

J. W. CONNELLY.

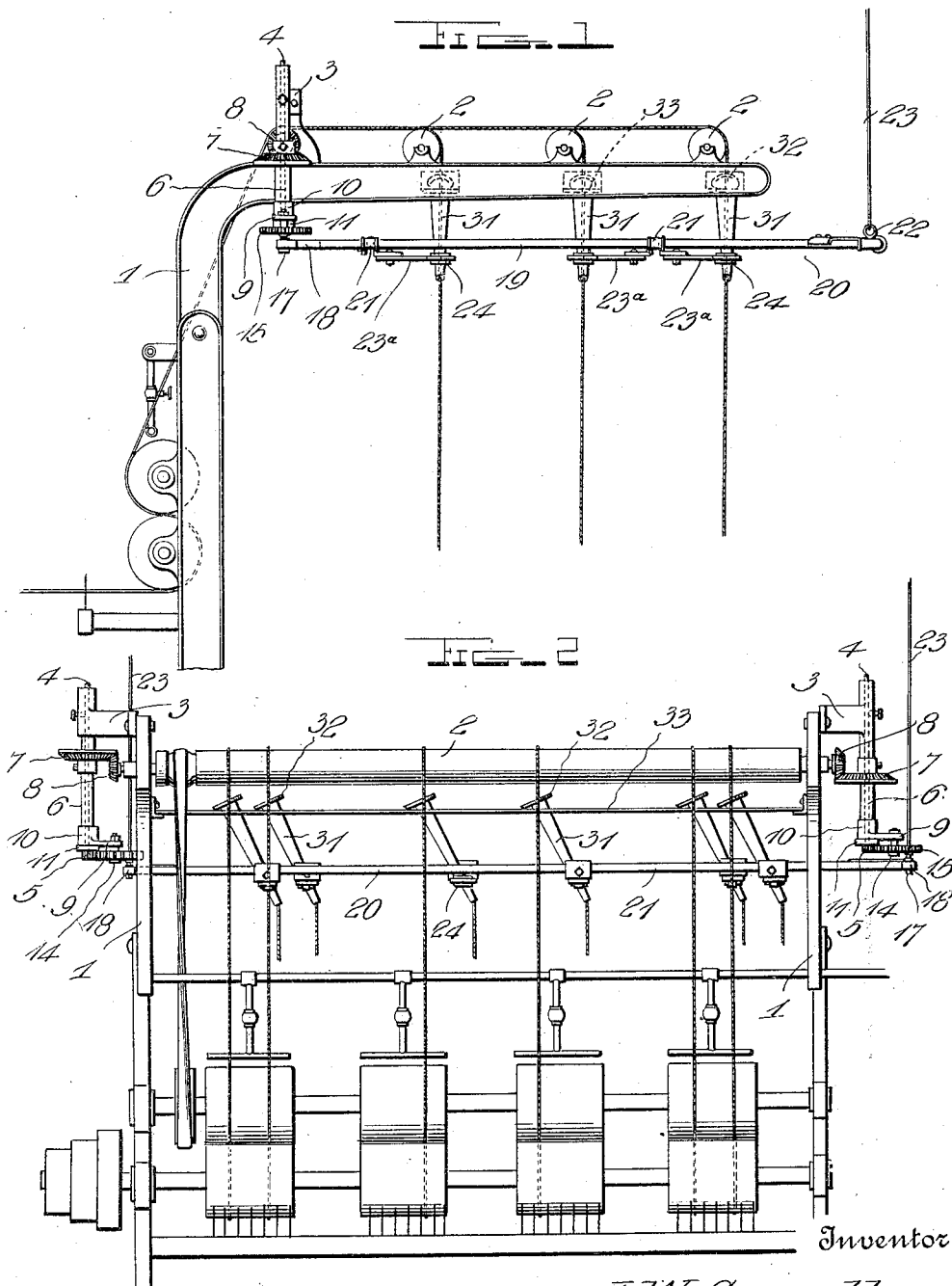
YARN COILER.

