July 27, 1937. H. J. SPENCER ET AL 2,087,928

REEL

Filed March 21, 1936 3 Sheets-Sheet 1

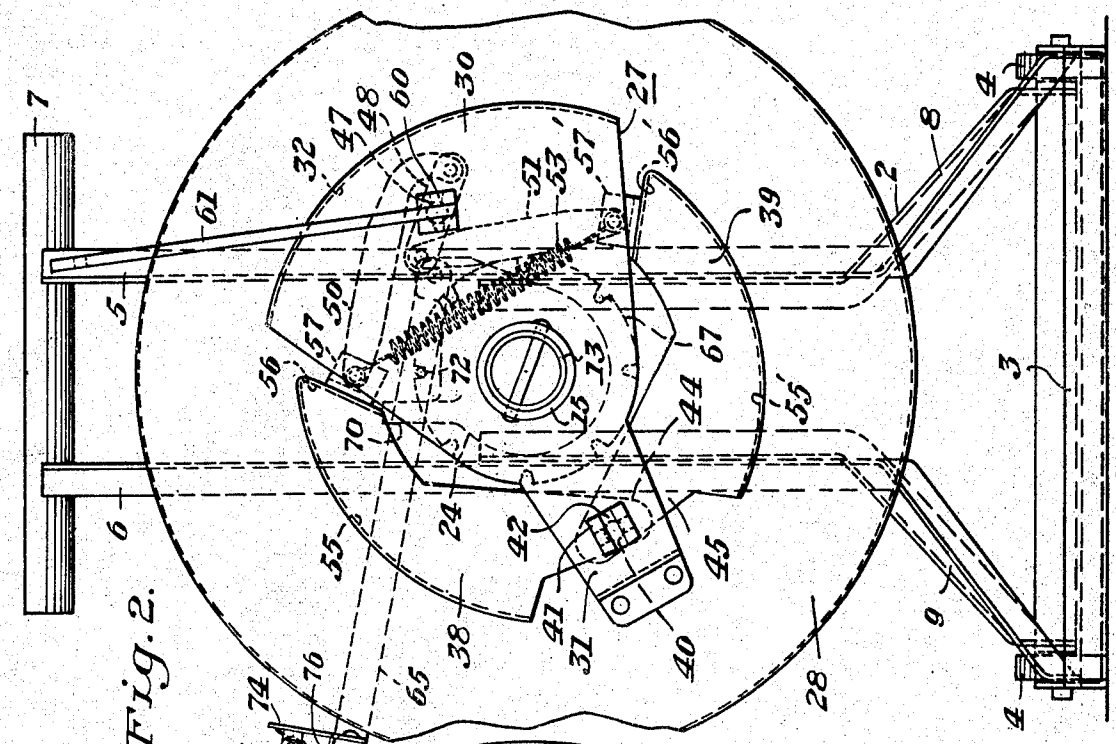


Fig. 2.

