

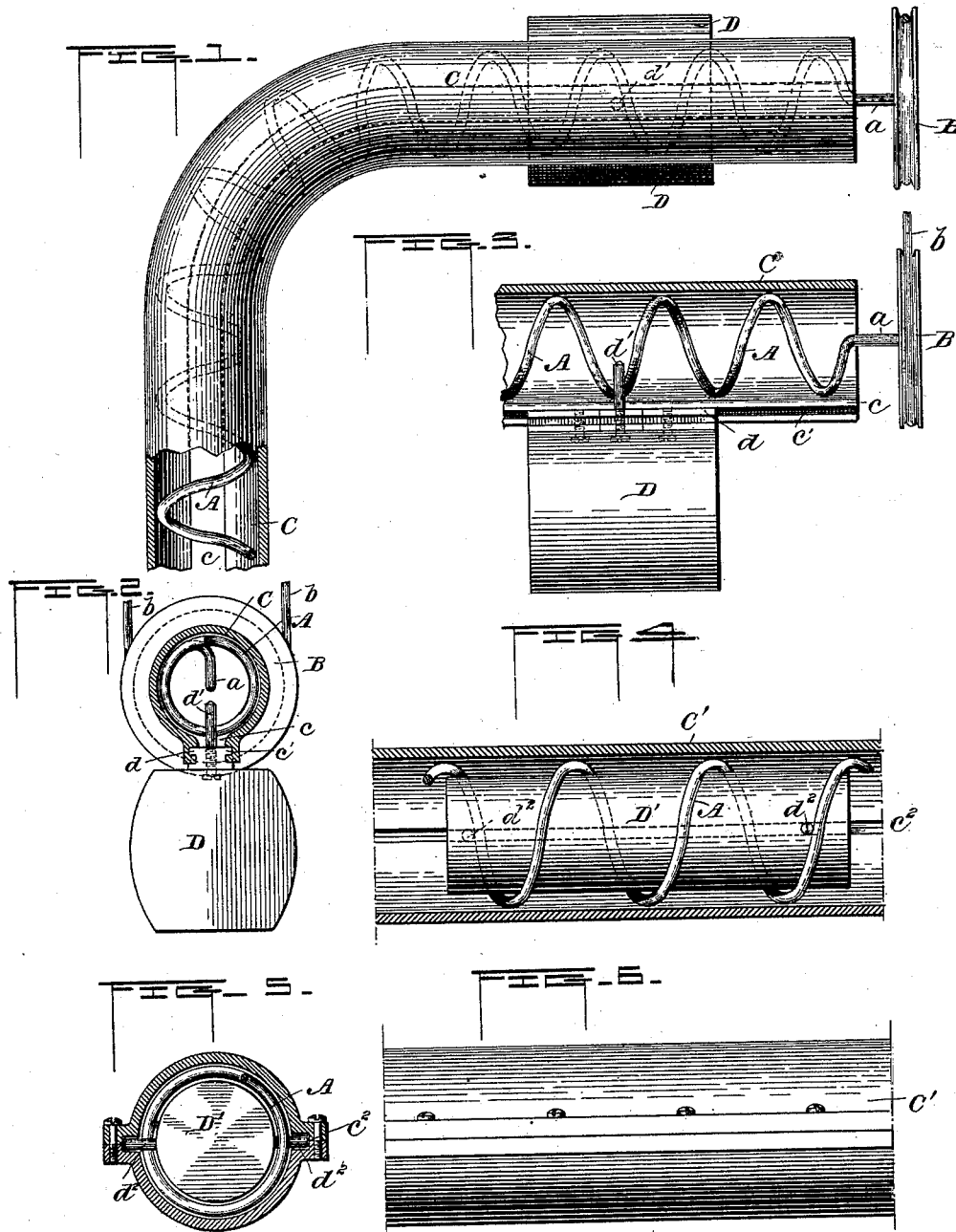
(No Model.)

