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UNCOILER

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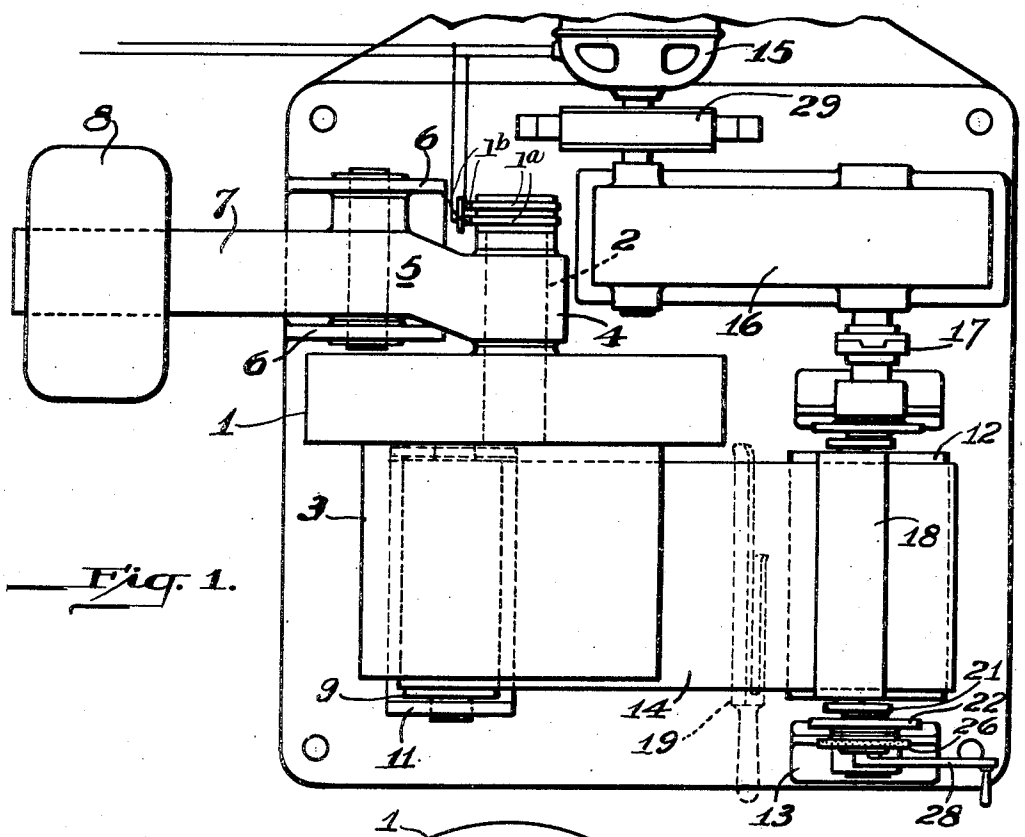


Fig. 1.

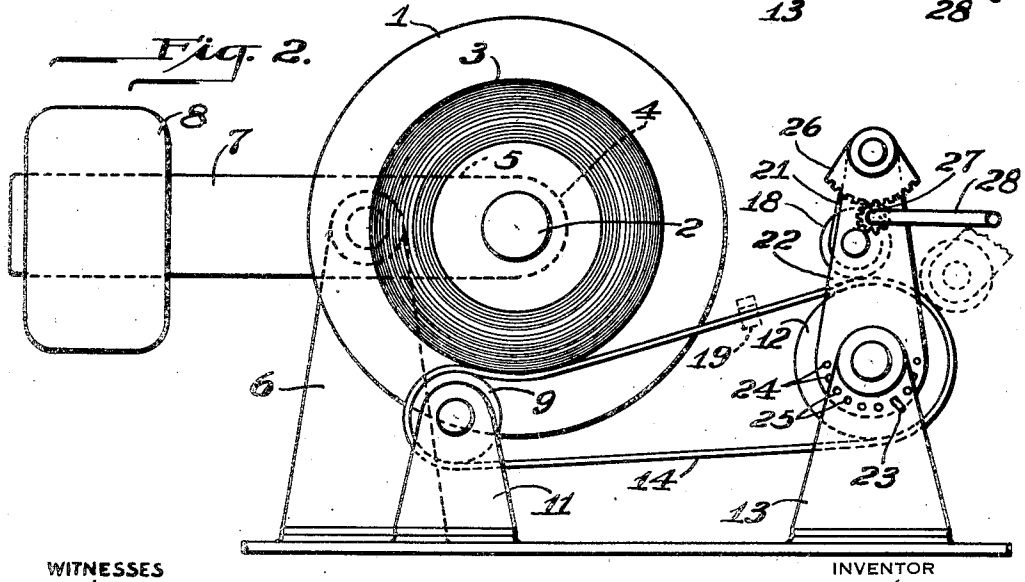


Fig. 2.

