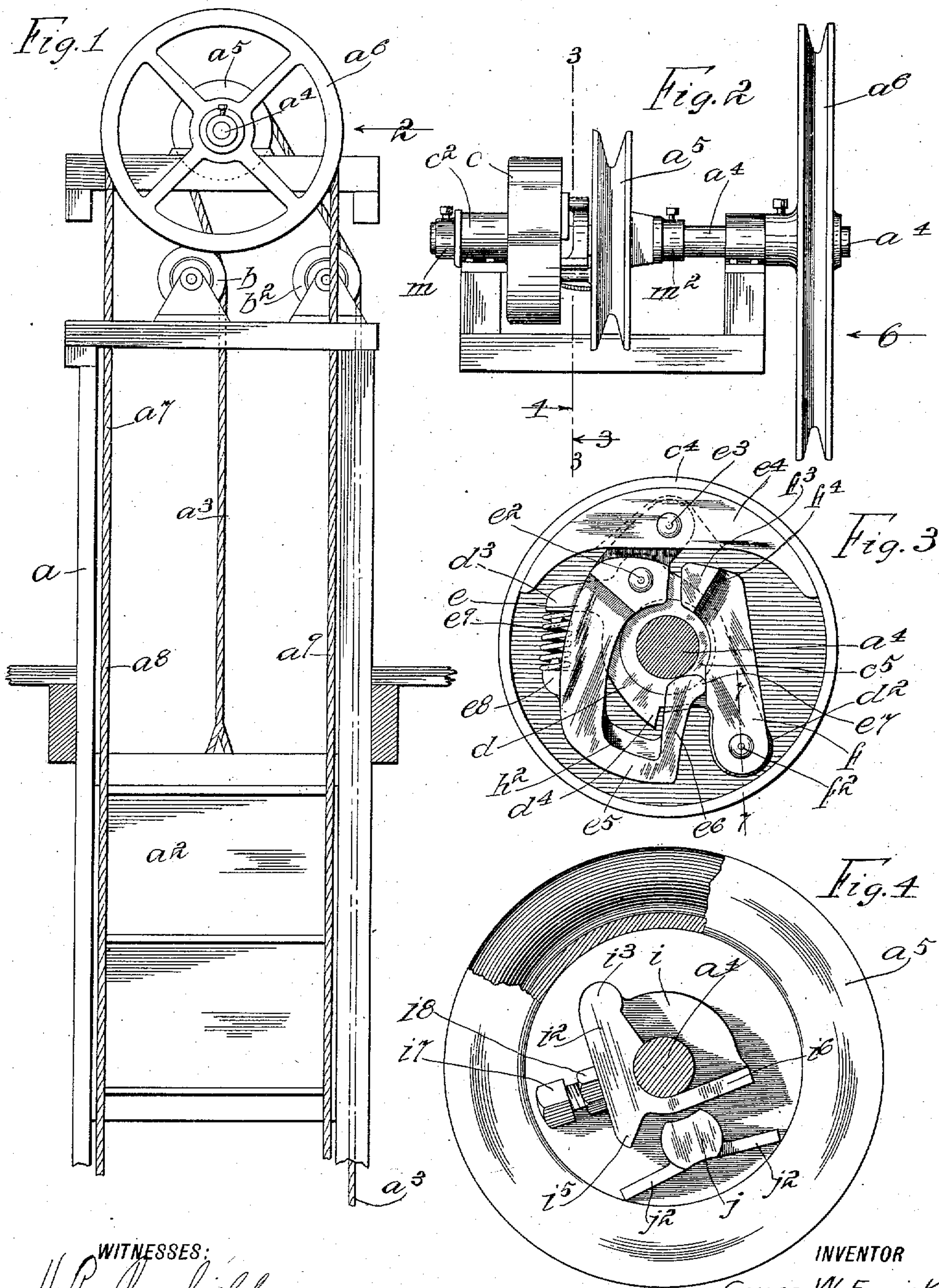


965,997.

Patented Aug. 2, 1910.

