Nov. 20, 1928.

1,692,789

L. YOUNG

MAGNETIC COILING DEVICE

Filed April 18, 1927

FIG. I

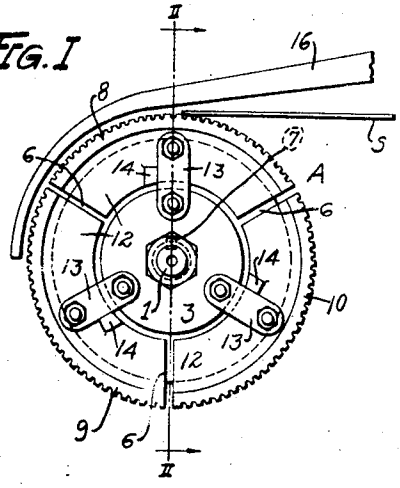


FIG. II

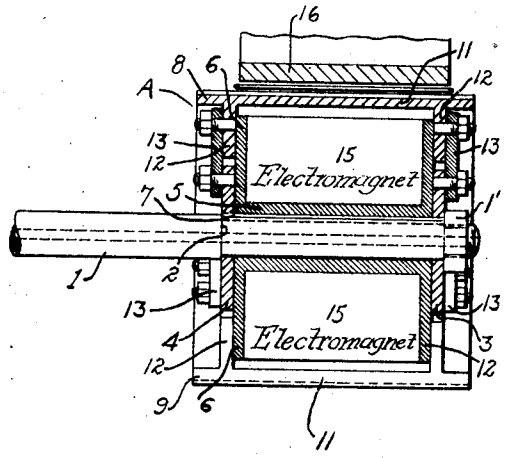
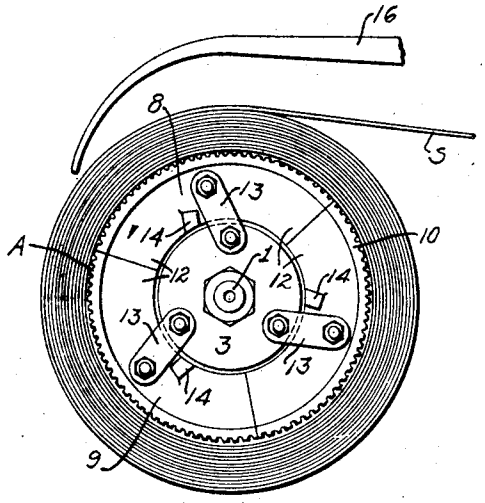


FIG. III



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UNITED STATES PATENT OFFICE.

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MAGNETIC COILING DEVICE.

Application filed April 18, 1927. Serial No. 184,605.

This invention relates generally to coiling machines and particularly to the type of coiling machines used in steel mills for coiling hot or cold rolled strip steel and commonly referred to as strip reels, the predominant object of the invention being to produce a reel for a machine of this type which includes novel and improved means whereby the forward end of strip metal may be fixed or attached to the reel at the start of the reeling operation, or while said reel is in motion.

Prior to this invention various means were employed in connection with strip reels for securing the forward end of the strip metal to the reel of the machine, so that said strip metal might be coiled on said reel, and the most common method was to provide the reel with one or more slots so that said reel was provided with a gripping device into which the forward end of the strip to be coiled was inserted. In lieu of the grip the forward end of the strip was bent or punched, or in some such manner physically attached to the reel, so as to cause same to rotate therewith without undue slippage. While these methods of securing the end of the strip to the reel were quite common and were reasonably efficient, they were objected to because it took some little time to properly introduce the end of the strip of metal into place and bend same, and also because they required that the coiler be stopped during the operation of attaching the strip. This difficulty was increased because of the fact that at this time the strip metal may be hot, and also provision had to be made to take care of the on-coming strip material, while the forward end portion was at rest during the operation of attaching same to the reel, as the main body of the strip continued to move during the attachment of the end thereof.

In view of the difficulties encountered in connection with the method described and further difficulties encountered in connection with other methods of securing the end of the strip metal to the reel, I have devised the improved arrangement disclosed in the present application, which, briefly stated, comprises associating an electro-magnet with the reel on which the strip metal is to be coiled. This electro-magnet is so arranged with respect to the reel that the forward end of the strip to be coiled on the reel is attracted by the electro-magnet, whereby said end of said strip metal will rigidly attach itself to the metallic reel, thus eliminating the need for bending, punching or gripping the strip material to attach it to the reel or providing any other means for physically attaching the end of the strip to the reel.

Fig. I is a side elevation of a reel of a coiling machine made in accordance with my invention and illustrating fragments of the guiding members associated therewith.

Fig. II is a vertical section on line II—II of Fig. I.

Fig. III is a view similar to Fig. I, but showing the reel as it will appear when the strip material has been coiled thereon.

