

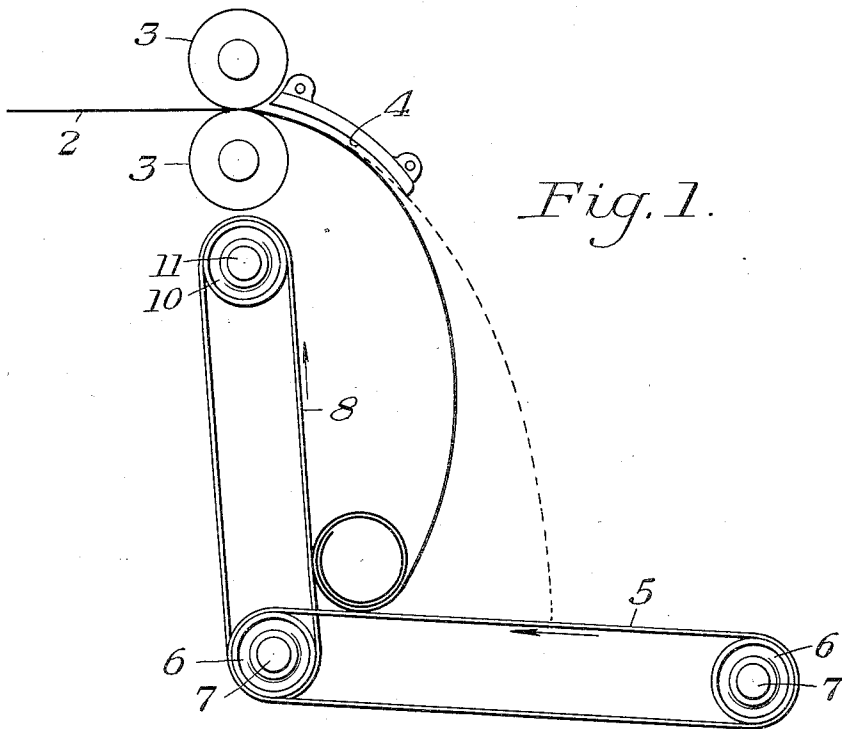
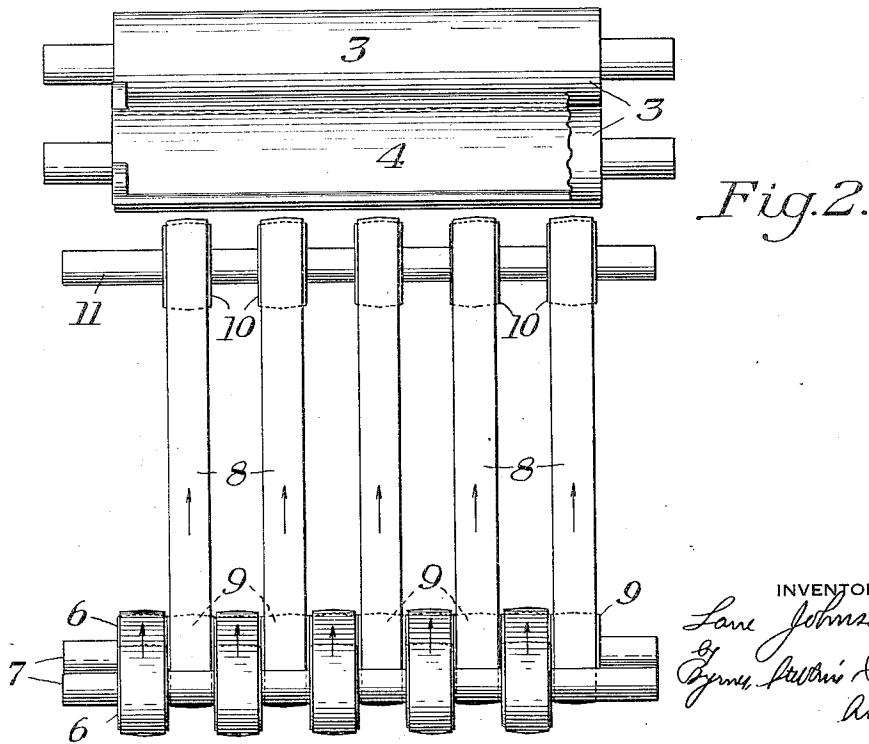
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METHOD OF COILING MATERIAL AND APPARATUS THEREFOR

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METHOD OF COILING MATERIAL AND APPARATUS THEREFOR.