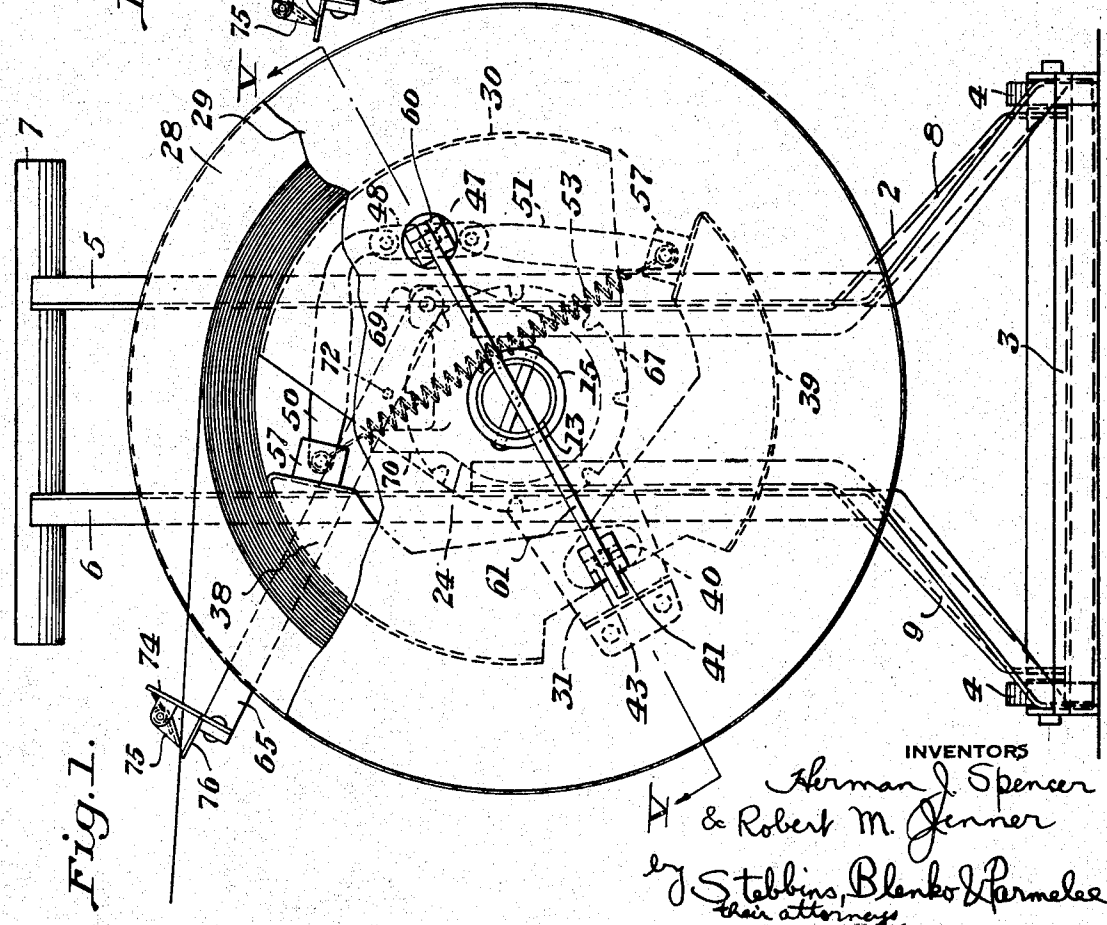


Fig. 1.

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REEL

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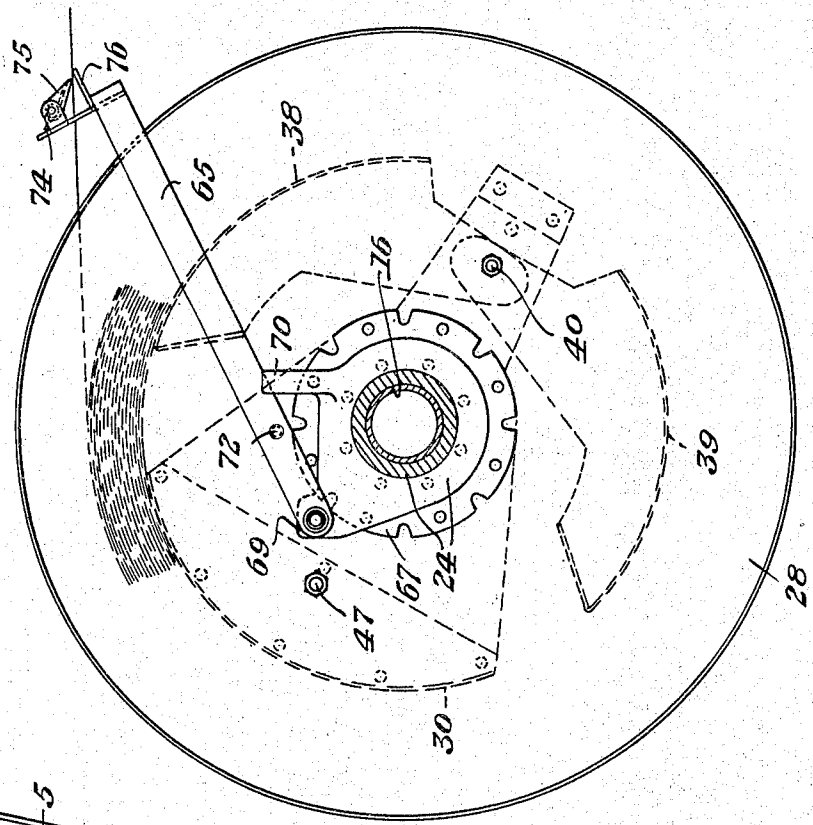