APPLICATION FILED MAR. 14, 1912.

Patented Dec. 15, 1914.

1,121,480.

4 SHEETS-SHEET 1.



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4 SHEETS-SHEET 2.

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FIG. 3

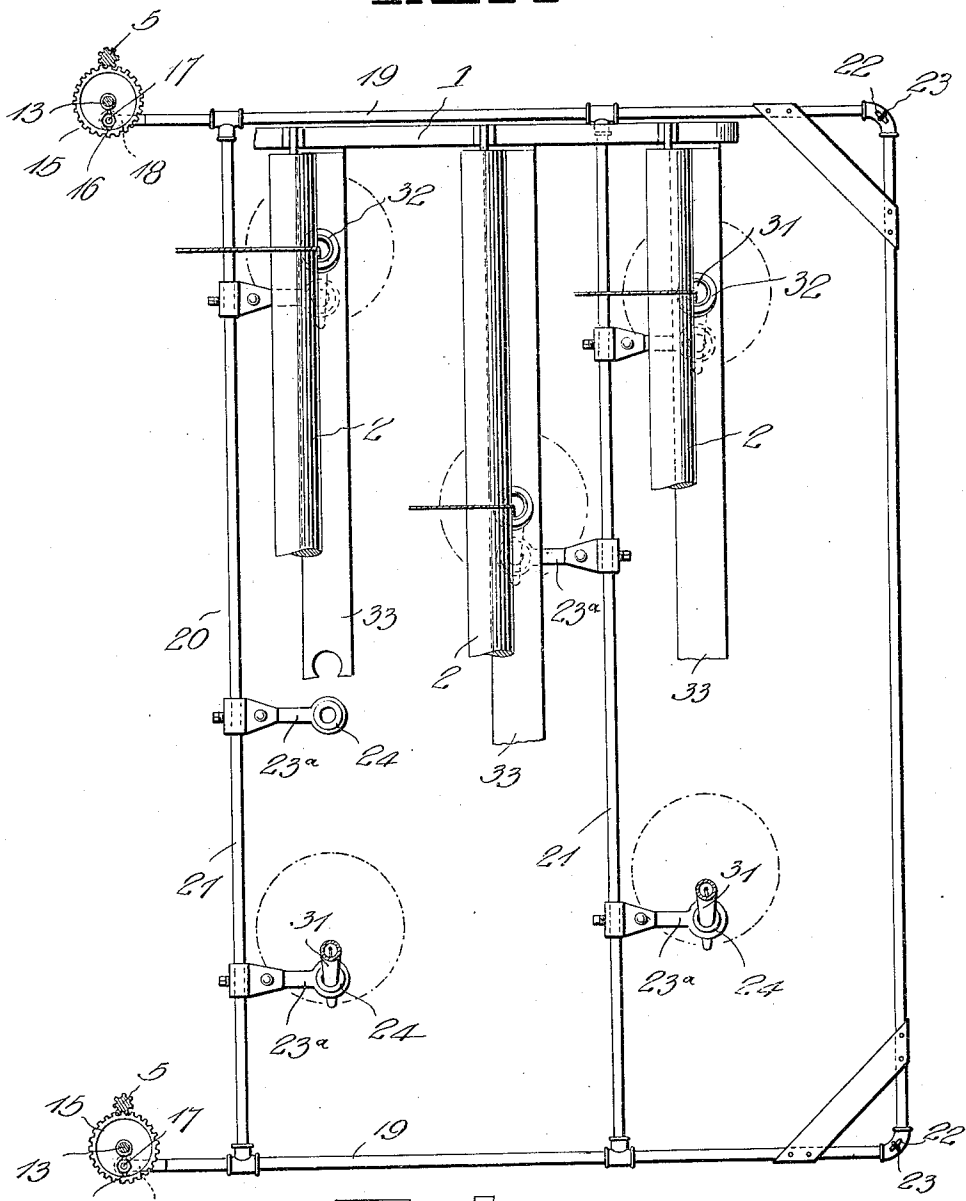
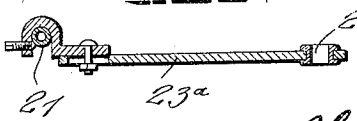