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The present invention relates broadly to the art of metal working, and more particularly to an improved method and apparatus for effecting the coiling of material delivered thereto.

It is customary in the metal working art to coil a wide variety of materials either for storage purposes or convenience in subsequent operations. While many materials are coiled with comparative ease, considerable difficulty is experienced in the coiling of other materials, and particularly those of a softer nature such for example as copper strips or sheets.

The present invention has for one of its objects the provision of an improved method and apparatus by means of which the coiling of materials and especially materials having the characteristics referred to may be effected.

In the accompanying drawings I have shown for purposes of illustration only, a preferred embodiment of the present invention, it being understood that the drawings do not define the limits of my invention, as changes in the construction and operation disclosed therein may be made without departing either from the spirit of my invention or the scope of my broader claims.

In the drawings:

Figure 1 is a diagrammatic side elevational view illustrating one embodiment of my invention, and

Figure 2 is a detail view illustrating one arrangement of coiling belts.

In carrying out the present invention, the material 2 to be coiled may be fed in any desired manner to a pair of feeding rolls 3. These rolls engage the material and cause the leading end thereof to engage a deflecting surface 4 which may be either stationary or traveling. Upon engagement with the deflector, the material travels downwardly at an angle to a substantially flat traveling surface 5 along the general path indicated by the dotted line.

When the advance end of the material engages the substantially flat coiling surface 5, which surface may comprise a plurality of endless belts cooperating with pulleys 6 on spaced shafts 7, it is deflected laterally.

One or more of the shafts may be driven to cause these belts to travel in the direction indicated by the arrows. This causes the material to move to the left as viewed in Figure 1 until it engages a second traveling surface similar to the surface 5 and extending upwardly therefrom. Conveniently, the surface 8 may be formed by a plurality of belts cooperating with pulleys 9 and 10 on the shafts 7 and 11 respectively. The pulleys 6 and 9 on the shaft 7 may be alternately arranged as clearly shown in Figure 2.

The upward movement of the surface 8 deflects the material a third time, the deflection being such as to cause the material to coil upon itself, this coiling action continuing until the entire length of material is coiled. The traveling surfaces are preferably, although not necessarily, so arranged that they form substantially a right angle between them. I have found that such an arrangement gives very advantageous results and obviates the necessity of any mandrel during the coiling operation. In actual practice, however, the relative relation of these surfaces may be varied within comparatively wide limits without destroying their effective coiling function.

If it is desired to produce a coil having the convolutions tightly engaging each other, it is only necessary to increase the speed of the surfaces 5 and 8 until they tend to move the material faster than the feeding means 3. This exerts a continuous pull on the material which tends to pull the coils tightly together. On the other hand, where a loose coil is desired, it may be obtained by slowing down the speed of travel of the surfaces 5 and 8 to the desired extent to eliminate pull or substantial pull on the material.

The method and apparatus disclosed herein may be effectively utilized with a wide variety of materials, although it is particularly valuable when operating on relatively soft material such as copper or the like.

Certain advantages of the present invention arise from the use of endless belts or substantially flat traveling surfaces for deflecting and coiling the material.

Other advantages arise from the provision of a plurality of traveling coiling sur-

faces arranged at an angle to each other, and preferably at approximately right angles.

Further advantages arise from the method of changing the coil characteristics by varying the speed of travel of the coiling surfaces.

I claim:

1. In the method of coiling material, the steps consisting of delivering the material to be coiled to a substantially flat traveling surface, utilizing the travel of said surface to bring the material into engagement with a second surface of similar characteristics disposed at an angle to the first mentioned surface, and further deflecting the material by said second surface while maintaining the angle between the surfaces at all times.

2. In the method of coiling material, the steps consisting of delivering the material to be coiled to a substantially flat traveling surface, at an angle thereto, utilizing the travel of said surface to bring the material into engagement with a second surface of similar characteristics disposed at an angle to the first mentioned surface, and further deflecting the material by said second surface while maintaining the angle between the surfaces at all times.

3. The method of coiling material, comprising supporting the material in the angle between angularly arranged belts, and effecting movement of said belts to rotate the material and coil the same while maintaining the angle between the belts at all times.

