May 11, 1943. S. S. KARNS 2,319,136

GARAGE DOOR OPERATOR

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Fig. 1.

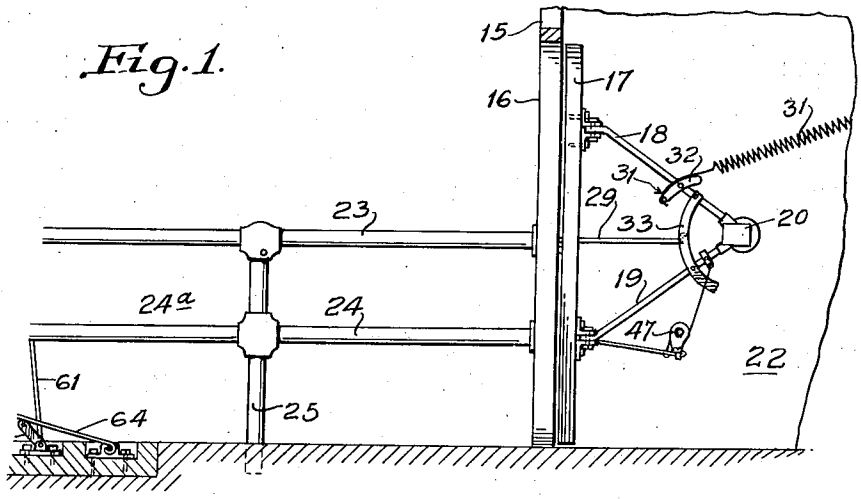


Fig. 2.

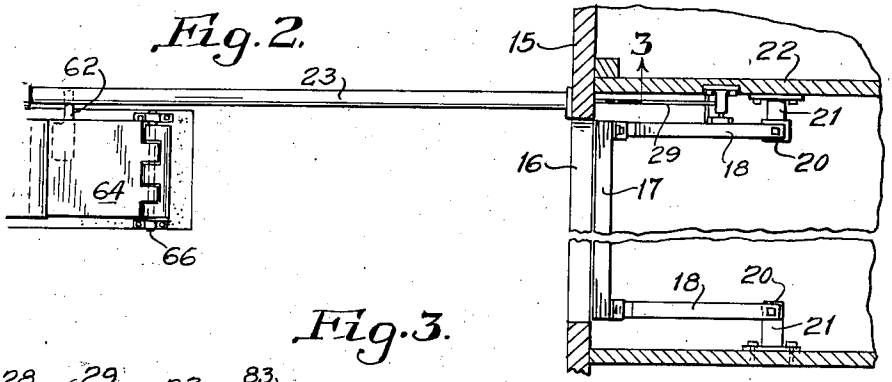
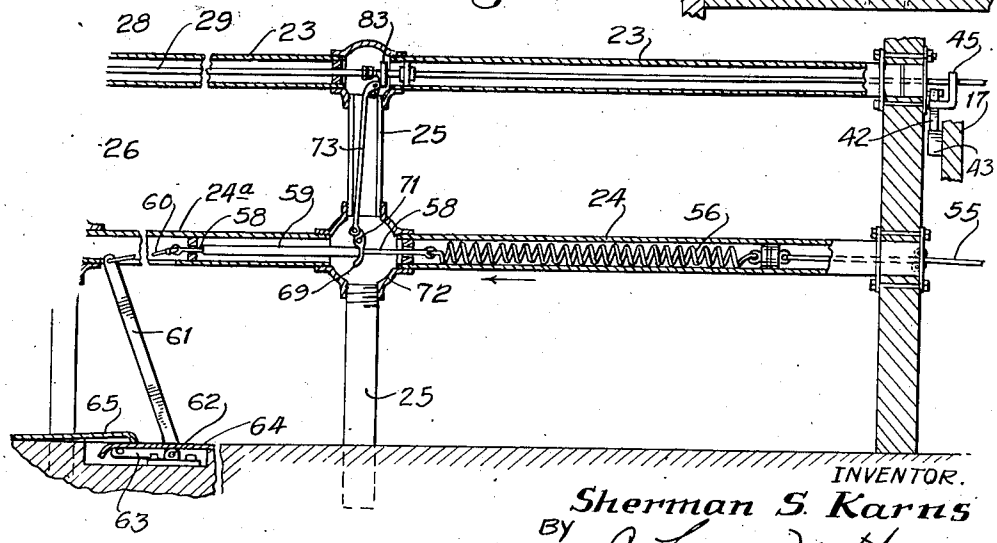


Fig. 3.



