B. B. BRIGGS.

FIRE APPARATUS.

APPLICATION FILED DEC. 7, 1908.

986,352.

Patented Mar. 7, 1911.

2 SHEETS—SHEET 1.

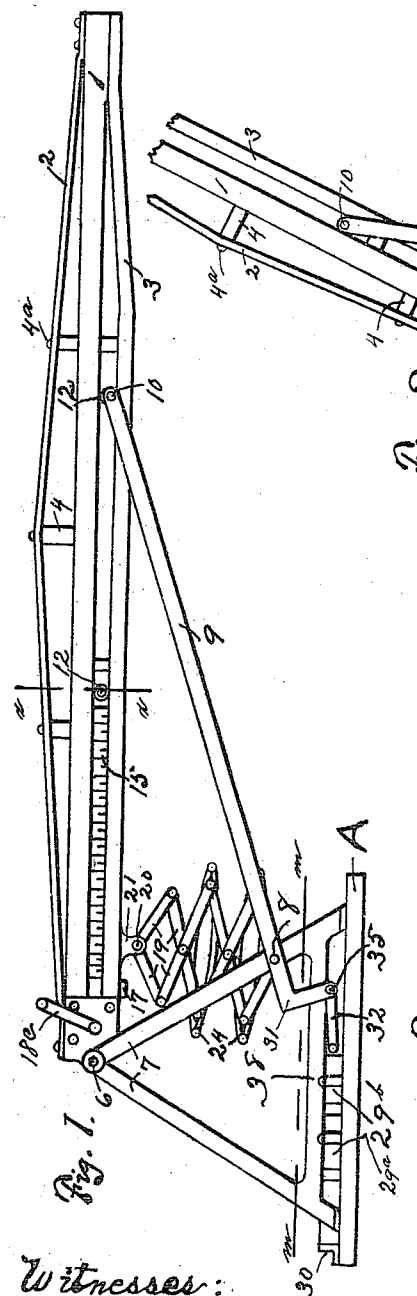

Fig. 1.

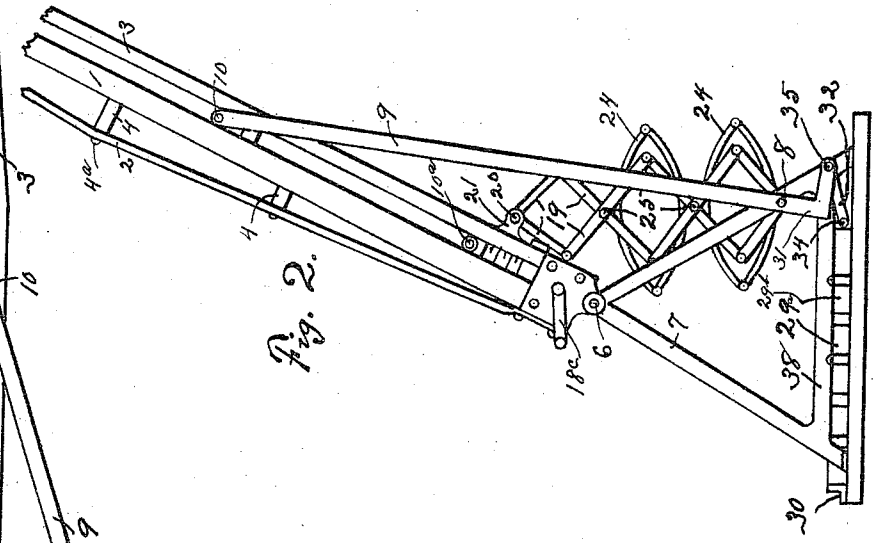

Fig. 2.