FIG. 7



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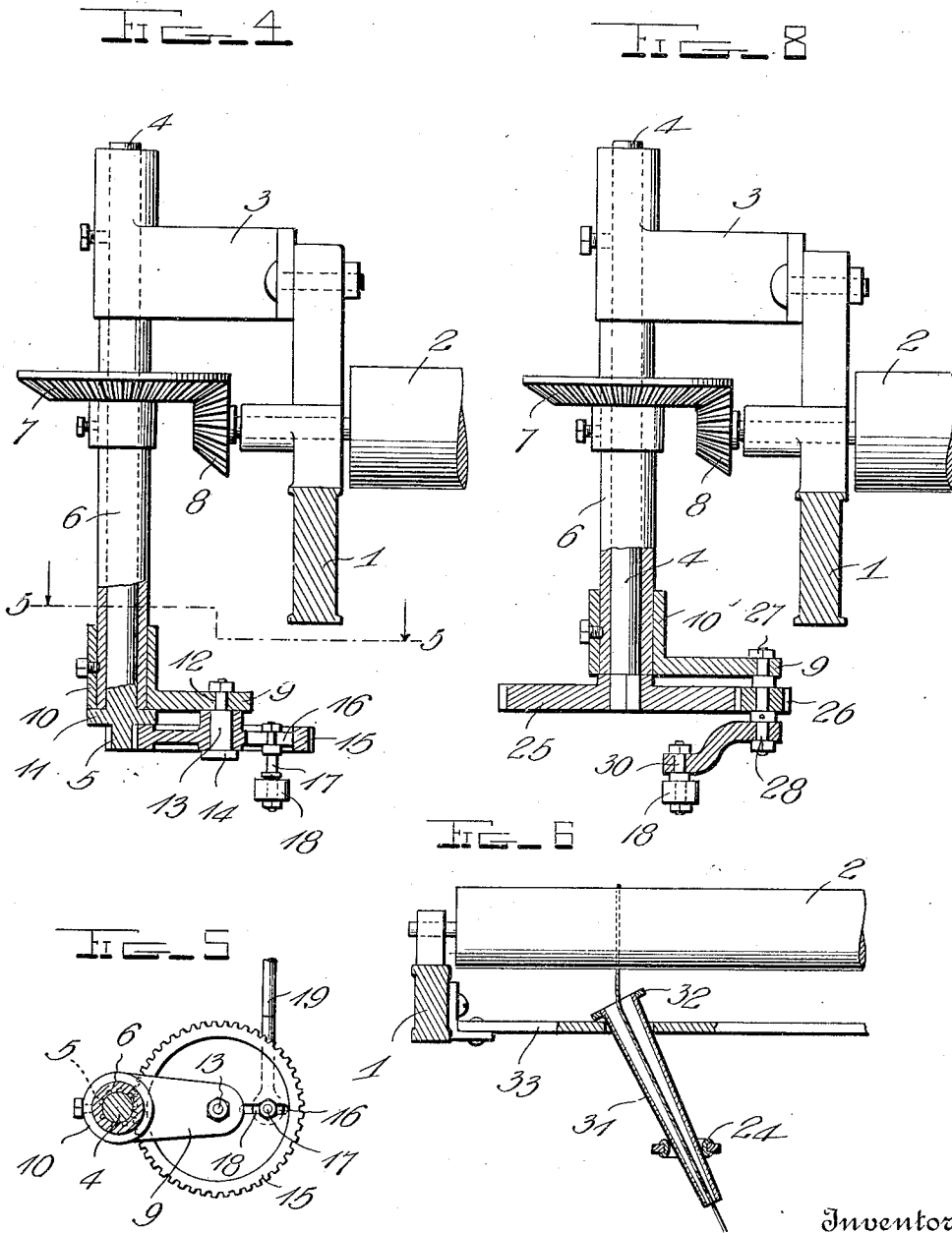
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4 SHEETS—SHEET 3



