No. 799,388. PATENTED SEPT. 12, 1905.

F. S. KEYES.

TRANSMITTING MECHANISM.

APPLICATION FILED MAR. 29, 1905.

3 SHEETS—SHEET 1.

Fig. 1.

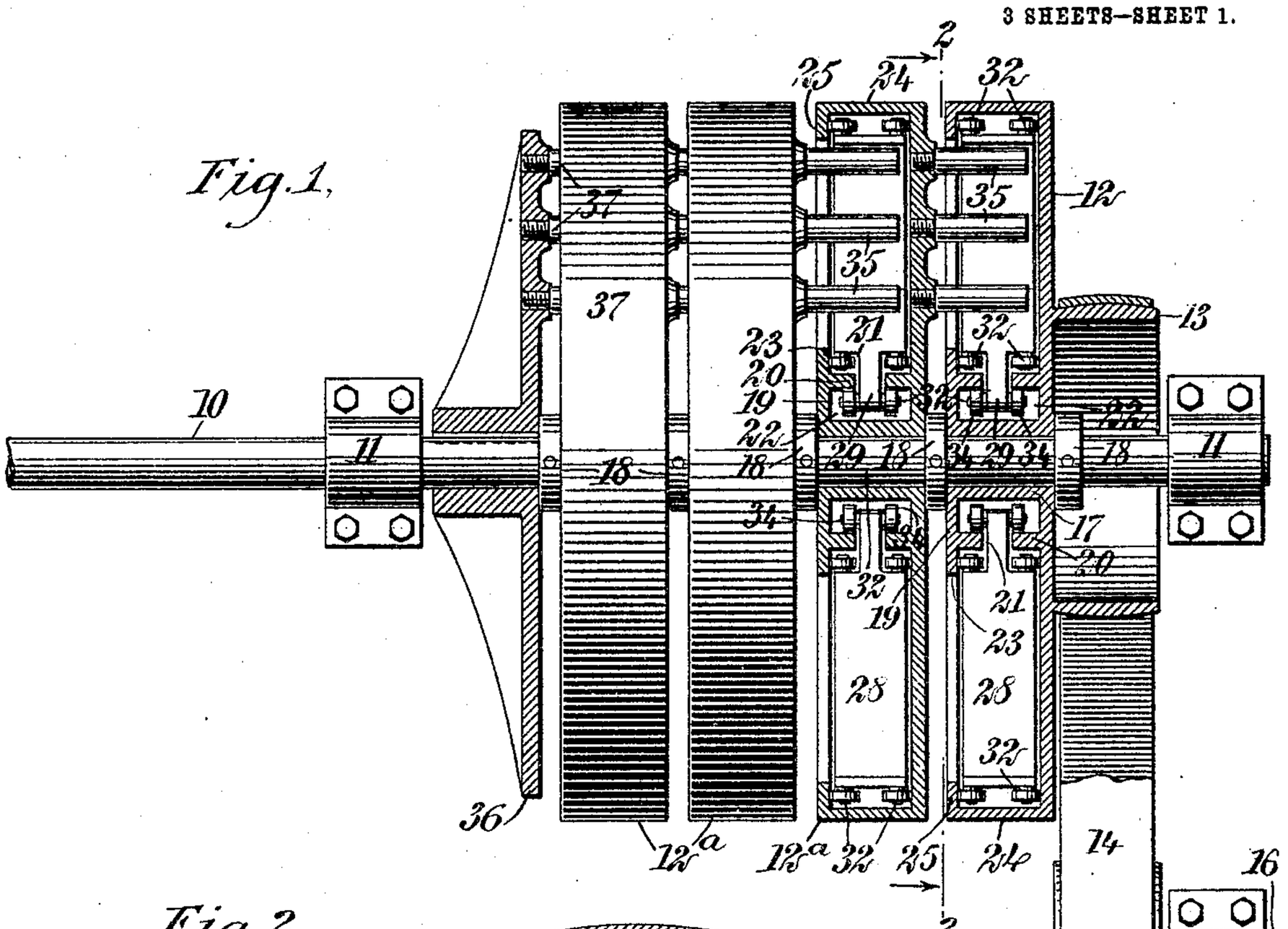
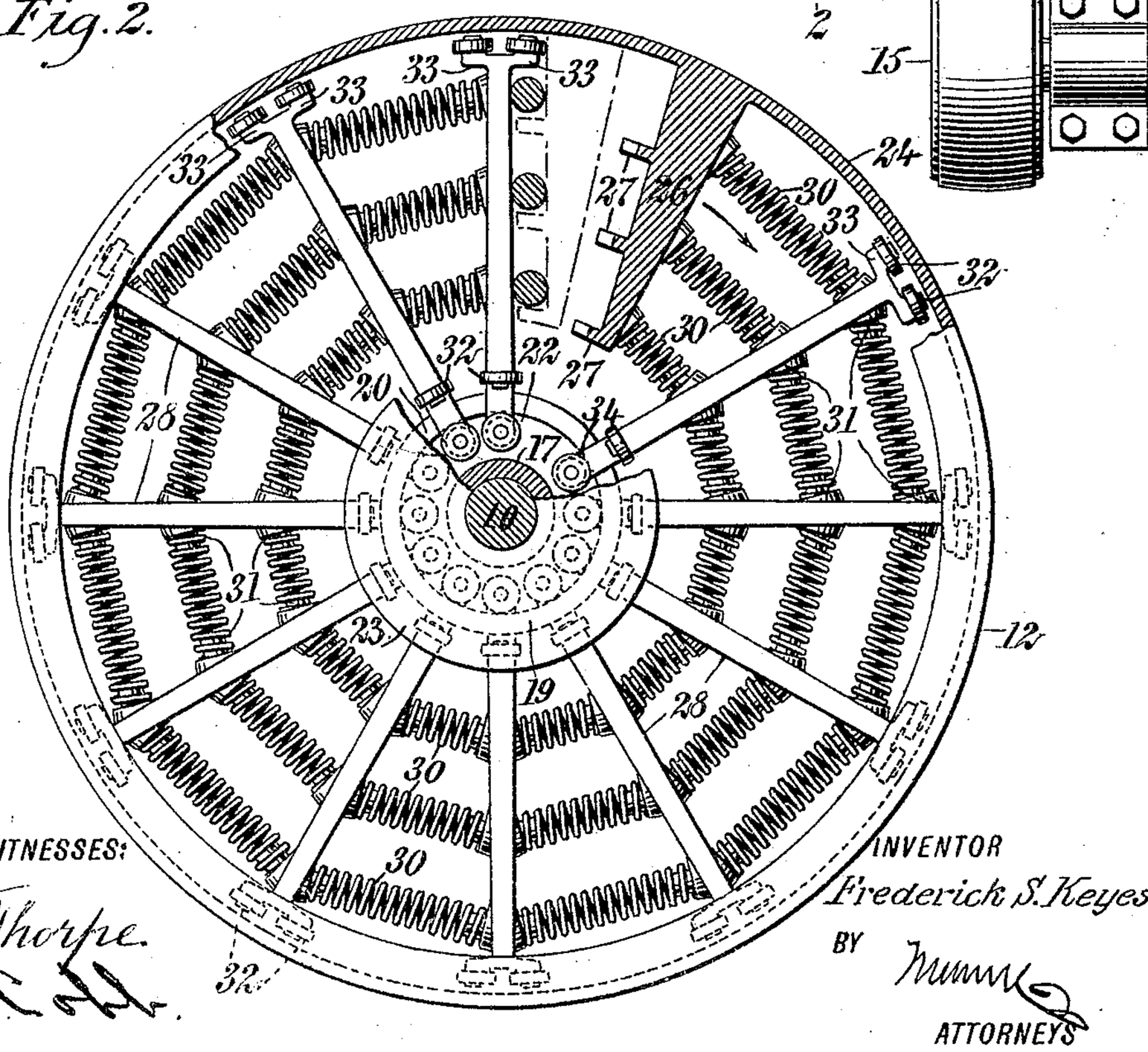


Fig. 2.