Fig. 4.

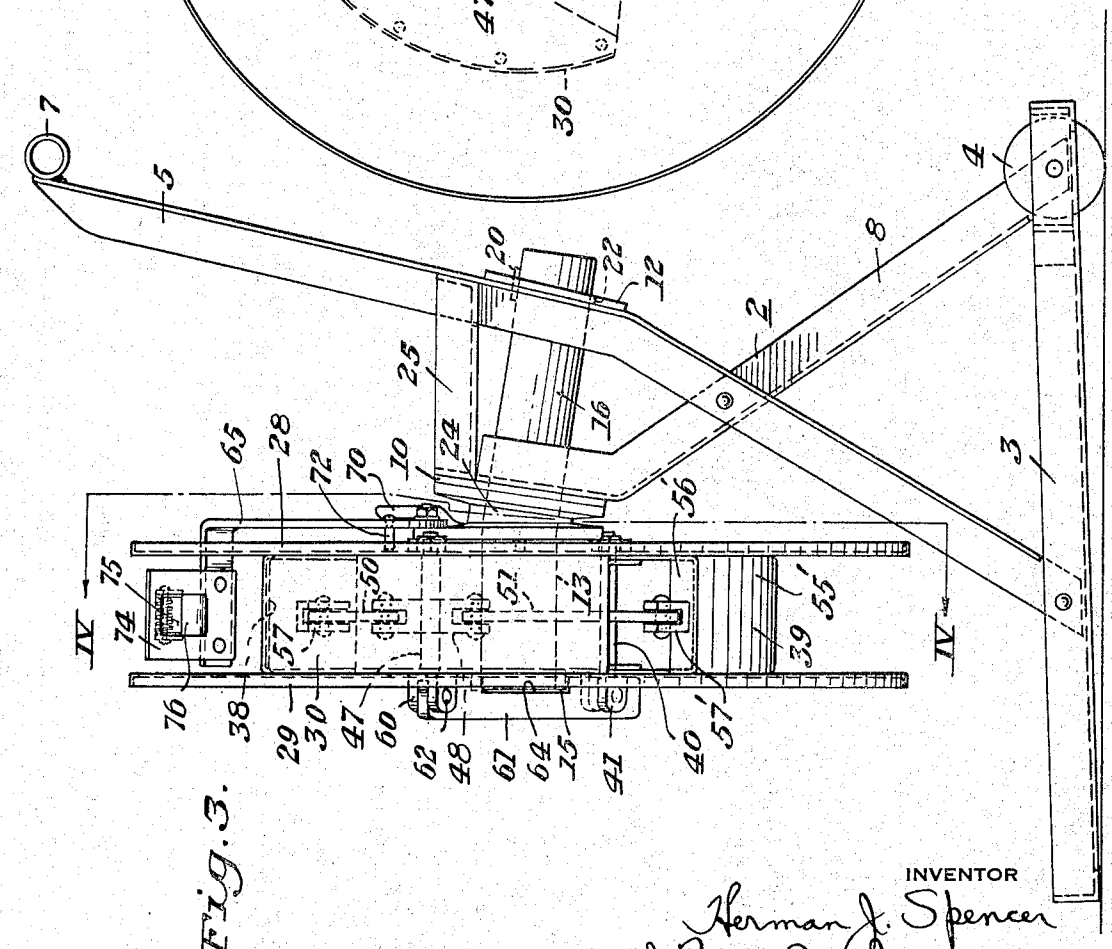


Fig. 3.