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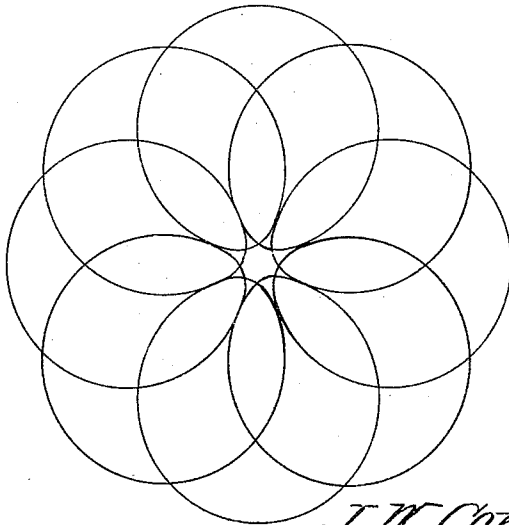
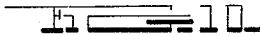
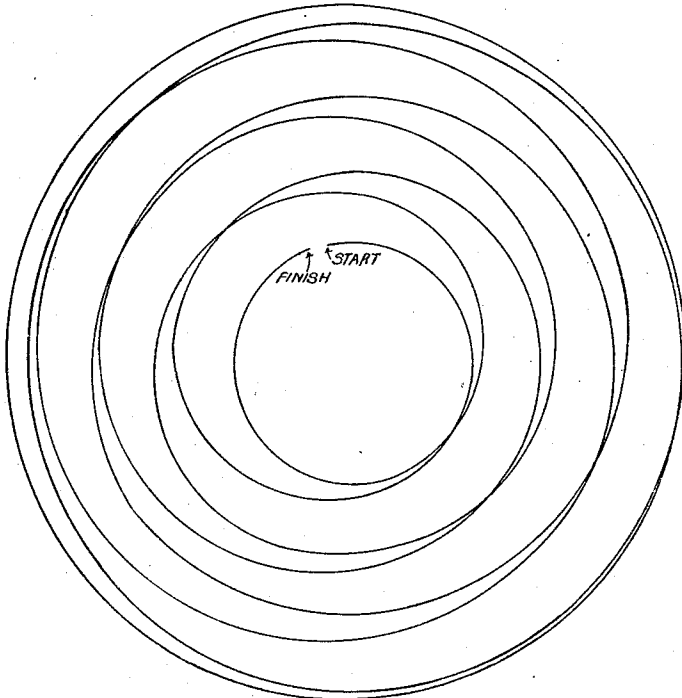
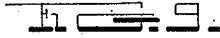
YARN COLLER.

APPLICATION FILED MAR. 14, 1912.

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4 SHEETS-SHEET 4.

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# UNITED STATES PATENT OFFICE.

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## YARN-COILER.

1,121,480.

Specification of Letters Patent.

Patented Dec. 15, 1914.

Application filed March 14, 1912. Serial No. 633,795.

To all whom it may concern:

Be it known that I, JAMES W. CONNELLY, a citizen of the United States, residing at Methuen, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Yarn-Coilers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in yarn coiling apparatus.

One object of the invention is to provide a coiling attachment for yarn splitting machines and the like, having an improved operating mechanism whereby the yarn will be coiled in a close and compact pile which will not collapse or readily fall over.

Another object is to provide a simple and comparatively inexpensive attachment of this character which may be readily connected with and operated by a moving part of a yarn-splitting machine or with any other machine in which a coiler is required or may be employed.