WITNESSES:

Edw. Thorpe.

S. H. Clark.

INVENTOR

Frederick S. Keyes

BY Munn & Co

ATTORNEYS

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3 SHEETS—SHEET 2.

Fig. 3.

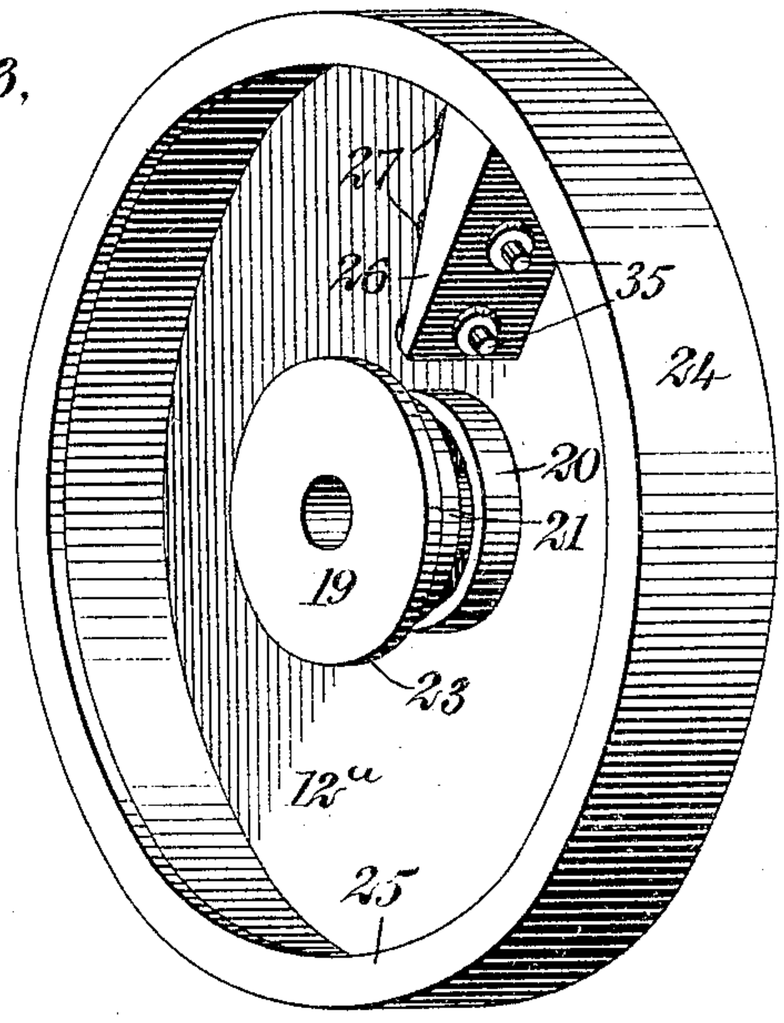
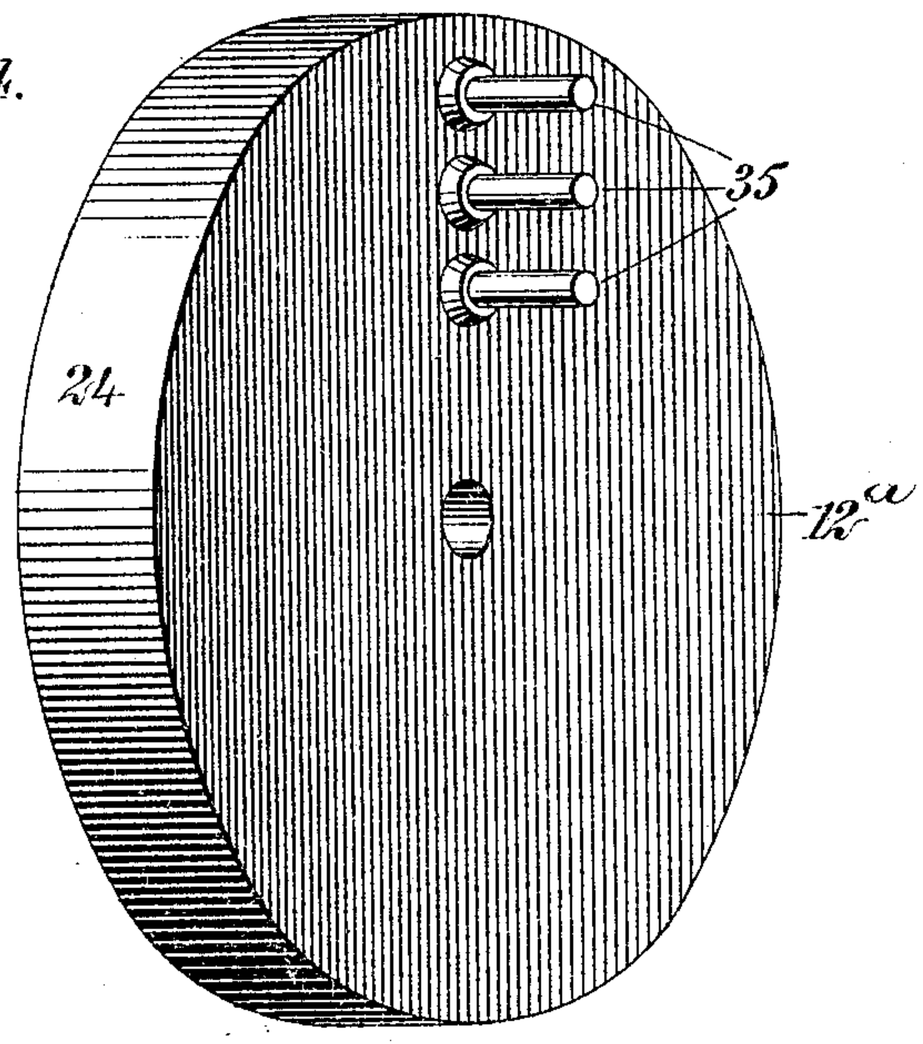