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REEL

Filed March 21, 1936 3 Sheets-Sheet 3

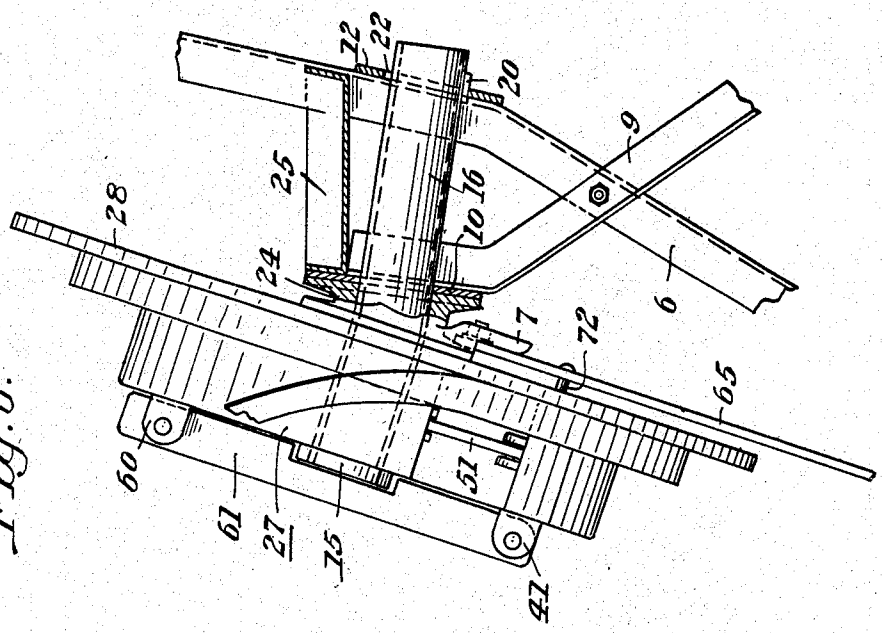


Fig. 6.

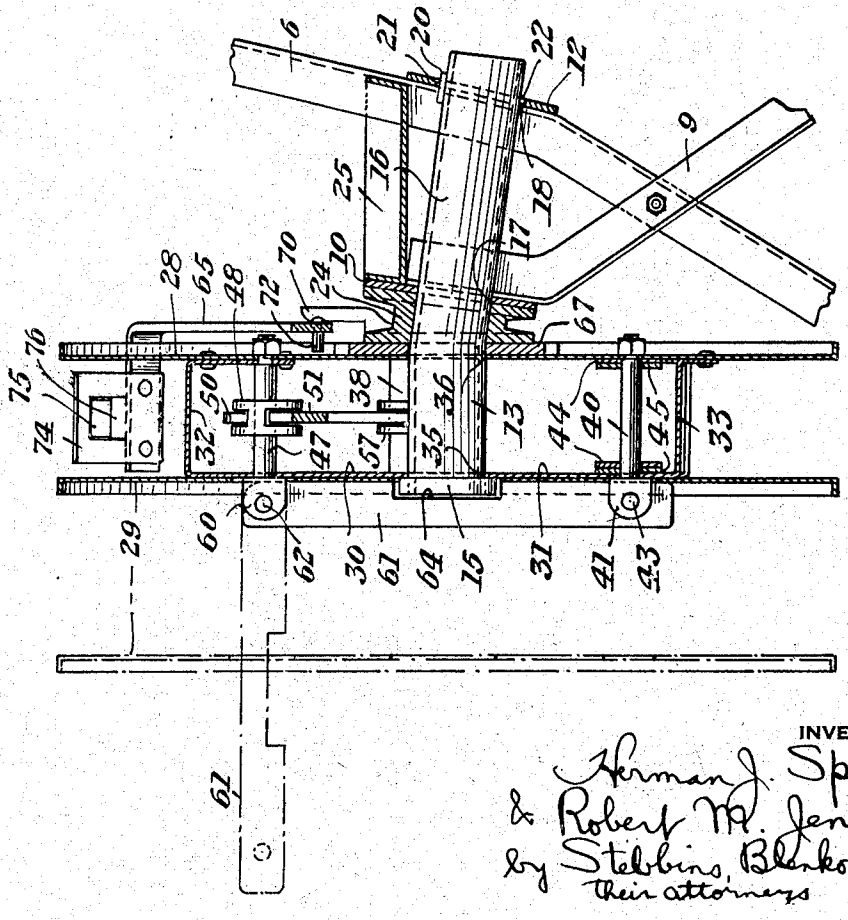


Fig. 5.