With these and other objects in view, the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings; Figure 1 is a side view of a yarn splitter showing my coiling attachment applied thereto; Fig. 2 is a rear view of the upper portion of the same; Fig. 3 is a plan view partly in section of the coiling attachment showing in dotted lines the formation of the piles of the yarn; Fig. 4 is a large side view partly in section of the driving gears of the apparatus. Fig. 5 is a horizontal sectional view taken on the line 5—5 of Fig. 4. Fig. 6 is a detail sectional view through a portion of the apparatus showing more clearly the construction and arrangement of the yarn guiding funnels. Fig. 7 is a detail vertical sectional view through one of the cross bars of the frame and the arm or bracket for supporting the pot-eyes; Fig. 8 is a view similar to Fig. 4 showing a modified construction and arrangement of the driving gears. Fig. 9 is a diagram showing the path followed by one of the pot-eyes employed in the form shown in Figs. 1 to 7, through which the

yarn is fed to the pile to be formed. Fig. 10 is a diagram showing the path followed by one of the pot-eyes operated by the form shown in Fig. 8 and through which the yarn is fed to the pile to be formed.

Referring more particularly to the drawings, 1 denotes the frame of a yarn splitting machine which may be of the usual or any preferred construction and in which is revolubly mounted the usual yarn carrying rolls 2. Secured to a suitable part of the frame 1 adjacent to the ends of the front roll 2 are brackets 3 in which are secured the upper ends of gear supporting shafts 4 which depend or project downwardly from the brackets and have their lower ends reduced and provided with spur gear pinions 5, said pinions being preferably cut or formed integral with said reduced ends of the shafts.

Revolubly mounted on the shafts 4 are operating sleeves 6 on which at a suitable distance below the brackets 3 are secured bevel gears 7. The teeth of the gear on one side of the splitting machine face upwardly, while the teeth on the gear at the opposite side of the machine face downwardly. Keyed to the ends of the shaft of the front roll 2 of the machine are bevel gear pinions 8 which engage the gears 7, said gears and the sleeves 6 being thus driven by the front roll 2 of the machine. Secured to the lower ends of the sleeves 6 are horizontally projecting gear supporting arms 9, said arms having on their inner ends collars 10 which are secured to the sleeves 6 by set screws or other suitable fastening means and on the lower ends of the shafts 4 immediately below the collars 10 are riveted or otherwise rigidly secured collars 11. In the arms 9 are arranged apertures 12 in which are secured stud shafts 13 the lower ends of which project a suitable distance below the arms 9 and have thereon gear supporting heads 14. Revolubly mounted on the stud shafts 13 are spur gears 15 which are engaged with and revolved by the stationary pinions 5 on the lower end of the shafts 4, as said gears are carried around the pinions by the movement of the arms 9 and the sleeves 6 which are revolved on the shafts 4 by the gears 7 and 8 as hereinafter described.

In the gears 15 supported by the arms 9 at the opposite sides of the machine are formed

radially disposed slots 16 in which are secured the upper ends of depending frame supporting studs 17 which are engaged with plugs 18 secured in the inner ends of the tubular side bars 19 of a yarn guiding and coiling frame 20. The side bars 19 of the frame are connected by cross bars 21 which are also preferably of tubular form and to the outer corners of the frame formed by the connection of the side bars 19 with the outer cross bar are eye-bolts 22 to which are secured the lower ends of frame supporting wires 23, the upper ends of which are attached to the ceiling or other suitable support whereby the outer portion of the frame is loosely hung or supported and permitted to freely swing when operated by the gears hereinbefore described. On the cross bars of the coiling frame are adjustably secured short arms or brackets 23<sup>a</sup> in the outer ends of which are arranged pot-eyes 24 through which the yarn passes from the rollers 2 and is coiled on the floor or other surface provided to receive the piles of yarn coiled by the attachment. By thus constructing and arranging the coiling frame and the operating mechanism thereof it will be seen that as the sleeve 6 and arm 9 are revolved around the shaft 4, a wide rotary or circular movement is imparted to the frame while the engagement of the gear 15 with the stationary pinion 5 will simultaneously impart a quick short circular movement to the frame. By thus moving the frame it will be seen that the wrist pins 17 and pot-eyes 24 will follow the path shown in Fig. 9 forming spirals arranged one within the other and that the yarn passing through the pot-eyes will be wound in large and small coils or spirals on the piles disposed from four to six feet below the pot-eyes and the same amount of yarn being fed during the formation of the small coils as the large ones the yarn under the influence of the atmosphere will fall into curls or waves zigzagging from one side to the other thus building the pile up solidly or without a central opening, thereby obviating the possibility of the pile collapsing or falling inwardly. By adjusting the studs 17 in the slots 16 of the gears the strokes of the frame may be regulated to make larger or smaller coils of the yarn on the pile. Hence the solid formation of the piles will be obvious when it is understood that there is the same quantity of yarn in the smallest coils as in the largest and that all the coils large or small are made in the same time; that is, the small coils are not made any quicker than the large ones. Consequently when the coils are near the outside of the pile they take up all of the yarn fed and as they grow smaller the yarn falls loosely and zigzag from one side to the other of the pile. When the pot-eyes are traveling in small