Fig. 4.



WITNESSES:

Edward Thorpe.

S. H. Church.

INVENTOR

Frederick S. Keyes

BY

Munn & Co.

ATTORNEYS

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3 SHEETS—SHEET 3.

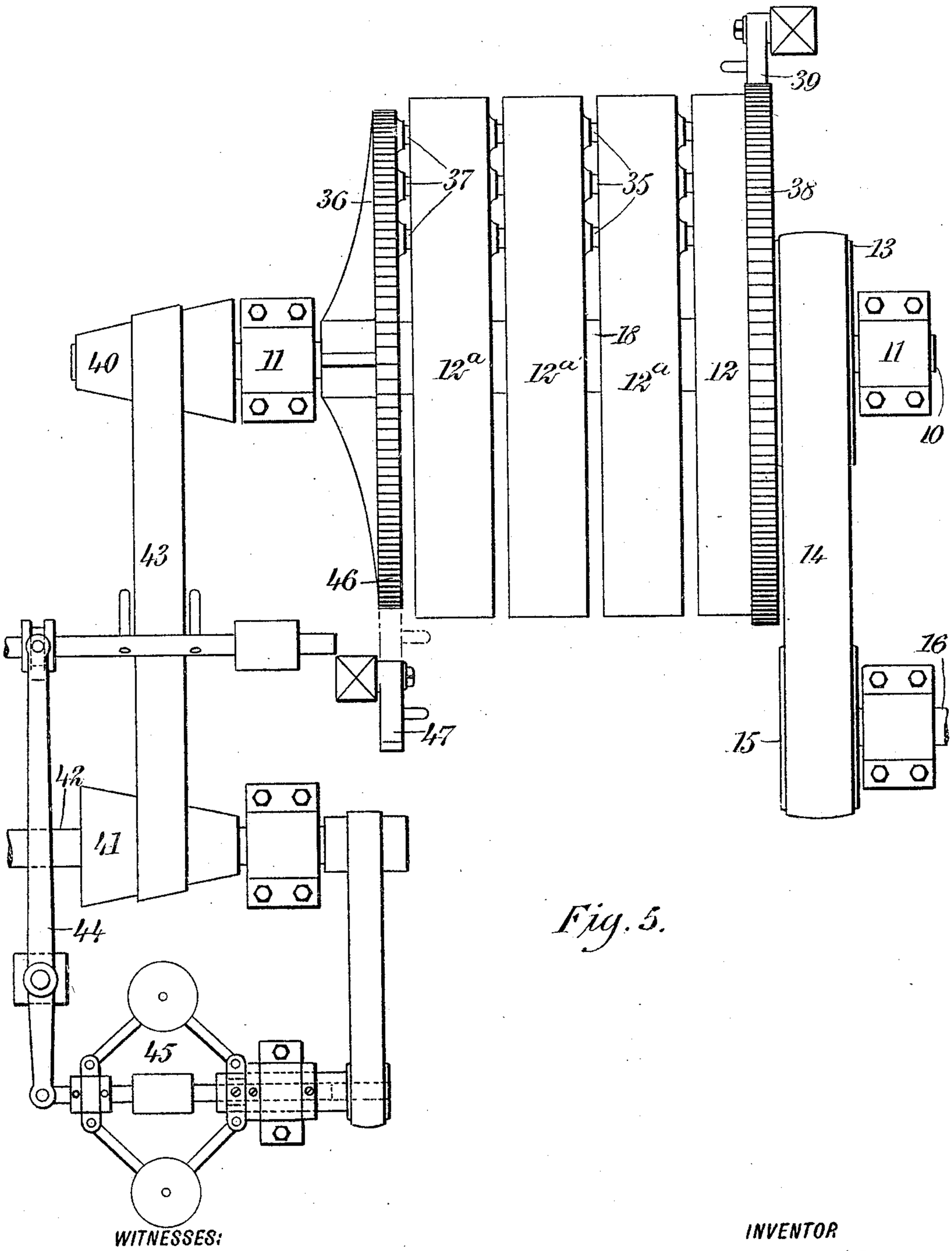

Fig. 5.

WITNESSES:

Edward Thorpe.

S. H. Cobb.

INVENTOR

Frederick S. Keyes

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

FREDERICK S. KEYES, OF WARREN, MASSACHUSETTS.

TRANSMITTING MECHANISM.

No. 799,388. Specification of Letters Patent. Patented Sept. 12, 1905.

Application filed March 29, 1905. Serial No. 252,680.

To all whom it may concern:

Be it known that I, FREDERICK S. KEYES, a citizen of the United States, and a resident of Warren, in the county of Worcester and State of Massachusetts, have invented a new and Improved Transmitting Mechanism, of which the following is a full, clear, and exact description.

My invention relates to mechanisms for transmitting power, and more particularly to those by which the energy may be stored and its action modified.

It consists in the various features and combinations hereinafter described and more particularly claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a top plan view of one embodiment of my invention, parts being in section. Fig. 2 is a transverse section therethrough on the line 2 2 of Fig. 1. Figs. 3 and 4 are perspective views of opposite sides of one of the transmitting members, and Fig. 5 is a diagrammatic view illustrating an application of my invention.

I have here shown a shaft 10 rotatable in bearings 11 and carrying a driving member in the form of a wheel 12. This wheel may receive power through a belt-surface 13, projecting from its outer side, and over which passes a belt 14 to a pulley 15, fast upon a driving-shaft 16. The wheel 12 has a central hub 17, which may turn loosely upon the shaft, it being prevented from moving longitudinally thereof by collars 18, fast upon the shaft at its opposite sides. This hub, as illustrated, projects from the wheel at the opposite side from the belt-surface and has at its outer extremity with respect to the wheel itself and its inner with respect to the system as a whole an annular flange 19. Connecting this flange and the wheel is a cylindrical wall 20, which is divided near its center by a continuous opening 21, leading to a chamber 22, formed by the flange and wall about the hub.

At 23 the flange 19 projects beyond the wall 21 to furnish a contact-surface.