2 Sheets—Sheet 1.

C. E. WILLIAMS.  
PROPELLING DEVICE FOR CASH CARRIERS.

No. 421,999.

Patented Feb. 25, 1890.



WITNESSES:

L. A. Comer Jr.  
H. J. Cushman

INVENTOR,

Chas. E. Williams  
Hawes & Chapman  
attys.  
by Henry Cabot  
Esq. Att'y.

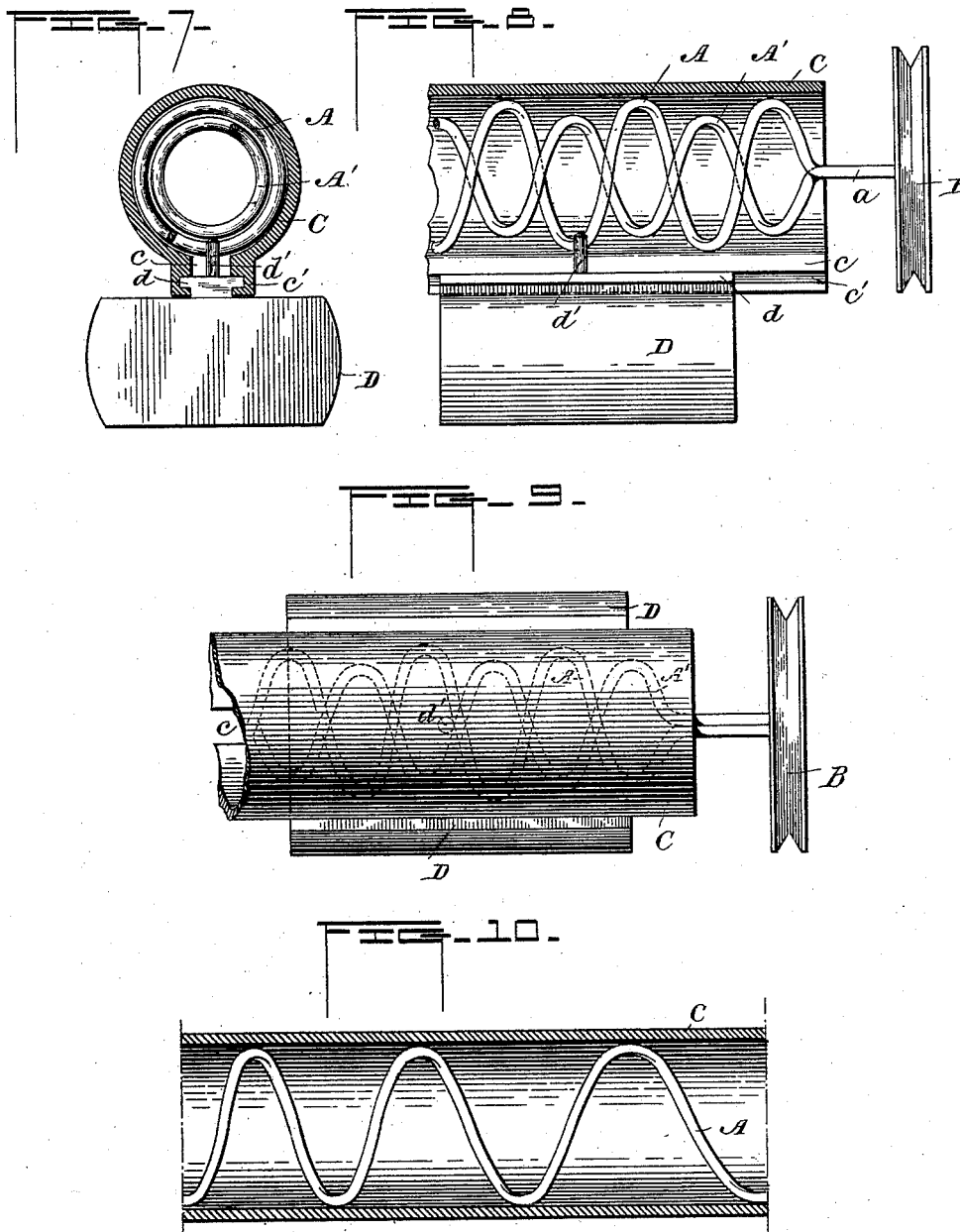
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*L. A. Connor Jr.*  
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# UNITED STATES PATENT OFFICE.