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Fig. 4.

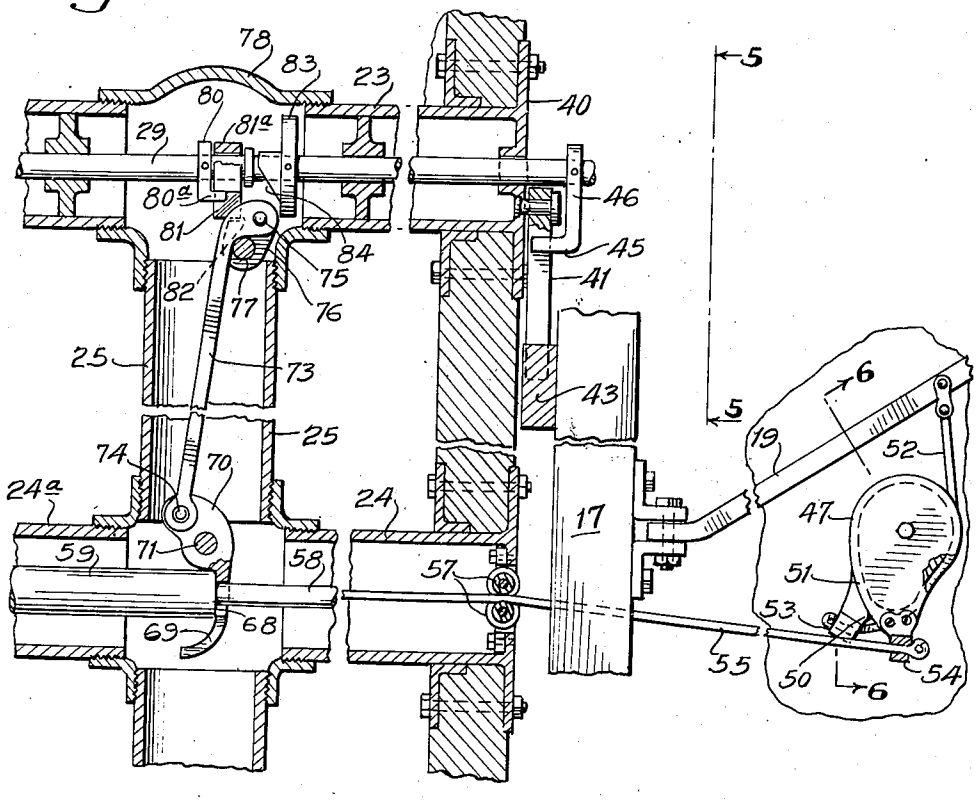


Fig. 5.

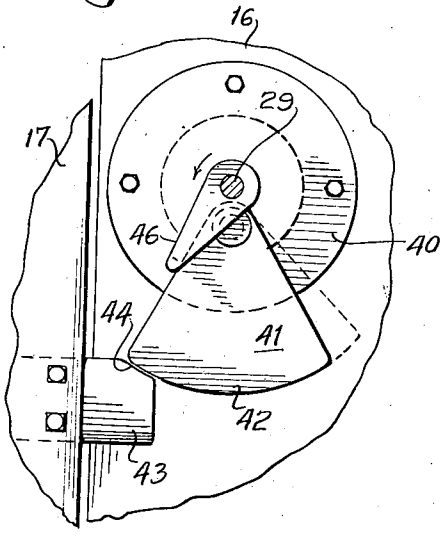
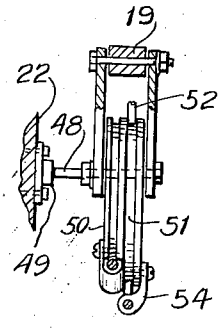


Fig. 6.



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Fig. 8.

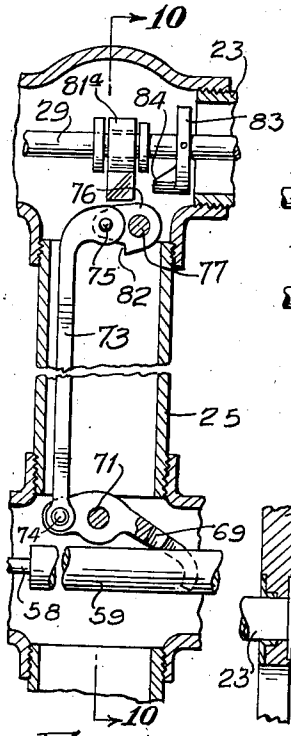


Fig. 7.