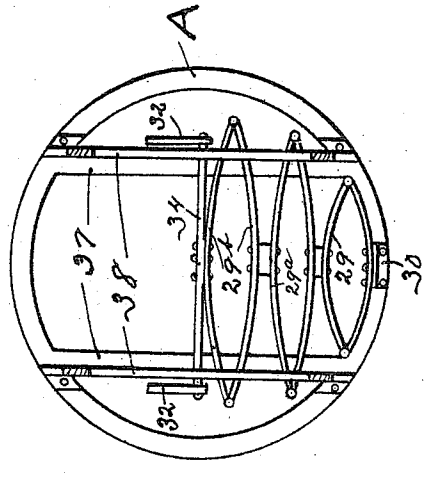

Fig. 3.

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2 SHEETS—SHEET 2.

Fig. 6.

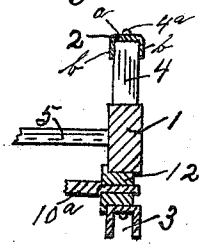


Fig. 5.

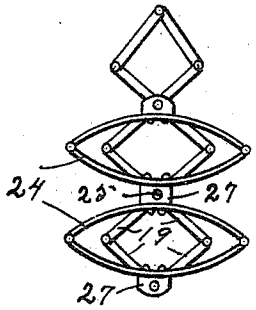
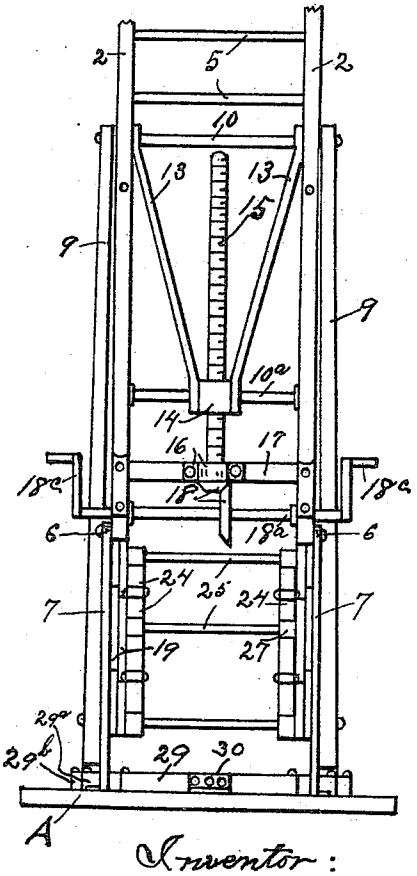


Fig. 4.



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UNITED STATES PATENT OFFICE.

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FIRE APPARATUS.

986,352. Specification of Letters Patent. Patented Mar. 7, 1911.

Application filed December 7, 1908. Serial No. 466,377.

To all whom it may concern:

Be it known that I, BURDETT B. BRIGGS, a citizen of the United States, and residing at Creston, in the county of Union and State of Iowa, have invented certain new and useful Improvements in Fire Apparatus; and the manner of carrying out the invention is set forth in the following full, clear, and exact description, terminating with claims particularly specifying the invention.

My invention relates to improvements in ladders and mechanism for operating the same, and the objects of the same are; to provide an improved screw mechanism for elevating the ladder; to provide an improved spring appliance for assisting the screw mechanism to elevate the ladder; to provide an improved metal truss bar for bracing the ladder.

To this end the invention consists in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, and as described and claimed with reference to the accompanying drawings which form part of this specification.

Figure 1 is a side elevation of my improved ladder and mechanism for elevating the same, and showing the ladder lowered. Fig. 2 is a side view of the ladder raised. Fig. 3 is a top view of Fig. 1 on the lines *m m* looking downward. Fig. 4 is a front view of the ladder raised. Fig. 5 is an inside view of one side of the crossed levers and raising springs. Fig. 6 is a cross section of one side of the ladder on the lines *x x* of Fig. 1.

Referring to the drawings similar characters of reference refer to similar parts throughout the drawings.