CHARLES E. WILLIAMS, OF WESTFIELD, MASSACHUSETTS.

## PROPELLING DEVICE FOR CASH-CARRIERS.

SPECIFICATION forming part of Letters Patent No. 421,999, dated February 25, 1890.

Application filed February 25, 1889. Serial No. 301,142. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. WILLIAMS, of Westfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Means for Propelling Cash and other Carriers, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to means for propelling carriers of various kinds by the distribution of power from one or more primary points; and it has for its object to provide means for such purpose which will combine within itself a capacity to impart a positive and rapid movement to the carrier upon either straight or curved lines and a lightness in weight and ease of movement which enable it to be operated with but slight power and at little expense.

A further object of the invention is to provide propelling means for carriers so constructed that a variable speed of the carrier can be produced without interrupting the constant movement of the propelling means.

To these ends my invention consists in a propelling medium for cash-carriers composed of an spirally-wound coil of metal or other suitable material, supported in such manner as to be capable of a revolving movement about its axis, and having connected therewith means for imparting such movement thereto, and a carrier movably mounted upon a way extending parallel with the axis of said coil, and having one or more fingers or engaging devices projecting therefrom and engaging the coil, as hereinafter fully described, and particularly pointed out in the claims.

It is obvious that in the practical application of my invention to the various kinds of work of which it is capable various forms of devices can be employed.

In the accompanying drawings I have illustrated some of the most simple embodiments of the invention, in which—

Figure 1 is a plan view, Fig. 2 a cross-section, and Fig. 3 a vertical section, illustrating one form of the invention. Fig. 4 is a vertical section, Fig. 5 a cross-section, and Fig. 6 a side elevation, showing a second form. Figs. 7, 8, and 9, in cross-section, vertical section, and plan views, respectively, illustrate a modified

form of the propelling medium. Fig. 10 illustrates the manner of providing a variable speed of the carrier by changing the pitch of the coils of the propelling medium.

Like letters designate like parts in the several figures.

The letter A designates the propelling medium, which consists of a helically or spirally wound coil, which may be composed of stiff wire round or angular in cross-section, of flat strips of metal, or from any material capable of being coiled and possessing the requisite amount of rigidity and stiffness. The diameter of the coils and the size of wire or other material from which they are formed will be governed according to the character of the work to be performed and the conditions attending the same.

Combined with the coil A are means for imparting a revolving movement thereto about its axis, and as one of the most simple devices for securing such movement I have herein shown a band-pulley B, mounted upon a portion *a* of the coil which projects beyond the end of the latter in a plane coincident with the axis thereof, whereby by revolving said pulley a steady and uniform revolving movement of the coil about its axis will be secured. A band *b*, connecting said pulley with any suitable motor, transmits motion from the latter to the former. The coil being perfectly flexible, it is obvious that whether arranged in straight or curved lines, or both, its revolving motion will be uniform throughout its length, providing it be supported in such manner as to reduce its frictional resistance to a minimum.

As shown in Figs. 1, 2, and 3, the support for the coil is composed of a tube C, having a longitudinal slot or opening *c* in the lower side thereof, and having a diameter slightly greater than the coil, whereby the latter is permitted to revolve freely therein. The tube C may be made from sheet or other metal, or from hard rubber, rawhide, or other suitable material, and when made from metal may be lined with rawhide or other wear and friction reducing and noise-deadening material. It will be supported by suitable brackets depending or projecting from any desired support in a manner well known to the art, and will be straight or curved to suit the

conditions under which it is used. The coil A is located within said tube with the portion *a* projecting beyond the end of the latter to receive pulley B.