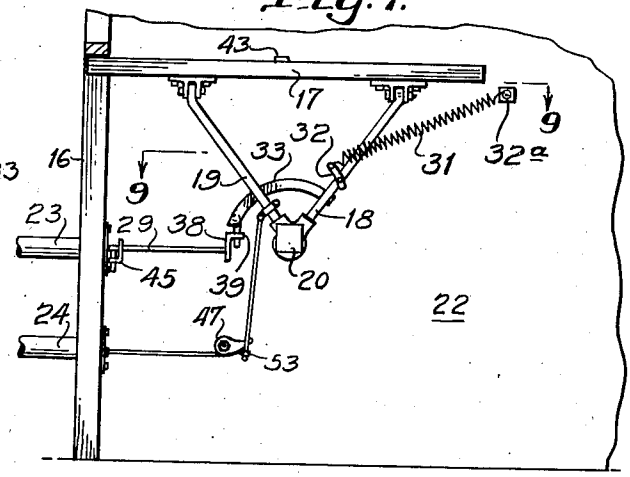


Fig. 9.

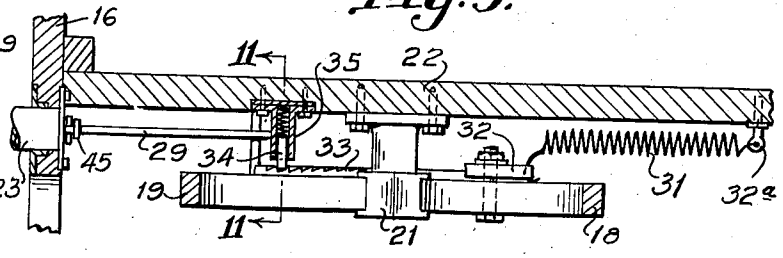


Fig. 10.

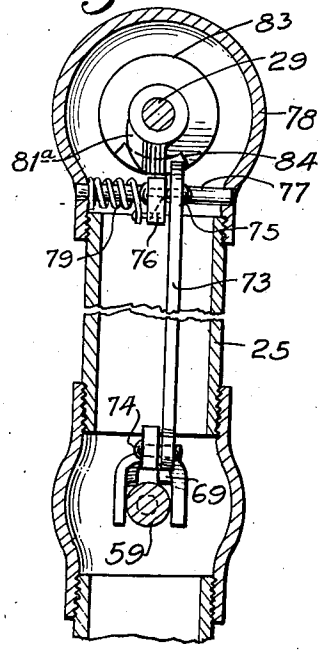


Fig. 11

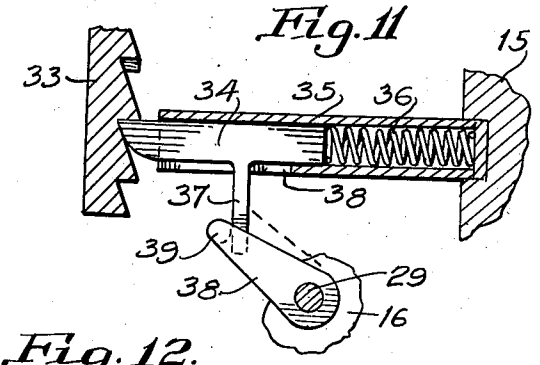
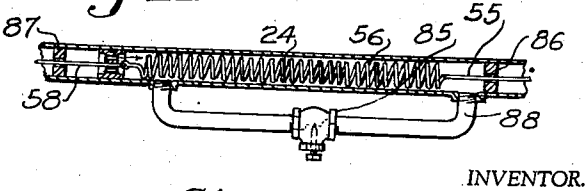


Fig. 12.



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UNITED STATES PATENT OFFICE

2,319,136

GARAGE DOOR OPERATOR

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Application August 7, 1940, Serial No. 351,745

4 Claims. (Cl. 268—37)

This invention relates to door opening mechanisms, and more especially to means for actuating garage doors in conjunction with the movement of a motor vehicle.

An object of the invention is to provide a simple, practical and efficient operator for garage doors and the like as described.

Another object of the invention is to provide a garage door operator powered by the movement of a motor vehicle.

A further object of the invention is to provide a garage door operator as described, having improved locking and safety features.

An additional object is to provide a garage door operator which may be controlled from a point within the reach of the motor vehicle driver without necessitating his leaving the driver's seat.