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UNITED STATES PATENT OFFICE

2,087,928

REEL

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Application March 21, 1936, Serial No. 70,026

7 Claims. (Cl. 242—72)

The present invention relates to apparatus for handling thin steel strap or the like for use in the strapping of boxes or in bulk binding, such as the binding of a large number of packages, boxes, barrels, or the like, together in trucks or cars for transportation purposes. More particularly, it relates to a new and improved reel for holding the strap to be used in the strapping operation and for feeding the strap to the strapping tool used for effecting the binding.

By our invention we provide a reel having a number of advantages over those which have been utilized heretofore in the handling of strap. The reel which we provide is of such character as to permit the ready mounting of the coil of strap on the reel and to tighten the strap on the reel so that as it is removed therefrom it will not bend or become clogged as it passes through the strap guide mechanism. The reel which we provide also embodies a removable face plate which enables the mounting of the coil of strap over one end of the drum on which the strap is to be mounted. The reel which we provide also embodies mechanism for guiding the strap as it is paid out from the reel in operation, and the strap-guide mechanism is provided with locking means to cooperate with the rotating drum for automatically locking the reel in position when strap is not being fed therefrom. The reel which we provide also is of such character that it may be used as a rotatable reel or a stationary reel and may be readily converted from one type to the other.

In the accompanying drawings we have shown for purposes of illustration only a preferred embodiment of the reel which we provide. It will be understood, of course, that our invention is not limited to the particular type of reel which is shown in the accompanying drawings, as our invention may be otherwise embodied within the scope of the claims appended hereto.

In the drawings, Figure 1 is a front elevational view of the reel which we provide, a portion of the removable face plate being broken away;

Figure 2 is a front elevational view of the reel shown in Figure 1 with the removable face plate removed from the reel, and showing the strap-guide mechanism in inoperative or locking position, and also showing the expansible drum in non-expanded position;

Figure 3 is a side elevational view of the reel shown in Figures 1 and 2;

Figure 4 is a sectional view taken along the line IV—IV of Figure 3;

Figure 5 is a partial sectional view taken vertically through the frame and the axis of the pivotal mounting of the reel, the section line V—V of Figure 1 indicating the section taken through the reel proper;

Figure 6 is a side elevational view of the reel shown in Figures 1 to 5 inclusive, but shown in inclined position and ready for use as an inclined stationary reel.

The reel which we provide by our invention is preferably mounted on a suitable support such as the frame shown in the drawings and indicated generally by the reference character **2**. The main frame **2**, as shown in the drawings, is formed of angle irons, but it will be understood that it may be formed from any type of metal or wood, or other material, capable of supporting the reel. The frame is provided with a base portion **3** comprising end and side portions which are all suitably connected together by welding or otherwise. The base portion of the frame is provided with wheels **4** at the rear end thereof, so that when it is desired to move the reel from one working location to another it will only be necessary to tilt the reel and maintain it on the wheels **4** during its movement from place to place. Thereafter it will be permitted to tilt forward so that the front end of the base portion of the frame will bear on the floor or ground and hold the reel in the desired position.