5 The letter D designates a carrier, which may be a receptacle for cash or for packages in the application of my invention to a store-service system, or may be a carrier of any desired size and form in other adaptations  
10 of my invention. In connection with said propelling medium and carrier I provide a way or ways upon which the carrier can be supported in such manner as to have free movement in a direction parallel with the  
15 axis of coil A, various forms of which can be used. As shown in Figs. 1, 2, and 3, I form such ways by bending or shaping the edges of tube C upon each side of the opening therein to form the inwardly-facing grooves  
20 *c' c'*, which are thus parallel with each other and with the axis of the coil. Formed upon the upper side of carrier D or suitably secured thereto is a projecting rib *d*, having in its two opposite sides parallel slots or grooves  
25 to receive the edges of tube C at the bottom of grooves *c' c'*, thus causing the upper portion of the sides of said rib *d* to project within said grooves in the tube, as shown in Fig. 2, whereby said rib is prevented from leaving  
30 said tube, while being free to move lengthwise thereof. One or more fingers *d'* or other engaging devices project from the upper or inner side of rib *d* within the circle described by the coil A, as shown, whereby revolution of  
35 the latter about its axis will cause the carrier to move upon the ways *c' c'* in a plane parallel with the axis of the coil and in either direction as the coil is revolved one way or the other.

40 In the form of the invention shown in Figs. 4, 5, and 6 the tube C' is a closed tube, and the carrier D' is made in the form of a hollow cylinder, the diameter of which is sufficiently less than the inner diameter of coil A to enable  
45 the former to enter and have free movement within the latter. Stud or pins *d<sup>2</sup>* project from opposite sides of said carrier through the coil and into oppositely-located parallel grooves or ways *c<sup>2</sup> c<sup>2</sup>* upon the inner side of  
50 tube C', and thus serve the double purpose of engaging the coil to cause movement of the carrier in a plane parallel with the axis of the coil and of preventing a revolving movement of the carrier about its own axis. The  
55 tube C' is preferably made in two parts united together by flanges and screws, as shown, to facilitate the formation of the grooves *c<sup>2</sup>* therein. Revolution of the coil in either direction will, by its contact with the  
60 studs *d<sup>2</sup>*, impart a positive movement in a right line to the carrier D' and in one direction or the other, as the case may be.

When the coil is of great length and is made of light material, the torsional strain thereon  
65 might have a tendency to cause it to contract in diameter in such manner as to impair its engagement with the carrier, and for the pur-

pose of counteracting said tendency I design to locate within the coil A a second coil A', wound in the reverse direction and rigidly  
70 connected at its ends to said coil A, so that both coils will revolve together. (See Figs. 7, 8, and 9.)

The outer coil A is preferably made of material which is of slightly greater diameter  
75 or thickness than that of which the inner coil is composed, so that while said coils engage each other the greater thickness of material of the outer one will enable it to engage the  
80 fingers *d'* of the carrier and propel the latter, while said fingers will entirely clear the inner coil. By thus disposing the two reversed coils the same torsional strain which would  
85 tend to contract the outer one will tend to expand the inner one, and the two coils will thus equalize each other and secure to the  
90 outer one the requisite strength and stiffness for great distances.

If the coil A be of a uniform pitch throughout, the carrier will be propelled with a constant speed from one end thereof to the other;  
95 but by varying the pitch of the coil at any desired points therein, as shown, for example, in Fig. 10, the carrier can be caused to move with a variable speed, while the revolving movement of the coil remains uniform. Such variable speed of the carrier is  
100 of much importance, and especially in the adaptation of my invention to a store-service apparatus, as it enables said carrier to be moved very rapidly between terminal points  
105 and to have its speed slackened as it approaches said points without interrupting the uniform motion of the coil and its motor.

