Sept. 11, 1956 R. F. HERR 2,762,577

REEL FOR COILED MATERIAL

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Fig. 1

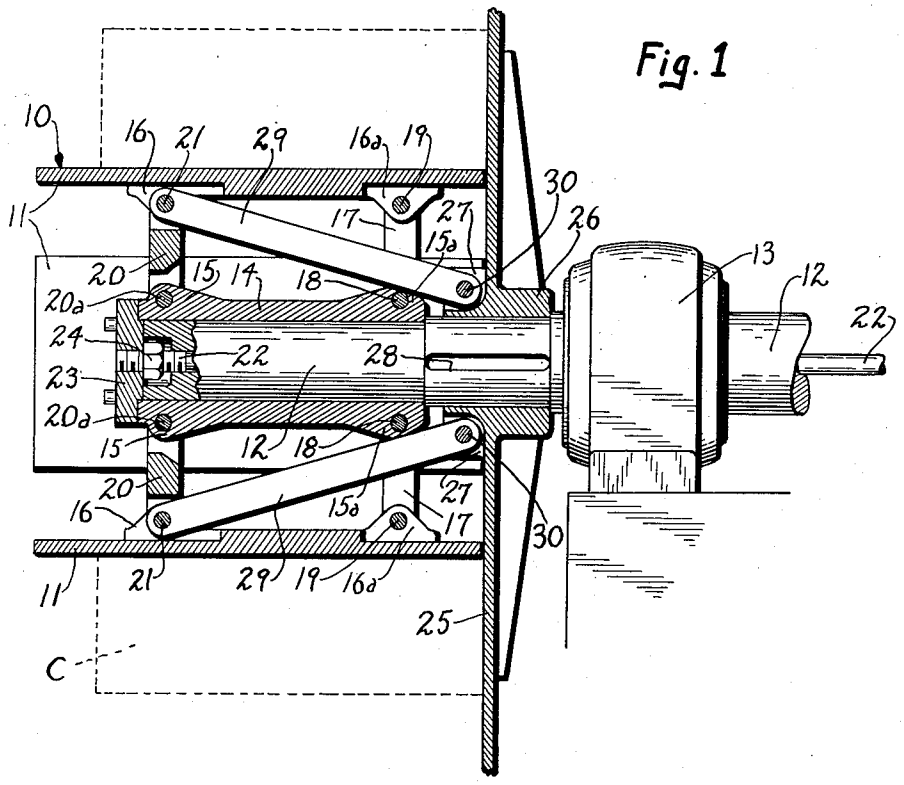
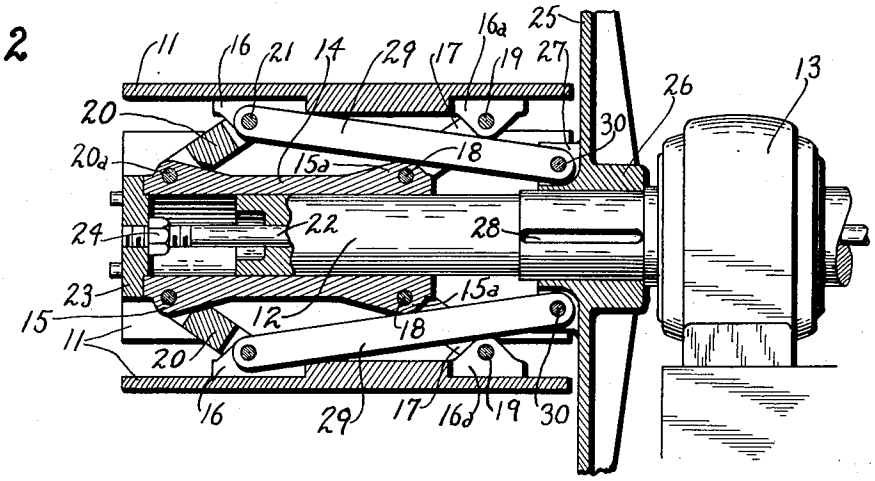