The main frame is provided with uprights **5** and **6** which are riveted or otherwise secured to opposite sides of the base portion and extend upwardly and are joined together at the top by means of a handle **7**. The main frame is also provided with uprights **8** and **9** which are connected at their lower ends with the base portion of the main frame and intermediate their ends with the uprights **5** and **6**. Adjacent the upper ends of the uprights **8** and **9** they are bent back somewhat beyond vertical position (see Fig. 5) so as to form a bearing surface to which may be welded a bearing plate **10**. The portions of the uprights **8** and **9** which provide this bearing surface are substantially parallel with portions of the uprights **5** and **6** to which a second bearing plate **12** is rigidly secured as by riveting or welding. We provide bearing plates of this character for cooperating with the means about to be described which we employ for mounting the reel on the support or frame **2**.

Such means are difficult of embodiment in such a way as to exhibit two capabilities which are among the features which we sought in order that the reel might be used both as a rotatable reel and as a stationary reel, and may be readily converted from one type to the other. We have succeeded in embodying in our reel first, means for rotatably mounting the reel so as to feed out the material, such as the strap, when the reel is used as a vertical reel; and second, the feature of convertibility, so that the reel may be tilted to the inclined position required of a stationary reel. The first feature may be simply embodied as a stud **13** on which the hub of the reel is journaled, this stud having a head **15** for retaining

the reel in place. In the embodiment shown, the stud 13 is herein constituted by one portion of a bent shaft, the other portion 16 of this shaft being received within alined openings 17 and 18 in the bearing plates 10 and 12 respectively. The portion 16 of the shaft is, as above intimated, angularly related to the portion 13, whereby the mounting for the reel is adjustable for disposing the axis of the stud 13 in different angular relations to the vertical. More particularly, the position of the portion 16 in the openings 17 and 18 is adjustable so as to dispose the stud 13 substantially horizontally (Figure 5), or inclined to the horizontal (Figure 6). To this end, a key 20 carried by the portion 16 in cooperating relation with the plate 12 is engageable with either an upper keyway 21 or a lower keyway 22 in the plate 12. Obviously, if other positions of the reel are desired than the two mentioned, additional keyways besides those indicated at 21 and 22 may be provided in the plate 12.

In order to adjust the positioning of the portion 16 in the plates 10 and 12, the bent shaft is moved to the left with reference to Figures 5 and 6, so as to withdraw the key 20 from one keyway; the bent shaft is then rotated in the openings 17 and 18 until the key comes opposite the desired keyway, when the portion 16 may be again moved to the right so that the key enters the keyway. In this way, the reel may be readily converted from the rotatable reel shown in Figure 5 to the stationary reel shown in Figure 6. When used as a stationary reel, a face plate, namely, the upper most when the reel is inclined, is generally removed. The manner of removing this face plate will be later explained.

At the front the reel is retained by the head 15. The reel bears at the rear against a positioning member 24 which, together with the bent shaft, constitute a bracket for rotatably mounting the hub of the reel. This bracket is in turn pivotally mounted in the support or frame 2, the member 24 being generally V-shaped in cross-section. The angle of the V opens upwardly when the reel is used as a rotatable reel, the member 24 engaging on one side the back of the reel and on the other side the inclined face of the plate 10. When the bracket is adjusted to the position shown in Figure 6 so that the reel may be used as a stationary reel, the angle of the V opens downwardly, and this angle is added to the inclination of the plate 10 so that the axis of the reel is inclined, as shown.

This reel may be used for various purposes. As it is particularly adapted, as above pointed out, for use in connection with the strapping of boxes or in bulk binding, we have provided a tray 25 secured between the uprights, which is adapted to hold spare clips, tacks, or nails, and the strapping tool itself.

As for such use of the reel, a coil of strap is rotatably mounted for paying out as the strap is used, we have provided an expansible hub indicated in general by the numeral 27, a permanent face plate 28 and a removable face plate 29. The main body portion 30 of the hub is secured as by riveting or welding, or both, to the face plate 28. The portion 30 has in general the shape of a sector, and its angular end is extended as indicated at 31. For the sake of lightness, the hub and face plates are made of sheet metal. The above description of the portion 30 gives its general contour; and its thickness (see Figure 5) is provided by an arcuate flange 32 and an end flange 33, these flanges extending to the permanent face plate 28 and being bent over parallel thereto for riveting or welding. The expansible hub of which the portion 30 constitutes the main body, and the face plate 28 thus constitute an assembly which is sufficient for the purposes of a stationary reel, as indicated in Figure 6.

