when said rotatable member is actuated.

5. In a machine for making wire strands or ropes, a rotatable member, a carrier on said member, supports on said carrier mounted to slide radially thereof, rollers on said supports, an adjusting device operatively connected with all of said supports and arranged when actuated to move said supports radially to adjust the rollers.

6. A machine for making wire strands or ropes comprising a rotatable member, a plurality of carriers thereon spaced axially of said member, a plurality of rollers on each of said carriers, certain of said carriers being adjustable axially of said rotatable member to vary the distance therebetween, the rollers on another of said carriers being mounted for adjustment radially of the rotatable member, and said rollers being arranged in sets comprising one roller on each of the carriers, and said rollers having their axes extending tangentially of said rotatable member.

7. A machine for making wire strands or ropes comprising a rotatable member, a plurality of carriers thereon spaced axially of said member, a plurality of rollers on each of said carriers, certain of said carriers being adjustable axially of said rotatable member to vary the distance therebetween, the rollers on one of said carriers being mounted for adjustment radially of the rotatable member, said rollers being arranged in sets comprising one roller on each of the carriers and said rollers being arranged in planes extending radially of said rotatable member, and means on said one carrier for adjusting all of the rollers thereon simultaneously and equally.

8. In a machine for making wire strands or ropes, a rotatable member, a carrier mounted on said member, supporting members slidably mounted on said carrier, rollers carried by said supporting members, said supporting members being provided with teeth, and a scroll member rotatably mounted adjacent said carrier and having teeth adapted to engage the teeth of said supports to adjust the latter radially of the carrier.

9. In a machine for making wire strands or ropes, a rotatable member, a carrier mounted on said member, supporting members slidably mounted on said carrier, rollers carried by said supporting members, said supporting members being provided with teeth, and a scroll member rotatably mounted adjacent said carrier and having

teeth adapted to engage the teeth of said supports to adjust the latter radially of the carrier, said scroll teeth being engaged with the teeth of all of said supports to effect simultaneous adjustment thereof.

10. In a machine for making wire strands or ropes, a rotatable member, a carrier on said member having arms projecting radially thereof, supports slidably mounted on said arms and having strand-engaging devices mounted thereon, said devices being mounted on axes transverse to said supports, and means engaged with all of said supports and adapted when moved to effect simultaneous adjustment thereof radially of said rotatable member.

11. In a machine for making wire strands or ropes, a rotatable member, a pair of spaced carriers mounted for longitudinal adjustment on said member, a third carrier arranged intermediate said spaced carriers, each of said carriers having a set of rollers thereon, the rollers of said first-named carriers being adjustable as a set with the carrier longitudinally of the rotatable member, the rollers of said last-named carrier being adjustable as a set radially of the rotatable member, and means on said carrier to effect said radial adjustment.

12. In a machine for making wire ropes or strands, a rotatable member, a hub keyed to said member, a carrier slidably mounted on said hub and having a set of rollers mounted thereon, means for adjustably securing said carrier to the hub, a second carrier mounted adjacent the face of the hub, a set of rollers supported by said carrier for adjustment radially of said rotatable member, and means carried by said hub adjacent said second carrier to effect simultaneous and predetermined relative adjustment of said rollers.

13. In a machine for making wire ropes or strands, a rotatable member, a hub keyed to said member, a carrier slidably mounted on said hub and having a set of rollers mounted thereon, means for adjustably securing said carrier to the hub, a second carrier mounted adjacent the face of the hub, a set of rollers supported by said carrier for adjustment radially of said rotatable member, means carried by said hub adjacent said second carrier to effect simultaneous and predetermined relative adjustment of said rollers, a third carrier mounted upon said rotatable member and having a set of rollers thereon, and means for adjusting said third carrier longitudinally of said rotatable member.

14. In a machine for making wire rope or strands, a rotatable member, a hub secured to said member, a carrier mounted on said hub for movement longitudinally of the axis thereof, said carrier having a set of rollers mounted thereon, means for adjustably securing said carrier to the hub, a second carrier mounted adjacent the face of the hub and having a set of rollers supported thereon for adjustment radially of said rotatable member, and means carried by said hub adjacent said second carrier to effect simultaneous and predetermined relative adjustment of said rollers.

15. A machine for making wire strands or ropes comprising a rotatable member, a pair of carriers supported by said member in spaced relation, each of said carriers being adjustable longitudinally of said member, a plurality of strand-engaging rollers on each of said carriers, a third carrier mounted on said rotatable member between said spaced carriers, means for

mounting a plurality of strand-engaging rollers on said third carrier for adjustment radially of said rotatable member, a member engaging said mounting means for effecting simultaneous radial adjustment of said last-named rollers, and one of said last-named rollers being adapted to cooperate with a roller on each of said spaced carriers to engage a strand.

16. In a machine for making wire ropes or strands, a rotatable member, a hub secured to said member, a carrier mounted on said hub for movement longitudinally of the axis thereof, said carrier having a set of rollers mounted thereon, means for adjustably securing said carrier to the hub, a second carrier mounted

adjacent the face of the hub and having a set of rollers supported thereon for adjustment radially of said rotatable member, and means to effect simultaneous and predetermined relative adjustment of said rollers.

17. A machine for making wire strands or ropes comprising a rotatable member, a pair of carriers supported by said member in spaced relation, each of said carriers being adjustable longitudinally of said member, a plurality of strand-engaging rollers on each of said carriers, and a third carrier mounted on said rotatable member between said spaced carriers and fixed against longitudinal movement.

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