Fig. 2



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Fig. 3

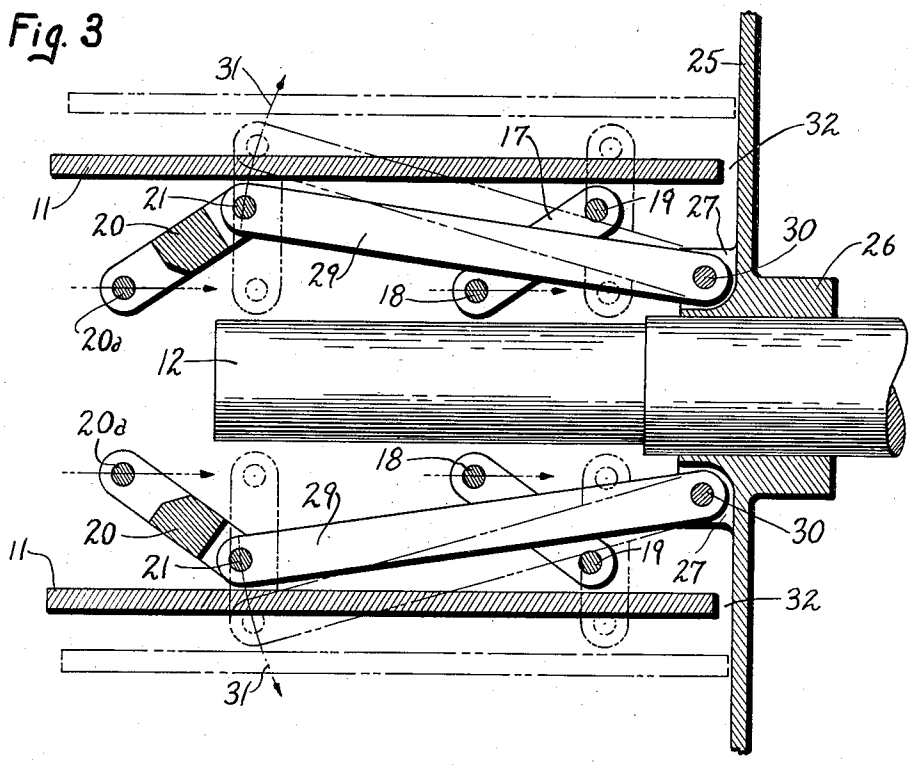
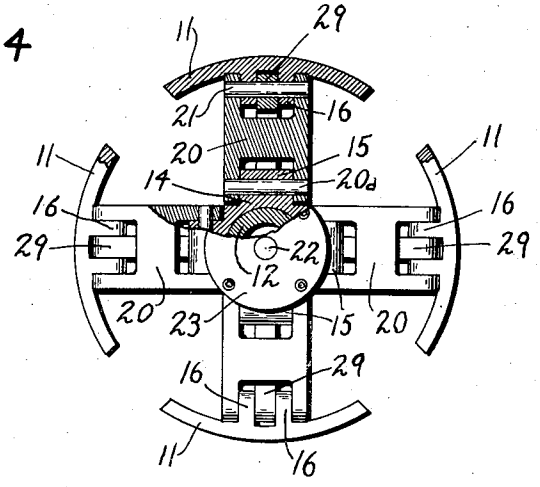


Fig. 4



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REEL FOR COILED MATERIAL

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3 Claims. (Cl. 242—72)

My invention relates to reels for coiled material, more particularly to reels used for handling coils of sheet steel, and the principal object of my invention is to provide new and improved reels of such character.

The ordinary reel used in handling of coils of material, such as sheet metal, comprises a collapsible drum or mandrel which is contractible so that it may be easily inserted in the eye of the coil and which is expandible so that it firmly engages the surface of the coil defining the eye.

In many cases the reel is aligned with other mechanisms. For example, when the reel is used as a pay-off reel it may be aligned with a slitter or cut-off device. Under such circumstances, it is desirable to maintain the coiled material in predetermined alignment with devices in subsequent work order and such alignment has heretofore been difficult to maintain because the coiled material might not always assume a predetermined relation on the reel or because the coil was not wound with the edges of the sheet in alignment and an endwise bulge was formed which prevented the coil from assuming predetermined position on the reel.