In the drawing, 1 designates a drive shaft of a strip reel provided with a reduced portion at an end thereof to produce an annular shoulder 2, and mounted on said reduced portion of said shaft is my improved reel A. The reel A comprises a pair of disks 3 and 4, which are spaced from each other longitudinally of the reduced portion of the shaft 1, said disk 3 being abutted against the shoulder 2 and the disk 4 being located adjacent to the outer end of the reduced portion of the shaft 1, as shown in Fig. II. Located between the spaced disks 3 and 4 and mounted on the reduced portion of the shaft 1 is a cylindrical member 5 provided with annular flanges 6 at its opposite ends. As will be seen by referring to Fig. II, the spaced disks 3 and 4 and the cylindrical member 5 are provided with keyways into which a key 7, carried by the reduced portion of the shaft 1, extends so that said disks and said cylindrical member will rotate with said shaft. Also a nut 1′ is arranged on the shaft 1 at the outer end thereof to prevent outward movement of the disks and member 5 on the shaft.

Associated with the disks 3 and 4 to produce the complete reel is a plurality of seg-

mental members 8, 9 and 10, said members comprising respectively an arcuate wall 11 which forms a portion of the circumferential face of the reel and a pair of oppositely disposed inwardly extended walls 12 which constitute portions of the end walls of the reel. The segmental members are secured to the oppositely disposed disks 3 and 4 by means of links 13, there being one of said links associated with each segmental member at each end thereof and each link being pivotally secured to one of the disks 3 and 4 and to one of the inwardly extended walls 12 of one of said segmental members. Also, each inwardly extended wall 13 of each segmental member is provided with a lug 14 against which the link 13 associated with said member at that side thereof is adapted to abut, as shown in Fig. I, so that rotary motion will be transmitted from the disks to the segmental members. Supported by the cylindrical member 5 and located between the annular flanges 6 thereof is one or more electro-magnets 15. The magnets 15 preferably are the same in number as the segmental members and also I prefer to give the electro-magnets approximately the same shape as said segmental members. I wish it to be understood, however, that I do not limit myself to this arrangement, as I reserve the right to give the electro-magnets any shape which is found desirable and also I may employ magnets of a number greater or less than the number of segmental members employed. The electro-magnets 15 are secured in place in any suitable manner and are, of course, electrically connected to a source of electrical energy.

Associated with the reel A at the upper portion thereof is a guide member 16, said guide member being provided with a curved portion arranged immediately adjacent to the circumferential face of the reel. As suggested by the position in which it is located in Fig. III, the guide member 16 is capable of being moved to a position remote from the reel, so that the coil of metal may be conveniently removed from the reel.

In the operation of a coiling machine provided with my improved reel, the forward end of the strip of metal S to be coiled is moved around the reel in such manner as to cause said strip to come into contact with the peripheral face of the magnetized reel A, as by means of the guiding member 16. The electro-magnets, which, as stated, are electrically connected to a suitable source of energy, will immediately attract the end of the strip and will draw same into firm contact with the arcuate walls of the segmental members, whereby said end of said strip will be carried around by the reel as said reel is rotated and as the strip of metal is coiled thereon.

When the coiling of the material has been completed and it is desired to remove the coil from the reel, the segmental members 8, 9 and 10 are permitted to rotate in the direction of the arrow in Fig. III with respect to the disks 3 and 4. This movement will have the effect of swinging the links 13 on their pivots, whereby each of the segmental members will be moved inwardly to reduce the diameter of the reel, whereupon the coil may be removed by the aid of a member which will pass between the corrugations 19 on the outer faces of the arcuate walls of the segmental members and in this manner will engage the lowermost turn of the coil, as well as the other coils thereof.

While I have shown my improved reel as including the structure which permits reduction of the diameter thereof to allow the coil to be removed, I do not wish to be limited to this arrangement, as I consider my invention in its broadest aspect to involve associating an electro-magnet or an equivalent electrical device with a reel of any construction in such manner that the forward end of the strip metal will be attracted by said electro-magnet and thus attach itself rigidly to the reel. Also, it is obvious that any one of a number of guiding devices may be substituted for the guiding member 16.

In the operation of my improved device, the peripheral speed of the coiler may be maintained so as to synchronize with the speed of delivery of the on-coming material, the motion of the coiler preferably being such that when the forward end of the strip comes into contact with the magnetized reel just enough pull is exerted on said strip to take up any slack that would ordinarily result from the material which is being delivered at a given rate of speed having its speed suddenly reduced. In other words, because the coiler is in motion and as instant contact is made with the forward end of the strip, the proper tension of the strip will be maintained and hence there will be no interruption in the delivery of the strip.

I claim:

1. A machine for coiling metal, comprising a drive shaft, a reel mounted on said drive shaft, said reel comprising a cylindrical member having annular flanges at its opposite ends, disks adjacent to said annular flanges, means whereby said cylindrical member and said disks are caused to rotate with said drive shaft, a plurality of segmental members, means whereby said segmental members are pivotally attached to said disks, and a plurality of electro-magnets supported by said cylindrical member, said electro-magnets being of a shape corresponding to the shape of said segmental members and being adapted to attract an end of said metal so that it will be attached to said reel.

2. A pulley for use in coiling metal strips comprising, a cylindrical core, an electro-

magnet associated with the core, an outer shell composed of a plurality of segmental members upon which the metal strip is adapted to be wound, and clamping means adapted normally to maintain the segmental members in a rigid expanded condition and operative to collapse the members, said clamping means including pivoted elements movable independently of said cylindrical core in a direction transversely with respect to the major axis thereof.

In testimony that I claim the foregoing I hereunto affix my signature.

LAFAYETTE YOUNG.