Fig. 3.

WITNESSES

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UNCOILER

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10 Claims. (Cl. 242—78)

This invention relates to apparatus for uncoiling coiled metal strip and particularly strip made of permeable material, such as steel and iron, and its object, generally stated, is to provide an apparatus of such character in which a rotatably mounted magnet is utilized as a chuck for holding the coil while the strip is being uncoiled from it, and which is simple and sturdy of construction, as well as easy and efficient to operate.

Another object is to provide a decoiling apparatus in which the strip is removed from the coil at a substantially fixed position, irrespective of the varying in the diameter of the coil, as it is uncoiled, and with a minimum amount of surface breaking which is highly desirable, especially in the handling of highly polished strip.

Another object is to provide a decoiling apparatus which may be operated at relatively high speed, and in which coils of various widths may be handled without any material adjustment of the apparatus.

These and numerous other objects, as well as the various other novel features and advantages of the invention, will be apparent when the following detailed description is read in conjunction with the accompanying drawing, of which Fig. 1 is a plan view of an uncoiling apparatus constructed in accordance with the invention; Fig. 2 a side elevation of the structure shown in Fig. 1; and Fig. 3 a side view of a stripping tool.

Referring by way of illustration to the single embodiment shown in the drawing, the invention comprises essentially a flat faced magnet 1, which is adapted to function as a coil engaging chuck, being mounted on a shaft 2 for rotation in the plane of its coil engaging face. As will be appreciated by those skilled in the art, this magnet may be made in various well known ways and for that reason the details of its construction, other than the showing of collector rings 1*a* and brushes 1*b* on the end of shaft 2 for connecting it to a source of current supply, have been omitted. The only major requirements of the magnet are that it be capable of firmly holding the coil in place once it is mounted thereon, and that it have sufficient strength to prevent the turns of the coil loosening and sliding across its face as the coil is unwound, which is highly desirable as it greatly reduces the occurrence of surface breaks in the strip which it is desired to maintain at a minimum.

For supporting the shaft 2 it is mounted in a suitable bearing 4 in the end of a lever 5 which in turn is pivotally mounted intermediate its two ends in a bifurcated bearing stand 6. The rear end 7 of this lever is equipped with a weight 8 which is adapted to counterbalance the weight of the magnet 1 and when not loaded normally holds the magnet in an elevated position in readiness for the reception of a coil.

In front and below the coil engaging face of the magnet there is mounted a roll 9 which is supported in a suitable bearing stand 11. Around this and another but somewhat larger roll 12, which is mounted in a bearing stand 13 spaced from the stand 11, there is mounted a conveyor belt 14. These together form a support for a coil when mounted on the magnet, as well as a conveyor for the strip as it is uncoiled, and cooperate with the lever 5 in maintaining the point at which the strip is removed from the coil substantially constant, irrespective of the varying in diameter of a coil as it is being uncoiled. This also aids in preventing the surface of the strip being broken, as it minimizes the bending to which the strip is subjected. To allow for the movement of the magnet about the pivotal support of the lever 5 the roll 9 is arranged far enough to the rear of the normal center of the magnet to insure the proper engagement of the coil in the conveyor belt, while to accommodate the handling of coils of varying length the conveyor 14 belt and its supporting rolls are made sufficiently wide to handle the widest strip which it may be desired to uncoil.

For driving the conveyor and also rotating the magnet when a coil is mounted thereon, if such is desired, a motor 15 is connected to the roll 12 through a suitable gear unit 16 and a clutch 17, while for pulling the strip from the coil a roll 18 is arranged to cooperate with roll 12 to form a set of pinch rolls for such purpose.

As shown, this latter roll 18 is mounted in a bifurcated support 21 which is pivotally suspended from a bifurcated support 22 which in turn is pivotally mounted on the bearing stand of roll 12 concentric with the center of that roll. This latter support is adjustably mounted so that roll 18 can be adjusted to contact the roll 12 at different points, to thereby impart a bending or straightening action to the strip as it is uncoiled, if desired. To hold the support 22 in its different positions arcuate rows of registering holes 23 and 24 are provided in the bear-

ing stand 13 and support 22, respectively, and pins 25 provided for locking the two supports together in a selected position. For adjusting the roll 18 to vary its contact with roll 12, a gear sector 26 is mounted on the support 21 and meshed with a pinion 27 supported on the shaft of a crank 28 mounted in the support 22. Hence, by turning the crank 28 the roll 18 may be moved toward or away from roll 12, which may be desirable particularly where the roll 18 is used for bending purposes only, as it may be when the strip is being pulled from the coil by some source of power other than that supplied by motor 15.

