No. 882,371. PATENTED MAR. 17, 1908.

J. A. CAFLISCH.

EXTENSION LADDER.

APPLICATION FILED SEPT. 21, 1907.

3 SHEETS—SHEET 1.

Fig. 7.

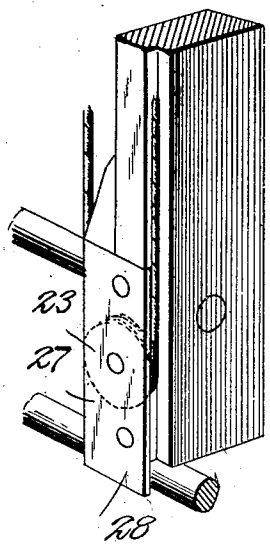


Fig. 8.

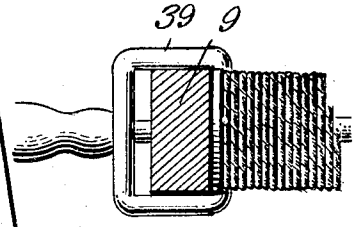
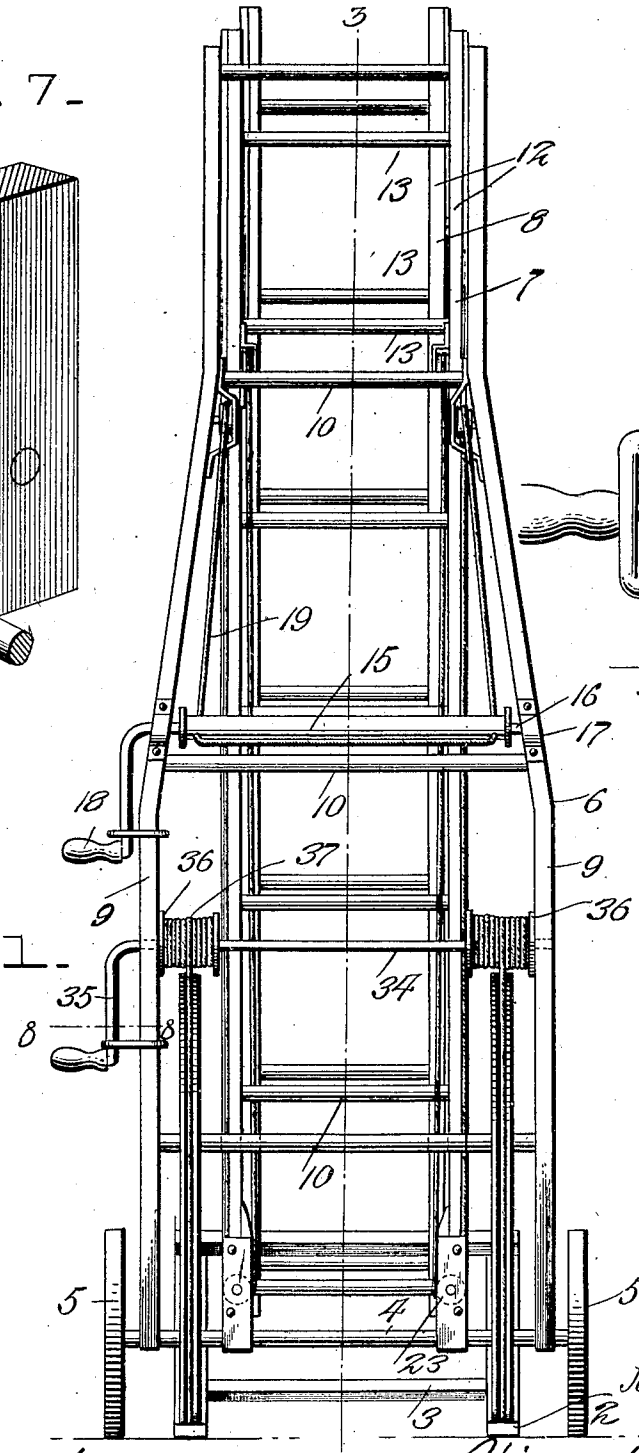


Fig. 1.