My invention overcomes the difficulties inherent in prior art constructions and makes it possible to maintain the coiled material in predetermined position on the reel, thus maintaining proper relation between the coiled material and subsequent material working devices.

In the drawings accompanying this specification and forming a part of this application, there is shown, for purposes of illustration, an embodiment which my invention may assume, and in these drawings:

Figure 1 is a central longitudinal fragmentary section of a reel embodying my invention, and showing parts in one relation,

Figure 2 is a sectional view similar to Figure 1 but showing parts in another relation,

Figure 3 is an enlarged generally diagrammatic view, showing parts in one relation in full lines and parts in another relation in dot-dash lines in order to provide clear comparison between the parts in the two positions, and

Figure 4 is a fragmentary end view of the reel shown in Figure 1, parts being shown in section to better illustrate the invention.

Referring to the drawings, the embodiment of the invention therein disclosed comprises a drum or mandrel **10** which is adapted to support a coil of material, shown in dotted lines at C. The drum is contractible so that it may be readily inserted within the eye of the coil, and is expandible to firmly engage with the material defining such eye.

In the embodiment herein disclosed, the drum is formed of four sections **11**, each of arcuate cross-section so that when the drum is in expanded relation it forms a generally cylindrical member.

A shaft **12** is supported for rotation by suitable bearings **13**, and this shaft may be freely rotatable, or may have connection with a friction brake, or may be motor driven, and since any of the foregoing may be of commercial design, such construction is not shown. In the embodiment disclosed, the shaft, and drum supported thereby, are supported in outboard-bearing relation so that the coil of material may be disposed over the drum by movement from the open end thereof.

A sleeve **14** is slidable longitudinally along the shaft **12** and is formed with four pairs of ears **15**, **15***a* each pair being directed toward a respective one of the sections **11**. Each of the sections is provided with a pair of ears **16**, **16***a* directed toward respective ears **15**, **15***a*. Spaced links **17** are pivotally connected to respective ears **15***a*, **16***a* as by pivot pins **18**, **19** and links **20**, of H construction, are pivotally connected to respective ears **15**, **16** as by pivot pins **20***a*, **21**.

In the embodiment herein disclosed, the shaft **12** is formed with a longitudinal central opening and a rod **22** passes through this opening and extends outwardly of the free end of the shaft. A cap **23** is bolted to the sleeve **14** and the extremity of the rod **22** is threaded into the cap. A lock nut **24** prevents unintentional disassembly of the connected parts. The rod **22** may be moved longitudinally in any suitable manner, a suggested form being a fluid cylinder (not shown) which has rotatable connection with the rod beyond the bearing **13**. Instead of a fluid motor, a nut and screw arrangement may be used to effect movement of the sleeve.

A face plate **25** is disposed transversely of the axis of the shaft **12** and is formed with a central collar **26** which, in this embodiment, is formed with four milled slots **27** which are 90° apart. The collar is secured to rotation with the shaft **12** by means of a key and keyway **28**, and sleeve **14** is also secured to rotation with the shaft **12** by any suitable means, not shown, which additionally permits relative axial movement of the shaft **12** and sleeve **14**.

In the embodiment disclosed, four long links **29** have pivotal connection with the collar **26** and with respective sections **11**, and as shown in the drawings each link **29** is pivotally secured within a respective slot **27** by a pivot pin **30**. Each link passes between the respective pair of links **17** and is pivoted to its respective section by the pivot pin **21** which connects the respective H-link to its section **11**.

The links **17**, **20** provide parallel linkage which will cause the sections **11** to move toward or away from the axis of the shaft **12** depending upon the direction of movement of the sleeve **14** as actuated by the rod **22**. Each link **29** causes its section **11** to swing in an arc defined by the pin **21** turning about the center formed by the pin **30** and since the links **29** are relatively long the arc will be relatively shallow. However, the arc is sufficient to move the sections toward the face plate **25** as the sections are moved away from the axis of the shaft **12**.