The clutch 17 is provided in the motor connection to allow the apparatus to be used without the motor, which it may be if the strip is drawn directly from the coil into a mill or other means capable of decoiling the strip. While to provide for braking the movement of the conveyor and magnet, or to adapt the pinch rolls 18 and 12 to function as a drag on the strip as it is pulled from the coil, a brake 29 is mounted on the drive shaft of the motor. This result, as will be appreciated, also may be obtained by applying dynamic braking to the motor.

In operation a coil is mounted in the center of magnet 1 by any suitable means, such as by a crane, and the magnet energized. As soon as the coil is attached to the magnet and its loading support removed it overbalances the weight of the counterbalancing weight 8 and causes the coil and magnet to fall until it rests on the conveyor belt 14. As soon as the coil is engaged on the conveyor the motor 15 is started and the free end of coil fed into the rolls 12 and 18. To assist in feeding the strip into these rolls a tool 19, such as that shown in Fig. 3, may be used. This is used to clamp the end of the strip to the belt by merely mounting it with its two legs straddling the strip and belt, and is removed as soon as the strip is picked up by the rolls, to which it is carried by the belt.

According to the provisions of the patent statutes, I have explained the principle and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practised otherwise than as specifically illustrated and described.

I claim:

1. An apparatus for uncoiling coils of permeable metal strip comprising a disc-shaped magnet for gripping the ends of a coil mounted for rotation about an axis perpendicular to its coil-engaging surface, and means for pulling the strip from the coil.

2. An apparatus for uncoiling coils of permeable metal strip comprising a flat-faced magnet for gripping the end of a coil mounted for rotation about an axis perpendicular to its gripping surface, means for rotating said magnet when a coil is mounted upon it, and means for engaging the outer end of a coil mounted on the magnet and pulling the strip from the coil.

3. An apparatus for uncoiling coils of permeable metal strip comprising a flat-faced magnet mounted for rotation about an axis perpendicular to its coil-engaging surface, and means for resisting the rotation of said magnet when a coil is mounted upon it.

4. An apparatus for uncoiling coils of permeable metal strip comprising a substantially flat-faced magnet mounted for rotation about an axis perpendicular to its face and adapted to grip the end of a coil of permeable strip and resist the movement across its face of the strip as it is uncoiled from the coil, and means for maintaining the point at which the strip is separated from the coil in a substantially fixed position.

5. An apparatus for uncoiling coils of permeable strip, comprising a flat-faced magnet adjustably mounted for rotation about an axis perpendicular to its coil-engaging surface, counterbalancing means for normally maintaining said magnet in an elevated position, and means mounted adjacent said magnet for engaging a coil mounted on the magnet.

6. An apparatus for uncoiling coils of permeable metal strip comprising a substantially flat-faced magnet adjustably mounted for rotation about an axis perpendicular to its coil-engaging surface, a conveyor mounted adjacent the coil-engaging face of said magnet for supporting a coil mounted on the magnet, and means cooperating with said conveyor for pulling the strip from the coil.

7. An apparatus for uncoiling coils of permeable metal strip comprising a substantially flat-faced magnet adjustably mounted for rotation about an axis perpendicular to its plane of rotation, means for normally maintaining said magnet in an elevated position, an endless conveyor arranged adjacent said magnet for engaging the periphery of a coil mounted on the magnet and relieving the magnet of its weight, means for driving said conveyor, and means cooperating with said conveyor for pulling the strip from the coil.

8. An apparatus for uncoiling coils of permeable metal strip comprising a magnet adapted to engage the end of a coil and resist the movement across its face of the strip as it is uncoiled, means for mounting said magnet for rotation in a plane coinciding with its coil-engaging surface, a pivotally mounted lever for supporting said magnet, means mounted on said lever for counterbalancing said magnet, and means mounted in front of said magnet for engaging and supporting a coil mounted on said magnet.

9. An apparatus for uncoiling coils of permeable metal strip comprising a magnet adapted to grip the end of a coil of permeable metal strip which is adjustably mounted for rotation in a plane coinciding with the coil-gripping surface and a roll mounted below and in front of said magnet for supporting a coil mounted on said magnet and maintaining the point at which the strip is removed from the coil substantially constant.

10. An apparatus for uncoiling coils of metal strip comprising a magnet adapted to grip the end of a coil of permeable strip adjustably mounted for rotation in a plane perpendicular to its coil-engaging surface, an endless conveyor consisting of a pair of rolls mounted in spaced relation in front of said magnet and an end belt extended thereover for supporting a coil mounted on the magnet, means for driving said conveyor, a roll adjustably mounted to cooperate with one of said conveyor rolls and form a set of pinch rolls therewith, and means for adjusting said latter roll so as to bend the strip as it is removed from the coil.

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