The sides of the ladder are each composed of a straight bar or leg 1, and a top or front truss bar 2, and a lower truss bar 3, both of the trusses are fastened at their ends to the ends of the leg 1, and several struts 4 interposed between the trusses and said leg and are secured together by bolts or rivets 4^a. The truss bar 2 is made or formed from sheet metal, and as seen in Fig. 6, the truss has a lateral flange *a*, and two vertical flanges *b b*; the vertical flanges *b b* project inward or toward the leg 1, and present a channel shape to the truss, and the ends of the struts 4 engage with the truss between said flanges, and which prevent the struts from turning. It will be manifest that by making this truss of this particular shape and from sheet metal, that the truss will be light, strong, and present no sharp edges coming directly in contact with a user of same, and at the same time much less liable to be sprung between the struts toward the leg 1. Rounds 5 connect the straight legs together in pairs, as is usual. The ladder is pivoted at its base end at 6, to the uprights 7 which are secured upon a support or turntable as is customary. A pair of levers 9 are pivoted at their base ends to the uprights 7 at 8, which is below and to the rear of the pivot 6 of the ladder. The free ends of the levers 9 are attached or pivoted to a cross-rod 10 and which is adapted to move between the legs 1 and truss bar 3, as seen in Figs. 1 and 2. Friction rollers 12 are mounted upon the cross-rod 10 and cross-rod 10^a which supports nut 14, as best shown in Fig. 6. A diverging or bifurcated draw-bar 13 is pivotally attached at its diverging ends to the cross-rod 10, or to the levers 9; a threaded nut or sleeve 14 is fastened to the converging end of the draw-bar 13, as seen in Fig. 4. A screw 15 is mounted at its base end in a bearing 16 attached to the cross-bar 17 on the base end of the ladder, the screw extends from the bearing 16 through the threaded sleeve 14, as seen in Fig. 4. The screw 15 is provided with bevel gears 18 arranged at its base end and attached onto the shaft 18^a mounted on the base end of the ladder, and operated with hand cranks 18^c attached onto the ends of the shaft 18^a, as seen in Fig. 4. It will be observed that when the screw 15 is actuated in one direction, through the mediation of the bevel gearing 18 operated by manual or other suitable power, that the free ends of the levers 9 will be drawn toward the base end of the ladder and thereby operate to raise the ladder, and by reversing the action of the screw, the ladder will be lowered.

To assist the elevating screw to raise the ladder I provide an improved spring appliance, composed of a system of crossed levers 19 termed (lazy-tongs), and pivoted together at their ends and crossing point as is usual with lazy-tong construction. The crossed levers are pivoted at one extremity to the support or uprights 7 at 8 and on the inner side of said uprights, and at another extremity to the ladder at 20 to the bracket 21 attached to the ladder, as seen in Fig. 1. There is a set of these crossed levers ar-

ranged on opposite sides of the ladder; springs 24 of an elliptic shape are mounted on the cross-rods 25 forming the pivot of the levers where they cross, and also connecting the springs and crossed levers together in pairs, the blocks 27 are attached onto the springs in a suitable manner and form a connection between each set of springs, and also secure the springs to the cross-rods 25, as seen in Figs. 2, 4 and 5. I have shown two elliptic springs used with each side or set of crossed levers, one spring being mounted upon the other at their centers or point of compression, and as seen in Fig. 1, when the ladder is lowered, the crossed levers will be folded and the springs 24 will be compressed, thereby exerting a raising pressure on the ladder, as the springs will operate to distend the crossed levers as seen in Fig. 2. To further assist the screw to elevate the ladder I employ a series of elliptic springs 29, 29^a and 29^b, attached together at point of compression and forming a triple elliptic spring as seen in Fig. 3, these springs are arranged to actuate horizontally, and are attached at one point to the support with a suitable bracket 30 attached to the support and to spring 29, as seen in Fig. 3. These springs do not have the lazy-tong attachments, as the springs form a system of lazy-tongs within themselves, but are provided with guide bars 37 formed on the support below the springs, and guide bars 38 formed on the uprights 7 above the springs and which would prevent the springs from buckling. A cross-bar 34 is attached onto the free spring 29^b, and links 32 are pivoted at one end to the ends of bar 34 and at their other ends to an angled base projection 31 on the base ends of levers 9 as at 35.