The hub portion 30 and the face plate 28 are provided with aligned openings 35 and 36 through which extends the portion 13 of the bent shaft. This portion, as above stated, constitutes a stud on which this assembly is journaled by virtue of the aligned openings 35 and 36. The hub includes in addition to the main body portion 30 a plurality of expansible sections 38 and 39. A pivot bolt 40 is secured as shown in the permanent face plate 28 and the extension 31. The head 41 of the bolt 40 is slotted at 42 (see Figure 2), and a perforation 43 extends transversely of the slot. The wings 44 and 45 of the sections 38 and 39 respectively are pivoted on the bolt 40 so that they may swing about this bolt to and from expanded position, the expanded position being shown in Figures 1 and 4 and the contracted position being shown in Figure 2.

A toggle is arranged to expand and contract the hub; and for this purpose we have provided a rotatable member and linkages connecting this member to the sections 38 and 39. For the rotatable member we prefer to use a bolt 47 having fixed thereon a cross-piece 48. The linkages 50 and 51 connect the opposite ends of the cross-piece 48 to the sections 38 and 39 respectively. In order to provide a greater throw for the toggle, the linkage 50 is given the shape of a dog leg so as to be capable of moving to fully retracted position as shown in Figure 2. A spring 53 extends between the sections 38 and 39 so as to bias them toward retracted position.

In order to fashion the sections 38 and 39 of sheet metal, the sides of each section are connected by an arcuate flange 55 or 55'; and this flange extends around the end, as indicated at 56 or 56', to provide an end wall carrying a lug 57 or 57' to which the respective linkage is connected. The spring 53 is preferably extended between the lugs 57 and 57'.

The bolt 47 is, of course, rotatable relative to the hub and face plate 28. Its head 60 is slotted to receive a bar 61 which is pivoted at 62 to the head 60. This bar may be swung to the position shown in Figure 2 when it is desired to contract the hub; and may be swung into registry with the slot 42 in the head 41, as shown in Figure 1, when it is desired to expand the hub. The bar 61 is perforated, and when lodged in the slot 42 a cotter pin may be inserted through this perforation and the perforation 43 to lock the bar in the position shown in full lines in Figure 5. The bar 61, the bolt 47 and the toggle together make up mechanism for expanding and contracting the hub, the operator manipulating the bar 61 of this mechanism when he desires to mount on the hub a new coil of strap.

This same mechanism has the further function of locking the removable face plate 29 in position. This face plate has a central opening substantially the size of the head 15, a circular opening for admitting the head 60 of the bolt 47 and an opening for admitting the head 41 of the bolt 40. When it is desired to remove or replace the face plate 29, the bar 61 is swung to the position shown in dotted lines in Figure 5, whereupon the face plate can be slid along the bar 61. In order to lock this face plate in position, as shown in Figure 5, it is merely necessary to swing the bar about its pivot 62. It will be noted that

this bar has a cut-out portion **64** which fits over the head **15** when the bar is secured in place in the head **41** by its cotter pin.

The rotatable mounting provided by our improved reel is controlled so that material, such as the strap, does not continue to pay out, once the pull on the material ceases. We have provided means for controlling rotation of the hub, which control means is actuated by an arm **65**. As such control means, either a brake or a locking device may be employed; we prefer to employ a locking device for the hub such as shown in the drawings. As the rear of the hub is constituted by the permanent face plate **28**, a notched disc **67** is secured thereto as by rivets. The arm **65** is pivoted to an upstanding lug **69** on the positioning member **24**; and is guided by a backing post **70** on the same member. The arm **65** carries a lug or tooth **72** which is engageable in a registering notch in the disc **67**. On the outer portion of the arm **65** is mounted a guide **74** for the material wound on the hub. This guide has an additional function, a braking action on the material being unwound. The means for thus acting on the material to prevent its loosely traveling through the guide may take various forms. In the embodiment shown, a spring-pressed tongue or flap **75** bears down upon the material to press it against a friction surface afforded by an under plate **76**.