circles directly over the centers of the piles they have very little control over the yarn and hence it falls in the very centers or around the centers of the piles. When a pot-eye is traveling in a small circle it cannot swing the yarn in an exact circle when it reaches the pile several feet below and consequently the falling yarn vacillates and falls in folds over the entire center of the pile. This condition when the pot-eye loses control over the yarn lasts for about two turns. Owing to the fact that the machine is run very rapidly and that the pot-eyes are about six feet from the floor the speed of the machine will cause the yarn during its swinging or coiling motion to reach the outside boundary of the pile a turn or two before the pot-eyes make their largest circle and the yarn runs on this outside boundary until the pot-eyes return to about the same place and this gives the right amount of yarn to the outside to render the pile even and distribute yarn quickly over its upper face.

The size of the piles and the number of coils may vary by varying the teeth of the gear 15 and the cog wheel 5 the diagram shown in Fig. 9 being made by a machine in which the cog wheel 5 has eight teeth and the gear wheel 15 has sixty-four teeth and when this number of teeth are employed eight circles will be formed during one revolution of the wrist pin 17 and consequently said wrist pin will travel in the same path during each revolution of gear 15 but as pointed out above the number of teeth in both the gear wheel and cog wheel may be varied but the same general path will be followed.

From the above it will be obvious that the yarn when it reaches the pile several feet below the pot-eye through which it is fed does not assume the same path formed by the pot-eye as the action of the air on the yarn from the time it leaves the pot-eye until it reaches the pile several feet below causes the circles of yarn to constantly sway from one side to the other and this together with the quantity of yarn fed during the formation of the small circles, produces a solid pile without any central opening.

When the device shown in Fig. 8 is employed, it is desirable to have a small central opening in the pile for the reason that the yarn crosses so many times near the center that it would pile up at this point if it were too close but when the yarn in the pile is pressed down, this small opening closes. This device is especially designed for forming very large piles and should be used only for such purposes.

In Fig. 8 of the drawings is shown a slightly modified arrangement of the frame operating gears. In this figure the lower

end of the shaft 4 has fixed thereon a gear 25 which corresponds to the gear 15 on the arm 9 in the first form of the invention and which is engaged with a pinion 26 revolubly mounted on a stud shaft 27 in the arm 9 and which corresponds to the pinion 5 on the shaft 4 of the first form of the device. By thus reversing the gears and fixedly mounting the large gear 25, the smaller gear or pinion 26 will be revolved around the larger gear and will be turned by its engagement with said larger gear as will be readily understood. The pinion 26 is supported on the shaft 27 by a nut 28 and said pinion is provided on its lower end with an extension to which is secured a downwardly curved crank arm 29, the outer end of which is pivotally connected by a stud 30 to the adjacent end of the yarn coiling frame as shown. By this arrangement of the gears and frame supporting mechanism, it will be seen that a slightly different form and arrangement of coils are made by the frame, the engagement of the pinion 26 with the gear 25 causing the frame to make a series of small elliptical shaped coils, said small coils being arranged around in a circle to form the large coils of the pile, or in other words, each large coil of the pile will be formed by a series of smaller coils arranged in the large coil.