Witnesses

D. W. Gould

F. C. Ackmann Jr.

Inventor

John A. Caflisch

By Victor J. Evans

Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

No. 882,371. PATENTED MAR. 17, 1908.

J. A. CAFLISCH.

EXTENSION LADDER.

APPLICATION FILED SEPT. 21, 1907.

3 SHEETS—SHEET 2.

Fig. 4.

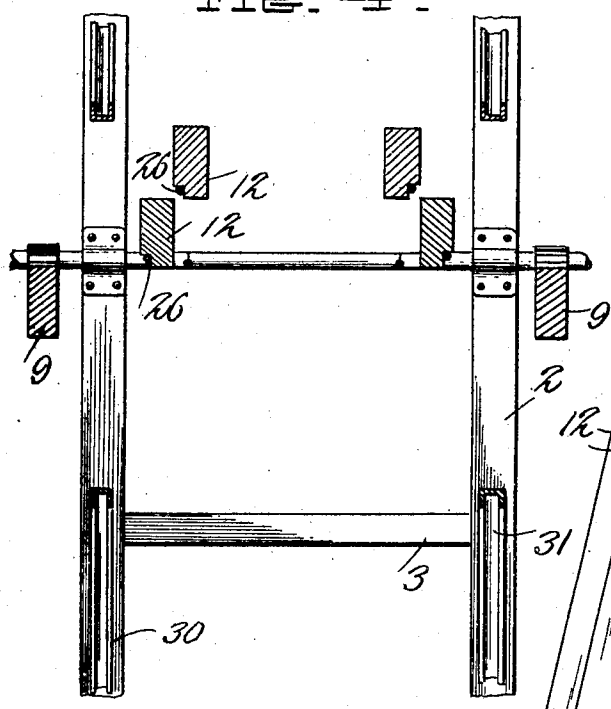


Fig. 9.

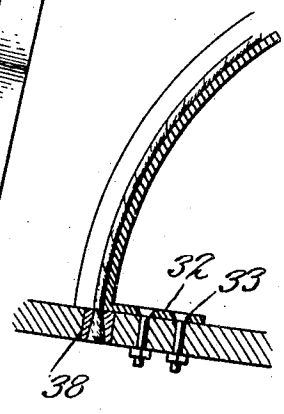


Fig. 2.

Witnesses
D. W. Gould.
Geo. Hickman Jr.

Inventor
John A. Caflisch

By Victor J. Evans
Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

No. 882,371. PATENTED MAR. 17, 1908.

J. A. CAFLISCH.

EXTENSION LADDER.

APPLICATION FILED SEPT. 21, 1907.

3 SHEETS—SHEET 3.

Fig. 5.

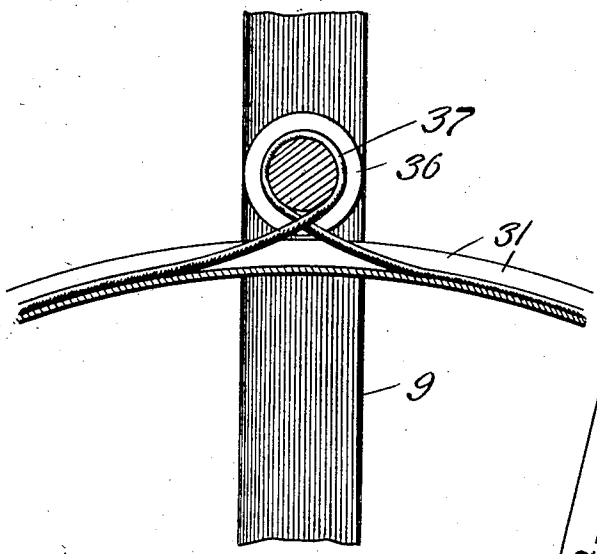


Fig. 6.