At the outer edge of the wheel surrounding the hub is a peripheral flange 24, and at the extremity of this flange in alinement with the flange 19 and projecting toward it is a flange 25, furnishing a contact-surface and forming, with the body of the wheel, a channel. Between the hub and flange 24 is a generally-radial abutment 26, which may be cast integrally with or fixed to the wheel and which projects inwardly from the periphery, it terminating outside the hub. This abutment may be braced at one side by a series of webs 27.

Extending in substantially radial lines from the hub are a plurality of movable abutments 28, projecting into the peripheral channel, and each having a reduced portion 29, which enters the opening 21. These abutments also serve as connecting members between the sections of circularly-arranged spiral springs 30, lying concentric to the hub. It should be noted that the division of the springs into comparatively short sections connected by the guided abutments, while not very materially decreasing their length, retains them in position and prevents their displacement or buckling and their thus offering frictional resistance to movement. These springs extend between and are supported by oppositely-placed bosses 31, which project toward one another from the adjacent faces of the abutments. The abutments 28 are guided in their movement without introducing appreciable friction by rolls 32, mounted to rotate upon projections at each side of the inner and outer extremities of the main portions of said abutments and contacting with the inner face of the wheel and with the flange 25 and the portion 23 of the inner flange. The outer rolls at each side are in pairs, they being supported upon lateral extensions 33. Their separated points of contact serve to prevent their turning axially under the stress of the springs. At opposite sides of each abutment extension 29 are rolls 34 34, which contact with the inner surface of the wall 20 and hold the abutments against outward displacement, they taking this component of the thrust of the springsections.

With the last of the movable abutments of the series, or that adjacent to the fixed abutment, contacts a set of studs or projections 35, here shown as three in number, corresponding to the series of springs. They extend from the inner side of a wheel or intermediate member 12^a, which at its opposite side may be in all respects similar to that just described. As illustrated, there are three of these wheels 12^a; but any greater or less number might be used. In fact, it will be obvious that instead of coöperating with the abutment of the last wheel 12^a the driven member

might as well, save as to the degree of spring action secured, act directly with the wheel 12. By the "driven" member I mean any part which is driven by the transmitting mechanism, and it may include the shaft 10 and a wheel 36, keyed to the shaft 10 by means of a suitable hub and having studs 37 projecting from its inner side and in the present instance contacting with the last movable abutment of the adjacent wheel 12^a, as do the projections of said wheels with those adjacent to them. The wheel 36, with its projections 37, therefore constitutes a companion member for the adjacent wheel 12^a to transmit power therefrom to the shaft 10.

In Fig. 5 of the drawings is shown one application of my invention. Here the wheel 12 is provided with ratchet-teeth 38, engaged by a relatively stationary pawl 39. The direction of inclination of the teeth is such that the springs of the mechanism are prevented from reacting upon the driving member, they being capable of exerting their effective tension to rotate the driven member only. The shaft 10 is provided with a cone-pulley 40, over which and a similar pulley 41 upon a driven shaft 42 passes a governing-belt 43. With this belt coöperates the lever 44 of a governor 45, of any convenient type and which acts to shift the belt upon the cone-pulleys to equalize the rotation of the driven shaft in the usual manner. There may also be associated with the wheel 36 a series of ratchet-teeth 46, with which may coöperate a pawl 47. By throwing this pawl into engagement with the teeth the driven mechanism may be locked and the entire power of the driving member applied to compress and store the energy of the springs 30.

The connections in which my invention may be used are manifold; but among the more useful is its employment to secure a coordination of the effects of motors—such as wave, wind, or explosive— in which the action is irregular. Here the springs absorb the excessive impulses and enable them to be applied during periods of diminution of power. It is applicable to the coupling of motors of unequal power and is useful as a storage mechanism in connection with wind-motors and other sources of energy in which the power varies or at times ceases altogether. In any event it will serve as a cushioning means between the driving member and that driven, taking up any shocks which would otherwise be transmitted.

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

1. The combination with a driving member and a driven member, of a plurality of circularly-arranged springs for transmitting power between the members, each of said springs comprising a plurality of independent sections.

2. The combination with a driving member and a driven member, of a plurality of concentrically-arranged spiral springs for transmitting power between the members.