It has sometimes been found that in making large piles the yarn will not feed properly through the pot-eyes as when the frame is swung outwardly so far, the yarn is apt to fall over the eyes and in order to avoid this difficulty, I preferably provide a yarn feeding funnel 31 which is suitably arranged and supported in the frame and through which the yarn passes. The upper edge of the funnel is provided with a binding or rim 32 of leather or similar material by means of which the upper end of the funnel is supported in a board 33 arranged above the coiler rods or bars of the frame in which the lower end of the funnel is secured as shown.

From the foregoing description taken in connection with the accompanying drawings, the construction and arrangement of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as claimed.

Having thus described my invention, what I claim is;

1. In a yarn coiler for yarn splitting machines and the like, a coiling frame loosely supported at its outer end, shafts suitably supported on the frame of the machine, stationary gears on the lower ends of said shafts, frame supporting and operating

arms revolubly mounted on said shafts, means whereby said arms are revolved around said shafts, gears loosely mounted on and carried by said arms around said stationary gears whereby the gears on said arms are revolved, and means to secure the inner ends of the coiling frame to the gears on said arms whereby the frame is operated by said gears to coil the yarn passing there-through.

2. In a coiling attachment for yarn splitting machines and the like, a yarn coiling frame loosely supported at its outer end, uniformly moving feed rolls for supplying yarn to said frame, frame supporting shafts secured to the frame of the machine on opposite sides thereof, stationary gear pinions on said shafts, sleeves revolubly mounted on the shafts and geared to a moving part of the machine whereby the sleeves are revolved, frame supporting arms carried by said sleeves, stud shafts arranged in said arms, gears revolubly mounted on said shafts and adapted to engage the stationary pinions on said frame supporting shafts and to be carried around said stationary pinions by the movement of the sleeves and arms, and frame supporting studs adjustably secured in said gears whereby the inner ends of the frame are supported and long and short circular movements imparted to the frame thereby forming compact, solid piles of yarn.

3. In a coiling attachment for yarn splitting machines and the like having therein yarn carrying rolls, a yarn carrying frame loosely supported at its outer end, frame supporting shafts secured to the machine on opposite sides thereof, stationary gear pinions on the lower ends of said shafts, sleeves revolubly mounted on the shafts, gears fixed on said sleeves, gears fixed on one of the rollers of the machine and adapted to engage the gears on said sleeves whereby the sleeves are driven by said roll, gear supporting arms arranged on said sleeves, gears revolubly supported by said arms and adapted to be operatively engaged with the gear pinions on said shafts when carried around by the movement of said sleeves and arms, frame supporting studs adjustably secured in the gears on said arms, and means whereby the inner ends of the coiling frame are pivotally connected with said studs.

4. In a yarn coiler for yarn splitting machines, a loosely supported coiling frame, a plurality of yarn guides on said frame, uniformly moving feed rolls for supplying yarn to said guides, and cooperating elements for rotating the frame to cause said guides to move in a path in the form of larger and smaller coils arranged one within the other whereby a solid pile of yarn is formed.