28 SHEETS—SHEET 1.



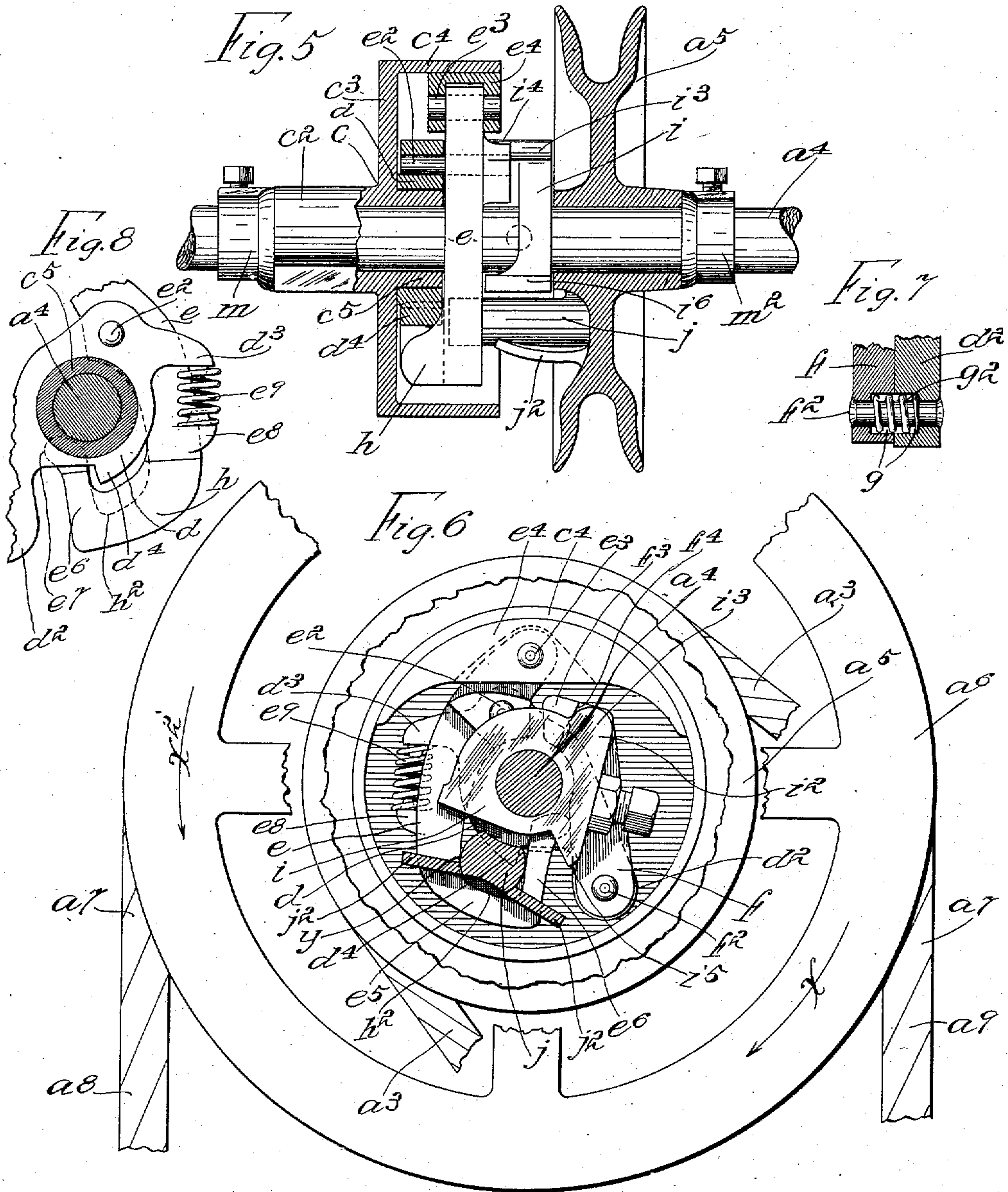
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Patented Aug. 2, 1910.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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DUMB-WAITER APPARATUS.

965,997.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed September 18, 1909. Serial No. 518,321.