As the material is pulled through the guide **74**, it lifts the lug **72** out of a notch in the disc **67**, if the hub was locked in place, and maintains the arm **65** in raised position. The arm **65** is thus maintained in the raised position shown in Figures 1 and 4 so long as the material being fed is taut; but slack caused by slowing up of the movement of the material permits the arm **65** to drop. The lug or tooth **72** rides on the periphery of the disc **67** until it drops into a notch and locks the hub in position as shown in Figure 2. The braking means **75**, **76** through which the material is paid out is opened by the pull which draws the material from the reel (see Figure 1); but as soon as there is slack, such that its spring is able to swing the flap **75**, the braking means closes on the material by moving to the position shown in Figure 2. It is apparent, therefore, that this arrangement has the advantage of preventing more material being paid out after the pull on the material stops. As will be appreciated by those skilled in the art, the momentum of the coil and reel is apt to cause the material to pay out. Our locking device stops the reel if the pull on the reel ceases, as soon as the tooth **72** drops into a notch in the disc **67**. It will further be appreciated that there is sufficient spring in strap steel to cause a coil to tend to unwind when there is no pull on the strap by the operator. But the braking means **75**, **76** effectually grip the strap as soon as there is slack; and since travel of the strap through the guide is now prevented, there will be no uncoiling due to the spring in the coil of strap steel.

It will be apparent from the above description that our improved reel is particularly well adapted for handling coils of material such as coiled strip steel which is to be fed to a strapping machine. One face plate is readily removable, and the hub of the reel is expansible so that it may tightly hold a coil of material mounted thereon. Our invention affords the further advantage that the same mechanism which expands the hub locks the replaced face plate in position when moved to the full line position indicated in Figure 5.

A particular advantage of our invention is that the reel may be readily converted from the vertical rotatable type to an inclined stationary type wherein the strip is fed off, as indicated in Figure 6.

A further advantage of our invention is the automatic control of the paying out of the material, due to the fact that the arm carrying the strip guide is also the actuating member for the brake or locking device which controls rotation of the hub.

We claim:

1. A reel comprising an expansible hub and face plates, at least one of which plates is removable, means for rotatably mounting the hub, and mechanism including a pivotally mounted handle movable to one position for releasing a face plate to permit removal thereof and to another position for locking said face plate in position.

2. A reel comprising an expansible hub and face plates, at least one of which plates is removable, means for rotatably mounting the hub, and mechanism movable to one position for contracting the hub and to another position for expanding the hub, said mechanism being arranged to lock said face plate in position when in hub expanding position.

3. A reel comprising a hub having a pair of expansible sections, a toggle for expanding and contracting said sections including a rotatable member and linkages connecting said member to said sections, face plates at least one of which is removable, and mechanism for rotating said member to expand and contract the hub, said mechanism being movable to one position for releasing a face plate and to another position for locking said face plate in position.

4. A reel comprising a hub, a shaft having angularly related portions and providing a rotatable mounting for the hub on one portion thereof, a support, and adjustable means for mounting the other portion of the shaft on said support with the first mentioned portion in various positions.

5. A reel comprising a support, a hub, and means including a wedge-shaped plate adapted to cooperate with the support and a shaft having angularly related portions for rotatably mounting the hub on said support, said means being shiftable to dispose the axis of rotation of the hub in a plurality of different angular positions relative to the vertical.

6. A reel comprising a hub, a shaft having angularly related portions and providing a rotatable mounting for the hub on one portion thereof, a support, and means for mounting the other portion of the shaft on said support with the hub supporting portion of the shaft in various positions.

7. A reel comprising a hub, a shaft having angularly related portions and providing a rotatable mounting for the hub on one portion thereof, a support, a wedge-shaped member cooperating with the support and with said hub, and means for mounting the other portion of the shaft on said support with the first-mentioned portion in various positions and with the said wedge-shaped member in various positions relative to the support.

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