3. The combination with a transmitting member, of connecting members movable thereon, springs situated between the connecting members, and a coöperating transmitting member.

4. The combination with a transmitting member, of connecting members movable thereon, rolls interposed between the connecting members and transmitting member, springs situated between the connecting members, and a coöperating transmitting member.

5. The combination with a transmitting member, of connecting members movable thereon, rolls mounted near opposite extremities of the connecting members and contacting with the transmitting member, springs situated between the connecting members, and a coöperating transmitting member.

6. The combination with a transmitting member, of connecting members movable thereon, springs situated between the connecting members, and a companion transmitting member having projections coöperating with the springs.

7. Transmitting mechanism comprising a rotatable member having a fixed abutment projecting at one side thereof, a movable abutment, a spring situated between the fixed and movable abutments, and a rotatable companion member provided with a projection contacting with the movable abutment.

8. Transmitting mechanism comprising a rotatable member having a fixed abutment projecting at one side thereof, a movable abutment, a plurality of springs situated between the fixed and movable abutments and lying at different distances from the axis of the rotatable member, and a rotatable companion member provided within a projection contacting with the movable abutment.

9. Transmitting mechanism comprising a rotatable member having a fixed abutment projecting at one side thereof, a plurality of substantially radial movable abutments, spring-sections situated between the fixed and movable abutments, and a rotatable companion member provided with a projection contacting with one of the movable abutments.

10. Transmitting mechanism comprising a rotatable member having a fixed abutment projecting at one side thereof, a plurality of substantially radial movable abutments, spring-sections situated between the fixed and movable abutments, and a rotatable companion member provided with a projection contacting with the movable abutment adjacent to the fixed abutment.

11. Transmitting mechanism comprising a rotatable member having a fixed abutment projecting at one side thereof, a movable abut-

ment, the adjacent faces of said abutments having opposite projections, a spiral spring extending between and supported by the projections, and a rotatable companion member provided with a projection contacting with the movable abutment.

12. Transmitting mechanism comprising a rotatable member having a fixed abutment projecting at one side thereof, a movable abutment, rolls rotatable upon the movable abutment and contacting with the rotatable member, a spring situated between the fixed and movable abutments, and a rotatable companion member provided with a projection contacting with the movable abutment.

13. Transmitting mechanism comprising a rotatable member having a fixed abutment projecting at one side thereof, a movable abutment provided at one end with lateral extensions contacting with the rotatable member, a spring situated between the fixed and movable abutments, and a rotatable companion member provided with a projection contacting with the movable abutment.

14. Transmitting mechanism comprising a rotatable member having a fixed abutment projecting from one side thereof, substantially radial abutments movable circumferentially of the rotatable member, means for preventing longitudinal displacement of the movable abutment, a spring situated between the fixed and movable abutments, and a rotatable companion member provided with a projection contacting with the movable abutment.

15. Transmitting mechanism comprising a wheel having a hub and a fixed abutment, substantially radial abutments movable toward and from the fixed abutment, springs situated between the abutments, and a driven member coöperating with one of the movable abutments.

16. Transmitting mechanism comprising a wheel having a hub provided with a chamber and also having a fixed abutment, abutments movable toward and from the fixed abutments and having portions extending into the chamber, springs situated between the abutments, rolls carried by the movable abutments within the chamber, and a driven member coöperating with one of the movable abutments.

17. Transmitting mechanism comprising a wheel having a hub, a circumferential flange and an intermediate fixed abutment, abutments movable toward and from the fixed abutment, rolls mounted upon the abutments and contacting with the circumferential flange and with the body of the wheel, springs situated between the abutments, and a driven member coöperating with one of the abutments.

18. Transmitting mechanism comprising a wheel having a hub, a circumferential flange and an intermediate fixed abutment, abutments movable toward and from the fixed abutment, pairs of separated rolls mounted at opposite sides of the abutments and contacting with the circumferential flange and with the body of the wheel, springs situated between the abutments, and a driven member cooperating with one of the abutments.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK S. KEYES.

Witnesses:
SYLVANUS H. COBB,
EVERARD BOLTON MARSHALL.