4. In the method of coiling material, the steps consisting of delivering the material to be coiled to a substantially flat traveling surface, utilizing the travel of said surface to bring the material into engagement with a second surface of similar characteristics, further deflecting the material by said second surface, and changing the characteristics of the coil by varying the speed of travel of at least one of said surfaces.

5. In the method of coiling material, the steps consisting of delivering the material to be coiled to a substantially flat traveling surface, utilizing the travel of said surface to bring the material into engagement with a second surface of similar characteristics, further deflecting the material by said second surface, and changing the characteristics of the coil by varying the speed of travel of said surfaces.

6. The method of coiling material, comprising supporting the material in the angle between angularly arranged belts, effecting movement of said belts to rotate the material and coil the same, and changing the characteristics of the coil by varying the speed of travel of at least one of said belts.

7. The method of coiling material, comprising supporting the material in the angle between angularly arranged belts, effecting

movement of said belts to rotate the material and coil the same, and changing the characteristics of the coil by varying the speed of travel of said belts.

8. The method of coiling material, comprising feeding the material into contact with a deflecting surface, engaging the deflected material and moving it laterally in a predetermined plane into engagement with another deflecting surface arranged at an angle to the first, and moving said last mentioned surface to deflect the material backwardly upon itself while maintaining the angle between the surfaces at all times.

9. The method of coiling material, comprising feeding the material into contact with a deflecting surface, engaging the deflected material and moving it laterally in a predetermined plane into engagement with another deflecting surface, moving said last mentioned surface to deflect the material backwardly upon itself, and varying the speed of movement of said last mentioned surface to vary the characteristics of the coil.

10. A coiling apparatus, comprising a pair of independently supported belts extending at an angle one to the other, and means for driving said belts.

11. A coiling apparatus, comprising a pair of belts extending at substantially right angles to each other, and means for driving said belts.

12. A coiling apparatus, comprising a pair of substantially tight belts extending at an angle one to the other, means for driving said belts, and means for delivering material to said belts.

13. A coiling apparatus, comprising a pair of belts extending at an angle one to the other, means for driving said belts, and means for delivering material to said belts, said last mentioned means comprising a deflector.

14. A coiling apparatus, comprising a pair of belts extending at substantially right angles to each other, means for driving said belts, and means for delivering material to said belts.

15. A coiling apparatus, comprising a pair of belts extending at substantially right angles to each other, means for driving said belts, and means for delivering material to said belts, said last mentioned means comprising a deflector.

16. Coiling apparatus, comprising a plurality of substantially flat surfaces arranged at an angle one to another, and means for driving said surfaces and maintaining the angle between the surfaces at all times.

17. Coiling apparatus, comprising a plurality of substantially flat surfaces arranged at substantially right angles to one another, and means for driving said surfaces.

18. Coiling apparatus, comprising a pair

of endless belts disposed about a common shaft at an angle one to the other, means for driving the belts, and means for delivering material thereto.

means for maintaining the angle between the belts at all times.

22. Coiling means, comprising two series of belts, the belts in one series being arranged alternately with the belts in the other series, the belts in the respective series being in different planes and forming an angle with one another, driving means for the belts, and means for delivering material to the belts.

23. In a machine for working a web into the form of a roll, the combination of a belt having a work supporting reach, a second belt having a work engaging reach with a portion thereof close to the first belt and extending upwardly and away from the first belt at an angle thereto, supporting and driving means for said belts arranged to drive said reach of the first belt toward the second belt and said inclined reach of the second belt upwardly and away from the first belt and to maintain the inclined reach of the second belt at an angle to the first belt at all times, and means for feeding a web of material to the first belt.

In testimony whereof I have hereunto set my hand.

LANE JOHNSON.

5 19. Coiling apparatus, comprising a plurality of endless belts disposed about a common shaft at an angle one to another, means for driving the belts, and means for delivering material thereto.

10 20. In a machine for working a web into the form of a roll, the combination of a belt having a work supporting reach, a second belt having an inclined reach with a portion thereof close to the first belt and extending upwardly and away from the first belt at an angle thereto, supporting and driving means for said belts arranged to drive said reach of the first belt toward the second belt and said inclined reach of the second belt upwardly and away from the first belt and to maintain the inclined reach of the second belt at an angle to the first belt at all times, and means for feeding a web of material to the first belt.

25 21. Coiling apparatus, comprising belts arranged so that their lateral edges overlap to coil material between the belts, the belts forming an angle with one another, and