Other objects and advantages will appear and be brought out more fully in the following specification, reference being had to the accompanying drawings, wherein

Fig. 1 is an elevation view showing a garage door and doorway and the actuating mechanism comprising my invention.

Fig. 2 is a plan view of the same.

Fig. 3 is an enlarged view, in section, showing parts shown in Fig. 1.

Fig. 4 is an enlarged elevation view, in section, of parts also shown in Figs. 1, 2, and 3.

Fig. 5 is an enlarged fragmentary view as seen from the line 5—5 of Fig. 4.

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 4.

Fig. 7 is an elevation view of the door in open position.

Fig. 8 is a fragmentary sectional view of the holding mechanism, also seen in Fig. 4.

Fig. 9 is a sectional view taken along the line of 9—9 of Fig. 7.

Fig. 10 is a sectional view taken along the line 10—10 of Fig. 8.

Fig. 11 is an enlarged sectional view taken along the line 11—11 of Fig. 9, and

Fig. 12 is a view showing an optional spring control.

Referring more particularly to the drawings, I show a garage having a front wall 15 and doorway 16, and a door 17 having brackets 18 and 19 secured to a base plate 20 having a bearing flange 21 secured to a side wall 22 of the garage building. Similar brackets and bearings are secured to the door and opposite side wall of the building structure for the pivotal opening of the door overhead in the well known manner. A plurality of pipes 23, 24, 25, 26 and 24a are secured together as shown and to wall 15 adjacent doorway 16. Pipes 23 and 26 are connected to an elbow 27 in which may be located a suitable lock 28 for a control rod 29 which extends through sections of pipe 23 and to which is connected an operating lever or handle 30.

A tension spring 31 is secured to a suitable fixture 32a on wall 22 and to the end of a cam member 32 secured to bracket 18 as clearly seen in Figs. 1 and 7. An arcuate ratchet member 33 is secured to brackets 18 and 19 and a locking dog or plunger 34 for engagement therewith is reciprocably mounted in a cylinder 35 secured to wall 22 and containing a spring 36 for biasing dog 34 against ratchet 33. Dog 34 is provided with a lug 37 which extends through a slot 38 in cylinder 35, and a crank arm 38 is secured to the end of rod 29 and has a finger 39 adapted for engagement with lug 37 so as to retract dog 34 when rod 29 is turned by handle 30. A flange 40 is mounted on the inner side of wall 15 and provides a pivot mounting for a weighted member 41 which has an arcuate surface 42 adjacent an extension member 43 secured to door 17, member 43 having an arcuate abutment surface 44 adapted for engagement with surface 42 to lock the door until released by the movement of weighted member 41 by a finger 45 on a crank 46 secured to rod 29. A cam member 47 is mounted on a shaft 48, a suitable bearing 49 for the shaft being provided on wall 22. Cam member 47 is provided with grooved cam surfaces 50 and 51, and a cable 52 is connected to bracket 19 and a suitable lug 53 at the end of cam surface 50. A lug 54 at the end of cam surface 51 secures one end of cable 55, the other end of which is secured to a tension spring 56 in pipe 24, suitable upper and lower guide rollers 57 being provided at the end of pipe 24 where a certain amount of flexing of cable 55 will occur. The other end of spring 56 is connected to the end of a rod 58, the latter having an enlarged diametrical portion 59, and a cable 60 is secured to the other end of rod 58 and to the upper end of a lever arm 61, a suitable slot 62 being provided in the lower portion of pipe 24a for the end of arm 61 and cable 60. Arm 61 is provided with a pivot 62 and a cam arm 63 is secured to pivot 62. A pair of plates 64 and 65 are pivoted at 66 and 67, respectively, and are positioned in the driveway so as to be run over by the wheel of a motor vehicle. The end of rod

portion 59 forms a radial abutment surface 68 for engagement with a bifurcated portion 69 of a lever arm 70 pivoted at 71 in the X-fitting joining pipes 24, 24a and 25. A link 73 is pivoted at 74 to arm 70 and pivoted at 75 to a crank 76 pivoted at 77 in a T-fitting 78 which connects pipes 23 and 25. A spring 79 is mounted on pivot 77 and connected between fitting 78 and crank 76 so as to normally turn the crank to the right as seen in Fig. 4, and hold link 73 and lever arm 70 in the position shown in Fig. 4 and lock rod portion 59 in engagement with bifurcated portion 69.