It will be observed in Fig. 1, that when the ladder is lowered the levers 9 will compress these horizontal springs, and that the springs will exert a raising pressure on the levers 9, and the ladder thereby will also be raised as shown in Figs. 2 and 3. I have graduated the length of the horizontal acting springs, 29 being the shortest which works free between the uprights 7, and 29^a being an intermediate length between the short spring 29 and the longest spring 29^b, making a sensitive and powerful combination. These spring appliances give a greater power, and are more durable and elastic than raising springs made from coiled wire or heavy coil springs, and do not require a complicated housing as does the coil springs to exclude ice and mud, and while I have shown the springs made single leaf, it is clear that the same could be composed of a plurality of flat leaves or plates, without departing from the spirit of my invention, also that the form of construction and arrangement might be changed or modified to meet the demands of other structures in this class of apparatus.

It is clear that by mounting the base end of the elevating screw in a bearing fastened on the base end of the ladder, that the ladder forms the swivel, or universal joint and a stronger and simpler method of construction is obtained than heretofore.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. The combination with a support, a ladder pivoted thereon, links pivoted at one end to said support at points remote from the pivot of the ladder, and the free ends of the links attached to a cross-rod movable on the ladder, a threaded sleeve connected to said cross-rod, a screw mounted on the base end of the ladder and engaging said sleeve, for the purpose set forth.

2. A support, a ladder pivoted thereon, links pivoted at one point to the support which is below the pivot of the ladder, a cross-rod attached to the free ends of said links and movable on the ladder, a threaded sleeve attached to said cross-rod, an elevating screw mounted in a bearing located at a point above the pivoted end of said links and engaging said sleeve, said screw arranged in line with said cross-rod.

3. A support, a ladder pivoted thereon, links pivoted to the support at points remote from the pivot of the ladder, and the free ends of the links movable on the ladder, a bifurcated draw-bar connected by its diverged ends to the movable ends of said links, an elevating screw mounted in a bearing on the base end of the ladder, a threaded sleeve on the converged end of said draw-bar and engaging with said screw for elevating the ladder, said screw and draw-bar arranged parallel with the ladder.

4. A support, a pair of links pivoted at their base ends thereto, a ladder pivoted at another point to the support, and the free ends of said links, movable on the ladder, a bifurcated draw-bar arranged parallel with the ladder and connected by its diverged end to the free ends of said links, and means attached to the converged ends of said draw-bar adapted for elevating the ladder.

5. The combination with a support, a ladder pivoted thereon, mechanism to elevate the ladder, and a spring attached at one point to the support and pivoted at another point to the ladder at points which are to the rear of the pivot of the ladder, and adapting the spring to actuate upward and forward to elevate the ladder.

6. A support, a ladder pivoted thereon, springs adapted for raising the ladder, said springs composed of longitudinal curved bars, and joined together in pairs and horizontally with the ladder when lowered,

means fixing the springs to the support, and means attaching the springs onto the ladder, for the purpose set forth.

7. A support, a ladder pivoted thereon, a spring pivotally attached to the support at a point remote from, but to the rear of the pivot of the ladder, said spring pivotally attached at another extremity to the ladder at a point which is to the rear of the pivot of the ladder, when the ladder is lowered, said spring actuating upward to elevate the ladder.

8. A support, a ladder pivoted thereon, springs mounted upon the support and adapted for raising the ladder, said springs composed of longitudinal curved bars joined together in pairs and arranged parallel with the ladder when lowered, means attaching the springs to the support, and means pivotally connecting the springs to the ladder, all for the purpose set forth.

In testimony whereof I have hereunto subscribed my name to this specification at Creston, in the county of Union and State of Iowa, this 5th day of December 1908, in the presence of two subscribing witnesses.

BURDETT B. BRIGGS.

Witnesses:
SILAS W. GOULDIN,
JAMES L. HAVERICK.