To all whom it may concern:

Be it known that I, GEORGE W. EMRICK, a citizen of the United States, and residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Dumb-Waiter Apparatus, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to dumb waiter apparatus involving a power shaft, a load wheel mounted loosely thereon, a hand or pull wheel also mounted on said shaft and secured thereto, an endless hand rope mounted on said hand or pull wheel and by means of which the dumb waiter is operated and the shaft turned in one direction to raise the load and in the opposite direction to lower the load, and a novel clutch and brake mechanism connected partly with a stationary support and partly with said shaft and said load wheel; and the object of the invention is to provide an improved clutch and brake mechanism for apparatus of this class which will be operated by the weight of the load to hold the load stationary when the movement of the hand or pull wheel ceases and by means of which and the hand rope the shaft may be turned in one direction to raise the load and in the opposite direction to lower the load, by simply pulling on said hand rope or the opposite depending parts thereof, the term load as here used meaning either the lift or car itself which carries the load, or said lift or car with the load thereon.

The invention is fully disclosed in the following specification of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views and in which:—

Figure 1. is a side elevation of a dumb waiter apparatus involving my invention. Fig. 2. a view at right angles to that shown in Fig. 1 or in the direction of the arrow 2 of Fig. 1 and showing only the operative mechanism at the top of the elevator shaft. Fig. 3. a partial section on the line 3—3 of Fig. 2 and looking in the direction of the arrow 3. Fig. 4. a sectional view on the same line as Fig. 3 but looking in the direction of the arrow 4. Fig. 5. a side elevation of the power shaft, load wheel and

clutch mechanism partly in section and in a position similar to that of Fig. 2. Fig. 6. a side view looking in the direction of the arrow 6 of Fig. 2 and showing the end of the power shaft, the hand or pull wheel, the load wheel and the clutch mechanism, the central part of said wheels being broken out and the shaft and the part of the clutch mechanism being shown in section. Fig. 7. a sectional detail of a part of the clutch mechanism taken on the line 7—7 of Fig. 3, and Fig. 8. a sectional view of the power shaft and a detail side view of a part of the clutch mechanism.

In the accompanying drawing I have shown at a in Fig. 1 an ordinary dumb waiter shaft in which is mounted a vertical movable lift or car a^2 with which is connected an operating rope a^3 , and at the top of the shaft a is mounted, in the usual manner, a power or operating shaft a^4 provided with a load wheel a^5 and a hand or pull wheel a^6 . The wheel a^6 is secured to the shaft a^4 , and mounted thereon in the usual manner, is an endless hand rope a^7 which depends within and through the elevator shaft a and may be operated from any floor of the building in which the apparatus is placed in the usual manner. The rope a^3 which suspends the car lift a^2 is passed over a central pulley b at the top portion of the elevator shaft and below the support of the shaft a^4 and around the power wheel a^5 which is loosely mounted on the shaft a^4 and then down and around another pulley b^2 from which it passes downwardly through one side of the shaft a and said rope is connected, in practice, with a counter-balance weight in the usual manner; but said counter-balance weight forms no part in this invention and is not shown and described.

In the practice of my invention I mount on the end portion of the shaft a^4 opposite the hand or pull wheel a^6 , a brake and clutch casing c which is secured to the supports of the shaft a^4 in any desired manner in which said shaft is free to rotate, and comprising a hub member c^2 and an annular web c^3 and an annular rim c^4 forming a circular casing which opens in the direction of the load wheel a^5 and the hub member c^2 is provided with a central inwardly directed sleeve c^5 which extends approximately half way through the annular rim c^4 and on which is mounted a rotatable plate d having an

arm d^2 which projects, when the parts are in the position shown in Fig. 3, downwardly and to the right, a nose d^3 which projects, when the parts are in the position shown in Fig. 3 to the left and a tooth d^4 between the arm d^2 and the nose d^3 .