A collar 80 is secured to rod 29 and is provided with a finger 80a which is adapted to engage a cam surfaced finger 81 of a collar 81a loose on rod 29. Finger 81 is adapted to engage an abutment 82 formed in a notch in crank 76 so as to lock crank 76 and link 73 and lever arm 70 in the position of Fig. 4 until it is desired to actuate the same as will be more fully apparent hereinafter. A collar 83 is secured on shaft 29 and is provided with a cam surface 84 which engages crank 76 when rod 29 is turned, and turns crank 76 over the dead center of pivot 77, whereupon link 73 will be pulled down by the pivoting of arm 70 as rod section 59 moves to the right.

In Fig. 12 I show an optional feature providing a dash pot operation for the door. The inter-connection of spring 56 and cable 55 is a piston 85. Fluid-sealed collars 86 and 87 are provided in pipe 24 for cable 55 and rod section 58, and a pipe 88 having an adjustable needle valve 89 is connected to two points of pipe 24 between collars 86 and 87. Pipes 24 and 88 are filled with oil or other fluid and movement of piston 85 will be regulated by the flow of the oil and controlled by valve 89.

The operation of the invention should be clear from the foregoing description. Door 17 will be actuated to the open position by spring 31 and will be actuated to the closed position by spring 56 which will be stronger than spring 31. Spring 56 is loaded or put under tension by the movement of arm 61 when actuated by cam arm 63 when the motor vehicle wheel passes over plates 64 and 65. This action moves rod section 59 to the left and permits spring 79 to turn crank 76 which lifts link 73 and turns lever arm 70 which locks rod section 59 since finger 81 drops behind abutment 82 on crank 76. Assume the door is open and held by engagement of dog 34 and ratchet 33. Lever 30 is turned to the left or rearwardly as seen in Fig. 1, and this action will cause crank arm 38 to engage lug 37 and release dog 34 from ratchet 33, and spring 56 which is now loaded will pull the door down and load spring 31. Inspection of cams 32, 50 and 51 will show that the maximum force will at all times be applied because of the shifting position of the cables from pivot center 48 and the point of attachment of cam 32 on bracket 18. During this initial movement when the tension of spring 56 is maximum the distance from cable 55 to pivot axis 48 is minimum, and the distance of cable 52 thereto is maximum. Also the lever arm of cam 32 is maximum during the initial portion of said movement, and minimum at the latter portion when spring tension 56 is minimum.

The door is opened by a turning handle 30 to the right or forwardly as seen in Figs. 1 and 3, and this movement rocks crank 76 over and releases rod section 59 from bifurcated portion 69 of arm 70 and releases spring 56 from tension, and spring 31 which has been loaded as described, now raises door 17 and draws spring 56 to the right in pipe 24. The movement of handle 30 to the right as just mentioned, causes crank 46 to swing weight 41 away from extension member 43 which has previously locked the door in closed position, and permits it to be now raised.

Having described my invention what I claim is:

1. Door actuating mechanism as described comprising spring means adapted to open said door, spring means adapted to close said door and energize said first spring means, means adapted to be actuated by the movement of a motor vehicle to energize said second spring means, locking means for said second spring means when in energized condition, locking means for said door in open and closed position, and manually actuated control means adapted to release said door locking means whereby said second spring means will close said door, said control means adapted to release said second spring means and said door locking means whereby said first spring means will open said door.

2. Door actuating means as described comprising a pivoted bracket for the door, a door opening spring connected to said bracket, a door closing spring, a double surface cam, a cable connected between said bracket and one of the cam surfaces, a cable connected to said second spring and the other surface of said cam, motor vehicle actuated means to energize said second spring, and locking and control means for said second spring.

3. Door actuating mechanism as described comprising a pivoted bracket for the door, a cam secured to said bracket, a door opening spring having an end passing over said cam and connected thereto, a door closing spring, a double surface cam, a cable connected to said second spring and to a surface of said second cam, a cable connected to said bracket and to the other surface of said second cam, a lever connected to said door closing spring, means adapted to be actuated by a motor vehicle wheel and connected to said lever to energize said second spring, and locking and control means for said second spring and said bracket.

4. Door actuating mechanism as described comprising a pivoted bracket for the door, a door opening spring connected to said bracket, a door closing spring connected to said bracket, a lever connected to said second spring, a motor vehicle wheel actuated plate adapted to actuate said lever whereby to energize said spring, and locking and control means for said bracket and second spring, said means including a rotatable rod, a toggle link positioned between said rod and said second spring, and a cam on said rod adapted to actuate said toggle link.

SHERMAN S. KARNS.