In operation, the drum is collapsed by urging the rod **22** to the left, as viewed in the drawings. Such action moves the sleeve **14** to the left, causing the links **17**, **20** to pivot about their respective pivot pins and fold inwardly toward the sleeve **14**. The long links, swinging through arcs **31** (see Figure 3) will cause the sections to move away from the face plate **25**, as shown by the space at **32**.

The drum or mandrel is now in position for receiving a coil of material, and such coil is assembled by moving it so that the drum extends through the eye of the coil. The coil is assembled so that its one side is positioned somewhat near the face plate, the exact position being unimportant, as will appear.

The drum or mandrel may then be expanded by urging the rod **22** to move to the right, as viewed in the drawings. Such action moves the sleeve **14** to the right and causes the links **17**, **20** to move to straightened position as

shown in Figure 1. The long links, swinging through the arc **31** will move the sections **11** toward the face plate and thus crowd the adjacent side of the coil against the face plate. In the event this side of the coil is bulged outwardly, such crowding action will tend to align the edges of the convolutions of the coil. Since the face plate may be accurately aligned with machinery in subsequent relation along the work line, the coil will always be mounted in accurate alignment with such subsequent machinery.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described, hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. A reel device adapted to be aligned with respect to material working apparatus for the purpose of aligning one side of an apertured coil of sheet material with said apparatus which performs subsequent operations on said material, comprising a rotatable drum composed of a plurality of radially expansible and contractible segments which when contracted provide for receiving the coil thereover and which when expanded engage with the wall of the coil aperture to support the coil, a face plate rotatable with said drum and having a radially extending surface projecting beyond the periphery of the drum, and means for shifting said drum segments radially outwardly and for relatively shifting said segments and said face plate axially toward each other, the outward radial shifting of said segments expanding said drum into engagement with the wall of the coil aperture to securely clamp the coil on the drum, and the relative axial shifting of said segments and said face plate assuring interabutment of said coil side with the face plate surface and consequent alignment of said coil side with said material working apparatus.

2. A reel device for aligning one side of an apertured coil of sheet material with material working apparatus which performs subsequent operations on said material, comprising a rotatable face plate held against axial movement and having a radially extending surface adapted to be aligned with said material working apparatus, a drum rotatable with said face plate and composed of a plurality of radially expansible and contractible segments each having a coil supporting portion disposed at one side of said face plate adjacent to said surface, said segments when contracted disposing their coil supporting portions in a predetermined position with respect to said face plate surface and providing for reception

of the coil thereon, and link means for shifting said segments radially outwardly to expand the drum and for shifting said segments axially to move said coil supporting portions from said predetermined position in a direction toward said face plate surface, the outward radial shifting of said segments expanding said drum into engagement with the wall of the coil aperture to securely clamp the coil on the drum, and the axial shifting of said segments moving the supported coil toward said face plate surface to assure interabutment of said coil side with the face plate surface and consequent alignment of said coil side with said material working apparatus.

3. A reel device for aligning one side of an apertured coil of sheet material with material working apparatus which performs subsequent operations on said material, comprising a rotatable supporting shaft, a sleeve rotatable with said shaft and movable axially therealong, a drum composed of a plurality of radially expansible and contractible segments which when contracted provide for receiving the coil thereover and which when expanded engage with the wall of the coil aperture to support the coil, a face plate rotatable with said shaft and held against axial movement, said face plate having a radially extending surfce projecting beyond the periphery of the drum and adapted to be aligned with said material working apparatus, first link means between each of said drum segments and said sleeve, each having opposite ends pivoted to a respective drum segment and said sleeve, second link means between each of said drum segments and said face plate, each having opposite ends pivoted to a respective drum segment and said face plate, said second link means being disposed at such angle to the axis of said drum to cause shifting of said segments axially only in a direction toward said face plate surface during expansion of said drum, and actuator means for shifting said sleeve axially on said shaft in a direction to simultaneously cause said first and second link means to expand said drum segments into engagement with the wall of the coil aperture to securely clamp the coil on the drum and to shift said segments axially in a direction toward said face plate surface to move the supported coil toward said surface and assure interabutment of said coil side with the face plate surface and consequent alignment of said coil side with said material working apparatus.

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