Pivoted to the plate d and above the shaft a^4 , when the parts are in the position shown in Fig. 3 is a brake arm e , this pivotal connection being shown at e^2 and pivoted to the upper and shorter end of the brake arm e as shown at e^3 is a brake shoe e^4 the length of which, in the form of construction shown is approximately one-third of the circumference of the rim c^4 . The longer end of the arm e extends downwardly below the shaft a^4 and is provided with an angular extension e^5 which passes under said shaft in the position of the parts shown in Fig. 3 and is provided with an upwardly directed member e^6 having a nose e^7 which bears on a lever f pivoted to the arm d^2 of the plate d at f^2 and which extends upwardly above the shaft d^4 and the upper end portion of which is provided with an inwardly directed head f^3 having a radial shoulder f^4 . The brake arm e is provided with a nose e^8 which corresponds with the nose d^3 on the plate d and between said noses is placed a spring e^9 . The arm d^2 of the plate d and the lever f are preferably provided at their pivotal connection at f^2 with corresponding recesses or chambers g in which is placed a spiral spring g^2 which serves to hold the lever f in proper operative position and to prevent said lever from swinging free and knocking against the shoe e^4 , and the nose e^7 of the extension e^6 of the arm e .

The laterally directed extension e^5 of the brake arm e is provided at the back thereof with a reinforcing rib h in which and in the bottom of said arm is formed a groove or recess h^2 and the front end of said rib is provided with a nose in connection with which the tooth d^4 of the plate d operates as clearly shown in Figs. 5 and 8; and in Fig. 5 the tooth d^4 of the plate d is shown in section and the end of the nose e^7 is shown in dotted lines.

The length of the brake shoe e^4 , in the form of construction shown is approximately one-third of the circumference of the rim c^4 of the brake and clutch casing c and said brake shoe is provided with an arc-shaped surface which corresponds with the inner surface of said rim; and the hereinbefore described construction constitutes all that part of my improved brake and clutch mechanism situated in and connected with the said brake and clutch casing and rotatable with the shaft a^4 .

Mounted on the shaft a^4 between the load wheel a^5 and the brake and clutch casing c and mechanism contained therein, and secured to said shaft by a set screw i^7 and lock

nut i^8 is a plate i provided at one side with a thickened member i^2 having at one end a head i^3 provided with a laterally directed extension i^4 which extends into the brake and clutch casing c and operates in connection with the shoulder f^4 of the head f^3 of the lever f , and the opposite end of the thickened member i^2 of the plate i is provided with a reinforcing rib or flange i^6 which extends at right angles to the thickened part or side i^2 of the plate i thereof.

Connected integrally with the load wheel a^5 and at one side of the hub thereof is a stud j preferably provided with reinforcing side wings j^2 formed integrally therewith and with the web of the wheel a^5 and the stud j extends into the brake and clutch casing c and into the U-shaped lower end portion of the brake arm e formed by the lower end portion of said arm, the laterally directed extension e^5 , and the upwardly directed member e^6 of said extension and the end of this stud operates in the recess h^2 in the lower end portion of said arm and in the back rib h thereof in the manner and for the purpose hereinafter described; and the stud j , is shown in full lines in Figs. 2, 4 and 5 and in section in Fig. 6.

In Fig. 3 of the accompanying drawing all the parts of the brake and clutch mechanism located in the brake and clutch casing c are shown in their normal position or that position which they occupy when the apparatus is at rest and the load suspended from the load wheel a^5 , and in Fig. 6 all the parts of the brake and clutch mechanism including the intermediate plate i secured to the shaft a^4 and the stud j connected with the load wheel a^5 are shown in their normal position or that in which the apparatus is at rest with the load suspended on the wheel a^5 and the operation will be readily understood from the foregoing description in view of the accompanying drawing and the following statement thereof.

With the various parts of the apparatus in the position shown in Figs. 4 and 6, the parts of the clutch mechanism and the brake apparatus or device including the spring e^9 are in operation and the shaft load wheel is held stationary. If now it is desired to raise the load the hand wheel a^6 the shaft a^4 and the part or plate i secured to the shaft a^4 must be turned in the direction of the arrow x and a slight pull on the part a^9 of the rope a^7 will accomplish this result. In this operation, and at the end of a slight movement of the wheel a^6 and shaft a^4 , the nose i^5 of the plate i is turned into engagement with the stud j on the wheel a^5 and as the pull on the part a^9 of the rope a^7 continues, the said stud j presses against the lower end portion of the arm e at a point marked y in Fig. 6, and the said lower end portion of said arm is given a very slight outward