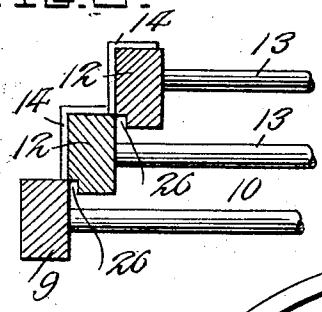


Fig. 3.

Inventor

Witnesses

D. W. Gould.

Geo. Ackman Jr.

By John A. Caflisch

Victor J. Evans Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN A. CAFLISCH, OF UNION CITY, PENNSYLVANIA.

EXTENSION-LADDER.

No. 882,371. Specification of Letters Patent. Patented March 17, 1908.

Application filed September 21, 1907. Serial No. 393,953.

To all whom it may concern:

Be it known that I, JOHN A. CAFLISCH, a citizen of the United States, residing at Union City, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Extension-Ladders, of which the following is a specification.

The invention relates to an improvement in extension ladders and is particularly directed to a structure in which the ladder sections may be quickly and conveniently extended and the ladder as a whole adjusted to any desired inclination with respect to the base or supporting member.

The main object of the present invention is the provision of an extension ladder made up of any desired number of independent sections and mounted upon a wheeled base, the construction including a simple means for elevating the respective ladder sections at will and a further means for adjusting the ladder as a whole at any desired inclination with respect to the base.

The invention will be described in the following specification, reference being had particularly to the accompanying drawings, in which:—

Figure 1 is a view in front elevation of a ladder constructed in accordance with my invention. Fig. 2 is a view in side elevation of the same. Fig. 3 is a section on line 3—3 of Fig. 1. Fig. 4 is an enlarged section on line 4—4 of Fig. 2. Fig. 5 is an enlarged sectional view illustrating particularly the means for adjusting the inclination of the ladder. Fig. 6 is an enlarged section on line 6—6 of Fig. 2. Fig. 7 is a broken perspective illustrating the connection of the elevating cable with one of the movable ladder sections. Fig. 8 is an enlarged section on line 8—8 of Fig. 1. Fig. 9 is a broken sectional view illustrating the connection of the adjusting cable guide with the wheel base.

Referring particularly to the drawings, my improved extension ladder comprises a base member or platform 1, preferably made up in skeleton form to include side bars 2 and cross bars 3, said platform being of any desired dimensions. The platform is supported upon an axle 4 mounted in bearings secured to the side bars 2, said axle carrying ground wheels 5 to provide for convenient transportation of the ladder.

The ladder proper is in the present instance, made up of three sections, a lower section 6, an intermediate section 7 and an upper section 8, the lower section comprising the sole supporting member for the intermediate and upper sections.

The side bars 9 of the lower section are connected by rungs 10, as is usual, said side bars being so constructed that they are spaced apart a greater distance at their lower ends than at their upper ends. This result may be gained by inclining an intermediate portion of each side bar so as to dispose the portions of said bar beyond the inclined portion in parallel but offset planes. The relatively lower ends of the side bars of the lower ladder section are pivotally supported on the shaft or axle 4, as at 11, said connection being preferably disposed between side bars of the base frame and the ground wheel.

The intermediate and upper ladder sections are practically identical so far as their ladder construction is concerned, each including side bars 12 connected by rungs 13. The respective ladder sections are, however, of slightly different widths, the intermediate sections being of a width to fit within or between the side bars of the reduced portion of the lower section, while the upper section is of a width to fit between the side bars of the intermediate section. The respective sections are maintained in their relative positions during the elevating and lowering operation through the medium of supporting plates 14, which are of right angle form with one leg secured to the inner surface of the side rail of the lower and intermediate ladder sections and the other leg underlying the edge of the adjacent section, whereby each section guides and supports the next adjacent section. The supporting plates are preferably disposed near the upper end of the respective ladder sections, whereby their guiding influence is rendered most effective. It is to be understood, however, that any number of such plates may be used and they may be positioned at any points desired to properly guide and support the ladder sections during elevation.