Various devices for switching and stopping  
110 the carriers at their proper terminal points similar to those now employed with cable and other systems can be used in connection with my invention and in a manner which will be obvious to persons skilled in  
115 the art. I am aware that scroll-cams and shafts with spiral grooves cut in their periphery have been used to secure reciprocatory movement to parts of machinery of various kinds; but such devices are wholly  
120 inapplicable to the uses for which my invention is designed, because of their necessarily limited length, great weight, and inflexibility, which prevents their being used in curved  
125 lines. I am also aware that grain-conveyers composed of a spiral shaft inclosed within a closed tube have been devised; but the action of such shafts upon the grain within the tube is not positive, and, instead of utilizing the spiral shaft to propel an independent carrier  
130 for miscellaneous articles, the shaft is itself the carrier, and the principle of operation is therefore wholly different from that devised by me.

So far as I am aware I am the first to utilize  
a coil with all of its incidents of lightness, cheapness, flexibility, ease of operation, &c., as the means for propelling an independent carrier, either with or without independent

ways to support the latter. I therefore do not wish to limit myself to the examples of such use herein shown and described so far as relates to the particular form of coil, its operating means, or the shape or size of the carrier, or the ways for the latter, it being obvious that various modifications in such details can be made within the spirit of my invention.

10 Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a helically or spirally wound coil, of an independent carrier 15 having a portion thereof projecting within said coil perpendicularly to the axis of the latter, a way upon which said carrier is mounted and upon which it has free movement, and means, substantially as described, 20 for revolving said coil about its axis, arranged and operating substantially as and for the purpose described.

2. The combination, with a tubular support, of a spirally-wound coil located therein, 25 means, substantially as described, for revolving said coil about its axis, and an independent carrier adapted to have free movement in the direction of the axis of said coil and having a projecting portion engaging said 30 coil, arranged and operating substantially as and for the purpose set forth.

3. The combination, with a tubular support, of a spirally-wound coil located therein, 35 means, substantially as described, for revolving said coil about its axis, a carrier mounted upon ways extending parallel with the axis of said coil, and an engaging device projecting from said carrier within the plane of the circumference of said coil, substantially as 40 set forth, whereby the revolution of said coil will propel said carrier upon its ways.

4. The combination, with a tubular support having an opening extending longitudi-

nally thereof and having its edges at each side of said opening composed of parallel 45 ways, of a spirally-wound coil located within said support and having secured thereto at one end a band-pulley whose axis coincides with the axis of the coil, whereby a uniform revolving motion about its axis can be im- 50 parted to said coil, and a carrier mounted to move upon the ways on said support, said carrier having one or more fingers projecting therefrom and engaging said coil, whereby the latter will impart positive movement to 55 the former in a plane parallel with the axis of the coil, substantially as set forth.

5. As a means for propelling cash and other carriers, two spirally-wound coils of reversed pitch located one within the other and rigidly 60 connected together at each end, a suitable support for said coils, and a band-pulley rigidly connected to said coils at one end, whereby a uniform revolving movement about their common axis will be imparted to the coils, in 65 combination with a carrier mounted upon ways extending parallel with the axis of said coils, said carrier having a device projecting therefrom and engaging the outermost coil, substantially as and for the purpose described. 70

6. The combination, with tube C, having opening *c* therein and parallel ways *c' c'* upon opposite sides of said opening, of spirally-wound coil A, located within said tube and having at one end thereof the portion *a*, co- 75 incident with the axis thereof, band-pulley B, mounted upon said portion *a* of the coil, and carrier D, having the portion *d* in engagement with said ways *c' c'* on the tube and having finger *d'* in engagement with said 80 coil, arranged and operating substantially as and for the purpose set forth.

CHARLES E. WILLIAMS.

Witnesses:

W. H. CHAPMAN,  
J. E. CHAPMAN.