movement which results in a corresponding slight downward movement of the brake shoe e^4 which releases the pressure of said shoe on the rim c^4 of the clutch and brake casing c and the entire clutch and brake mechanism is free to turn in said casing with the shaft a^4 , load wheel a^5 and hand or pull wheel a^6 as long as the pull on the part a^9 of the rope a^7 continues, and the car or car and its load may thus be raised to any desired point. As soon, however, as the pull on the part a^9 of the rope a^7 is discontinued the parts of the brake and clutch mechanism will be automatically thrown into the position shown in Fig. 3, and the car with its load will be held stationary. If it is desired to lower the car and its load or the car alone a pull is exerted on the part a^8 of the rope a^7 and this turns the shaft a^4 and the wheel a^6 in the direction of the arrow x^2 of Fig. 6. This operation turns the plate i until the head i^3 or the outwardly directed extension of said head strikes the shoulder f^4 of the head f^3 of the lever f . This operation causes the lever f to press against the nose e^7 of the upwardly directed member e^6 of the lower end portion of the arm e and forces said lower end portion of said arm outwardly to a very slight extent and also by reason of its pivotal connection at f^2 , turns the plate d in the direction of the arrow x^2 ; and this operation releases the pressure of the brake shoe e^4 on the rim c^4 of the brake and clutch casing c exactly in the manner as hereinbefore described when said arm is operated by the stud j on the pull wheel, and the wheel a^6 , the shaft a^4 , the wheel a^5 and the clutch and brake mechanism inside of the casing c will be free to rotate as long as the pull is exerted on the part a^8 of the rope a^7 .

In both of the above described operations the tooth d^4 of the plate d operates in connection with the nose h^2 of the bottom portion of the arm e to regulate the movement of said arm or to prevent too great a movement thereof, it being apparent that whether said arm is operated by the stud j or by the lever f the extent of the movement of said arm will be limited by the stud d^4 and the nose h^2 .

As shown in Figs. 2 and 5 the load wheel a^5 , the clutch casing c and intermediate plate i and shaft a^4 are maintained in their relative positions by means of two collars m and m^2 secured to the shaft a^4 by set screws.

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

1. In an apparatus of the class described,

a support, a casing secured thereto, a shaft passing through said casing and rotatable therein, said shaft being provided with a pull wheel, a load wheel loosely mounted on said shaft between said pull wheel and said casing, said casing being also provided with an annular flange or rim which opens in the direction of said load wheel, and with a sleeve which extends in the direction of said load wheel, and clutch and brake devices mounted loosely in said casing and on said sleeve, comprising a plate through which said shaft passes, an arm pivoted to one side of said plate and provided with shorter and longer ends, a brake shoe pivoted to the shorter end of said arm, the longer end of said arm being provided with a lateral and inwardly directed extension, said arm and said plate being also provided with projections between which is placed a spiral spring, and a lever pivoted to said plate opposite to the connection of said arm therewith, and devices connected with the load wheel and with the shaft between the load wheel and said casing for operating said clutch and brake devices when the pull wheel is turned in either direction.

2. In an apparatus of the class described, a support, a casing secured thereto, a shaft passing through said casing and rotatable therein, said shaft being provided with a pull wheel, a load wheel loosely mounted on said shaft between said pull wheel and said casing, said casing being also provided with an annular flange or rim which opens in the direction of said load wheel, and clutch and brake devices mounted loosely in said casing, comprising a plate through which said shaft passes, an arm pivoted to one side of said plate and provided with shorter and longer ends, a brake shoe pivoted to the shorter end of said arm, the longer end of said arm being provided with a lateral and inwardly directed extension, said arm and said plate being also provided with projections between which is placed a spiral spring, a lever pivoted to said plate opposite to the connection of said arm therewith, and devices connected with the load wheel and with the shaft between the load wheel and said casing for operating said clutch and brake devices when the pull wheel is turned in either direction.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 15th day of September 1909.

GEORGE W. EMRICK.

Witnesses:

H. R. CANFIELD,
C. E. MULREANY.