Mounted upon the relatively forward edges of the side bars 9 of the lower section is an elevating roller 15, preferably of substantial diameter and having a central shaft 16 supported in bearings 17 on the side bars, one end of the shaft being projected beyond the bearing and formed to provide a crank handle 18. This roller is designed in operation to elevate the respective ladder sections with relation to the lower section, being for this

purpose connected with the respective sections through the medium of an elevating cable 19. This cable is secured at one end to the lower end of the upper ladder section, as at 20, being thence carried upward adjacent one of the side bars of the upper ladder section to and around a groove pulley 21 mounted in a housing 22 secured on the inner surface of one of the side bars of the intermediate ladder section. From the pulley 21 the cable extends downward along side one of the side bars of the intermediate ladder section and passes around a grooved pulley 23 secured in a recess formed in the relatively rear edge of the side bar of said section, a guide block 24 being secured to the side bar to properly direct the cable. From the pulley 23 the cable extends upwardly adjacent the particular side bar and passes over a grooved pulley 25 secured on the inner surface of one of the side bars of the lower section, from which pulley the cable extends to and is connected with the roller 15, the connection between the cable and roller is preferably provided by passing the cable through an opening extending transverse the roller, the respective openings in the roller for both strands of the cable being arranged adjacent the ends of the roller. The cable connections just described are, of course, repeated on the opposite sides of the ladder sections, so that both terminals of the cable are secured to the lower end of the upper section, and the central portion of the cable extends longitudinally of the roller 15 between the openings therein, as clearly shown in Fig. 1.

The pulleys 23 mounted on the lower ends of the intermediate ladder section are disposed at right angles to the remaining pulleys, so that the cable strands leading to and from the pulleys 23 will lie and operate upon respectively opposite sides of the side bars of the intermediate section. The outer surfaces of the respective side bars of the intermediate and upper ladder sections are channeled throughout their lengths adjacent their rear edges, as at 26, for the reception of the cable during operation, as clearly shown in Fig. 6. The pulley 23, carried by the lower ends of the intermediate section, is, as before stated, mounted in a recess formed in each side bar of said section, and secured therein by a guard plate 27. The lower end of the guard plate projects below the lower edge of the respective side bar, thereby providing a projecting lip 28 designed when the parts are in lowered position to bear against the axle 4 of the base frame, insuring the maintaining of the ladder sections in proper relative positions and preventing any tendency of the lower ends of the intermediate ladder section to swing away from the lower section.

In connection with the elevating means described I have provided a simple and effective means whereby the ladder as a whole may be adjusted to any desired inclination with respect to the base. To this end I provide what I term cable guides 29, preferably two in number and adapted to be secured to the base frame. Each of the guides are formed of semicircular metallic strips 30 which are longitudinally channeled or grooved at 31 to receive and support the adjusting cable. The terminals of the strips are provided with radially disposed flanges 32 designed to rest respectively upon the upper surface of the side bars 2 of the base and be secured thereto through bolts 33, as clearly shown in Fig. 9. The cable guides lie between the side bars of the lower ladder section, and immediately above these guides there is mounted in said side bars a shaft 34, which at one end is projected beyond the side bar in the form of an operating handle 35. Directly overlying each guide 29 there is fixed to the shaft 34 a flanged roller 36 about which is wound the adjusting cable 37. The intermediate portion of the cable is given several turns about the particular roller and is projected from said roller in opposite directions in the guide 29, said cable resting, of course, in the groove 31 formed in the guide. The terminals of the particular cable are secured in socket members 38 fixed in the side bars of the base frame in alinement with the guide channels 31, as clearly seen in Fig. 9.