5. In a yarn coiler, a loosely supported coiling frame, uniformly moving feed rolls

- for supplying yarn to said frame, cooperating elements operable to impart a wide circular movement to said frame and simultaneously a short circular movement causing it to travel in a path in the form of a spiral, whereby the yarn is wound in short and long coils.
6. In a coiling machine, a supporting structure, a coiling frame loosely mounted at one end on said structure, supporting means for the other end of said frame to permit said frame to swing freely, actuating mechanism for said frame having means for imparting a wide circular movement to said frame, and means for imparting a quick short circular movement to said frame.
7. In a coiling machine, a supporting structure, a coiling frame loosely mounted at one end on said structure, supporting means for the other end of said frame to permit said frame to swing freely, actuating mechanism for said frame having means for imparting a wide circular movement to said frame, means for imparting a quick short circular movement to said frame, and means for varying the stroke of the frame to produce larger or smaller coils.
8. In a yarn coiler, a coiling frame loosely supported at one end, stationary shafts suitably supported on the frame of the machine, gears on said shafts, frame supporting and operating arms revolubly mounted on said shafts, means whereby said arms are revolved around said shafts, gears carried by said arms and meshing with and revoluble around said shaft carried gears, whereby the gears on said arms are revolved, and means to secure the other end of the coiling frame to the gears on said arms, whereby the frame is operated by said gears to coil the yarn passing therethrough.
9. In a yarn coiler for yarn splitting machines and the like, a coiling frame loosely supported at its outer end, shafts suitably supported on the frame of the machine, stationary gears on the lower ends of said shafts, frame supporting and operating arms revolubly mounted on said shafts, means whereby said arms are revolved around said shafts, gears loosely mounted on and carried by said arms around said stationary gears whereby the gears on said arms are revolved, means to secure the inner ends of the coiling frame to the gears on said arms whereby the frame is operated by said gears to coil the yarn passing therethrough, laterally and longitudinally adjustable brackets secured to said coiling frame, pot eyes arranged in said brackets, yarn guiding funnels having their lower ends loosely engaged with said pot eyes, funnel supporting elements adapted to receive and loosely support the funnels at their upper ends whereby the funnels are permitted to swing around with the movement of the coiling frame.
10. In a yarn coiler for yarn splitting machines, a loosely supported coiling frame, a yarn guide on said frame, a uniformly moving feed roll for supplying yarn to said guide, means for simultaneously rotating and revolving said frame to cause the guide thereof to move in a path composed of larger and smaller spirally arranged coils.
11. In a yarn coiler for yarn splitting machines and the like having uniformly moving feed rolls mounted therein, a loosely supported coiling frame, frame supporting members secured to the machine, stationary gear pinions on said members, sleeves revolubly mounted on said members, cooperating elements on said sleeves and one of the rolls of the machine whereby the sleeves are driven by said roll, gears revolubly supported by said sleeves and adapted to be operatively engaged with the gear pinions on said frame supporting members, frame supporting studs secured in said revoluble gears, and means whereby the inner ends of the coiling frame are pivotally connected with said studs.
12. In a yarn coiling attachment for yarn splitting machines, a yarn carrying frame loosely supported at its outer end, laterally spaced frame supporting shafts secured to the machine, stationary gear pinions on said shafts, sleeves revolubly mounted on said shafts, yarn carrying rolls mounted on said machine, cooperating elements on said sleeves and one of said rolls whereby the sleeves are driven by said roll, gear supports on said sleeves, gears revolubly mounted in said supports in position to engage the gear pinions on said shafts, frame supporting studs adjustably secured in the gears of said arms, and means whereby one end of the coiling frame is pivotally connected with said studs.
13. In a yarn coiler, a yarn guide and means for moving said guide through a continuous spiral path composed of series of coils, the coils of alternate series gradually increasing in size and the interposed series having their coils decreasing in size.
14. In a yarn coiler, means for positively feeding yarn in a continuous stream, swinging guides through which the yarn passes, and means for moving said guides to throw the yarn first in a spiral, the coils of which gradually increase in size and then into a spiral, the coils of which gradually decrease in size.
15. In a yarn coiler, a loosely supported coiling frame, uniformly moving feed rolls for supplying yarn to said frame, intermeshing stationary and revoluble gears, said revoluble gear being connected with said frame, and means for actuating said revoluble gear to impart a wide circular movement and a quick short circular movement to the frame.
16. In a yarn coiler, a yarn guide, an oper-

ating wheel therefor, a connection between  
said wheel and guide pivoted eccentrically  
to the wheel, means for moving said wheel  
in a circular path, and means for rotating  
5 said wheel a fraction of a revolution during  
each of its complete movements around said  
path.

In testimony whereof I have hereunto set  
my hand in presence of two subscribing wit-  
nesses.

JAMES W. CONNELLY.

Witnesses:

ALEX S. MCGREGOR,  
DAVID GRAVEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."