The rollers 36 are so disposed with relation to the guides 29 that in the operation of the shaft 34 said rollers will be taking up the cable on one side of said rollers and feeding it off on the opposite side, which, as the terminals of the cables are fixed will result in drawing the rollers in one or the other direction with the effect to swing the lower ladder section, and thereby the entire ladder on the axle 4. As the rollers are disposed immediately above the guides the operation described will tend to at all times maintain the adjusting cable in the channel 31 of the guides, thereby insuring the most effective and convenient adjustment.

The respective operating handles 18 and 35 are secured against accidental movement through a simple locking means, illustrated more particularly in Fig. 8. For the purpose noted I utilize a rectangular loop or link member 39 designed to loosely and slidably embrace the adjacent side bar 9 of the lower ladder section and also the normally depending portion of the crank handle. When in normal position the link effectively serves to prevent operation of the handle, as will be clear from Fig. 1, it being obvious that when it is desired to operate either shaft the particular link member may be manually elevated until the cross bar normally disposed against the depending portion of the crank

handle rests upon the horizontal portion of the particular shaft projected beyond the side bar. In this position the link will not interfere with the revolution of the shaft to any desired degree, but is always in position to be dropped over the handle portion and again secure the shaft against movement.

From the foregoing description it will be obvious that I have provided an extension ladder, which, through the medium of the wheeled frame, may be readily and conveniently transported from place to place, which may be conveniently and quickly adjusted to arrange the ladder as a whole at any desired inclination to the base frame, and the sections of which may be elevated to any extent within their extreme lengths.

In the use of the ladder it is to be understood that the end of the wheeled frame toward which the ladder is inclined will serve as a base support to prevent movement of the frame during the use of the ladder, said end resting upon the ground and being capable of being secured to any desired fixture.

Having thus described the invention what is claimed as new, is:—

1. An extension ladder comprising a base frame, a series of ladder sections mounted thereon, one of the sections having pivotal connections with the frame, an adjusting cable carried by one of said sections, and a semi-cylindrical guide secured to the frame and formed with a groove to receive the cable, said guide forming an arc of the circle of which the pivot point of the pivoted ladder section is the center.

2. An extension ladder comprising a base frame, a series of ladder sections mounted thereon, one of the sections having pivotal connection with the frame, an adjusting cable carried by one of said sections, and a semicylindrical guide secured to the frame and formed with a groove to receive the cable, the respective ends of the cable being secured to the respective ends of the guide, said guide forming an arc of the circle of which the pivot point of the pivoted ladder section is the center.

3. An extension ladder comprising a wheeled frame, a ladder section pivotally mounted on said frame, a shaft mounted in said section, a cable wound about the shaft and terminally projected in opposite directions therefrom, and a guide secured to the frame and receiving the projected portions of the cable, said shaft being supported for movement immediately above the guide and adapted in movement to travel in concentric relation with the guide, whereby operation of the shaft in either direction will wind the cable projecting in said direction and incline the ladder section.

4. An extension ladder comprising a wheeled frame, a ladder section pivotally mounted on said frame, a shaft mounted in said section, a cable wound about the shaft and terminally projected in opposite directions therefrom, and a guide secured to the frame and receiving the projected portions of the cable, the terminals of the cable being secured to opposing ends of the guide, said shaft being supported for movement immediately above the guide and adapted in movement to travel in concentric relation with the guide, whereby operation of the shaft in either direction will wind the cable projecting in said direction and incline the ladder section.

5. An extension ladder comprising a wheeled frame including an axle extending transversely of the frame, a series of ladder sections mounted on the frame, an elevating cable operatively connecting the sections, said cable passing longitudinally of the respective sections, cable receiving pulleys carried by one of the sections, and guard plates for said pulleys, the ends of said guard plates depending below the section to engage the axle when the sections are in lowered position.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. CAFLISCH.

Witnesses:

JOHN L. FLETCHER,

K. ALLEN.