No. 858,789. PATENTED JULY 2, 1907.

W. P. BRACHMANN.

POWER TRANSMITTING DEVICE OR MECHANISM.

APPLICATION FILED JULY 24, 1906.

6 SHEETS—SHEET 1.

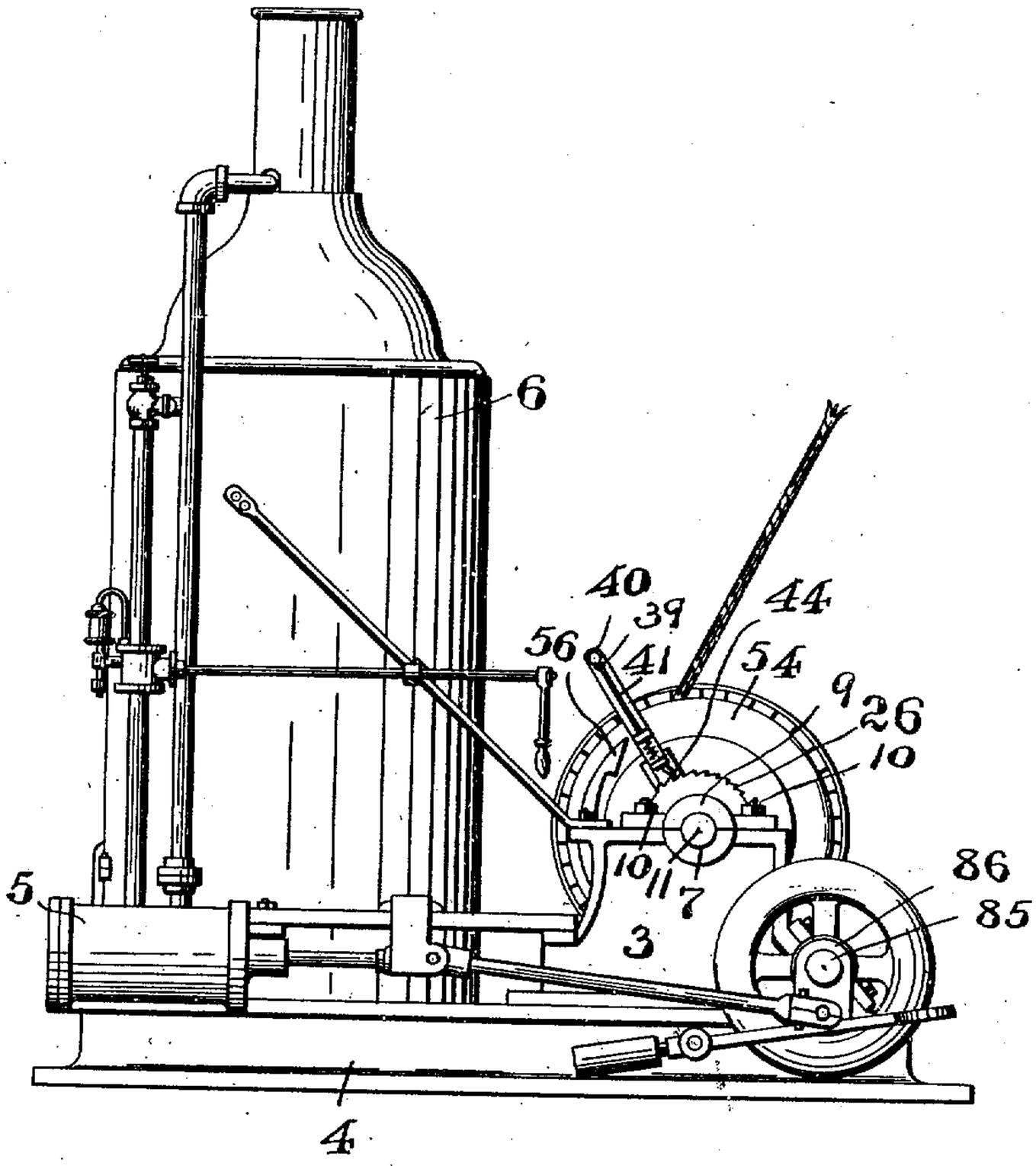

Fig 1

WITNESSES:

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INVENTOR:

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BY

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ATTORNEYS.

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6 SHEETS—SHEET 2.

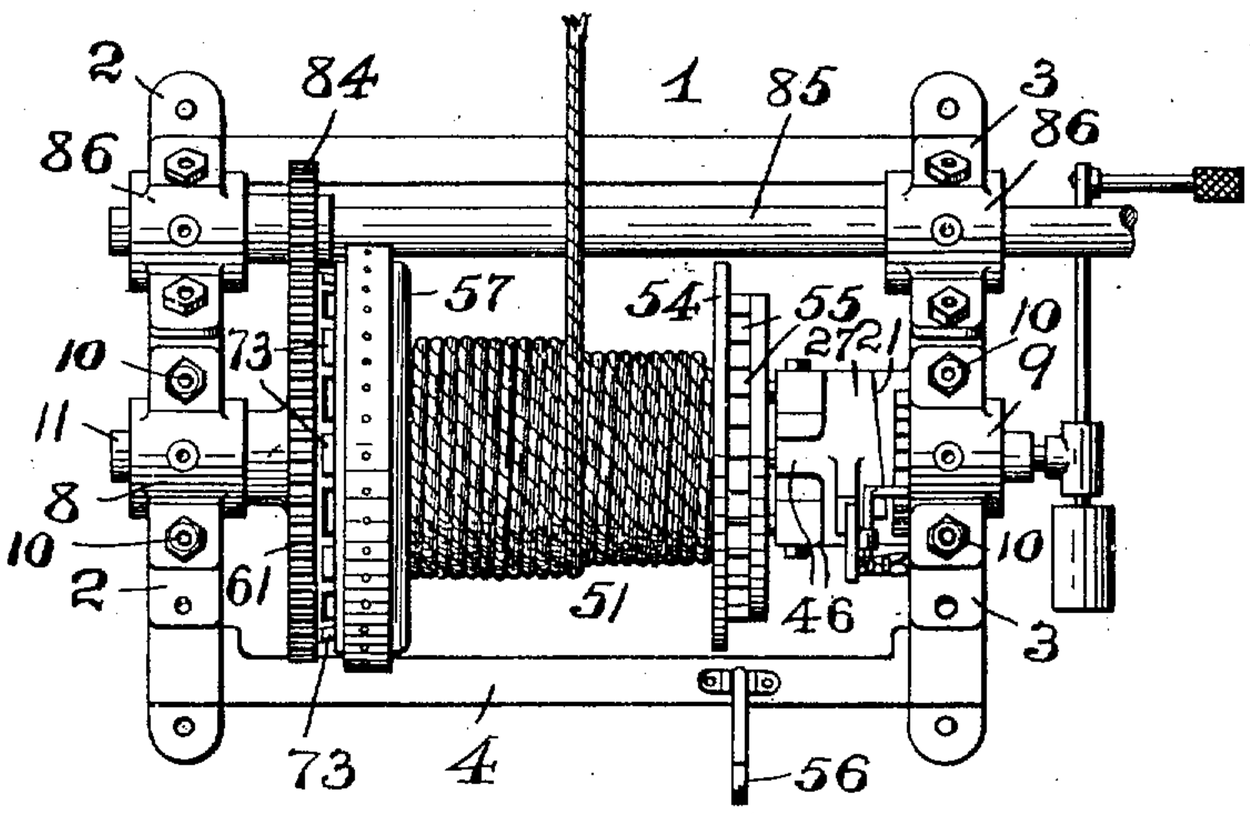

FIG 2.

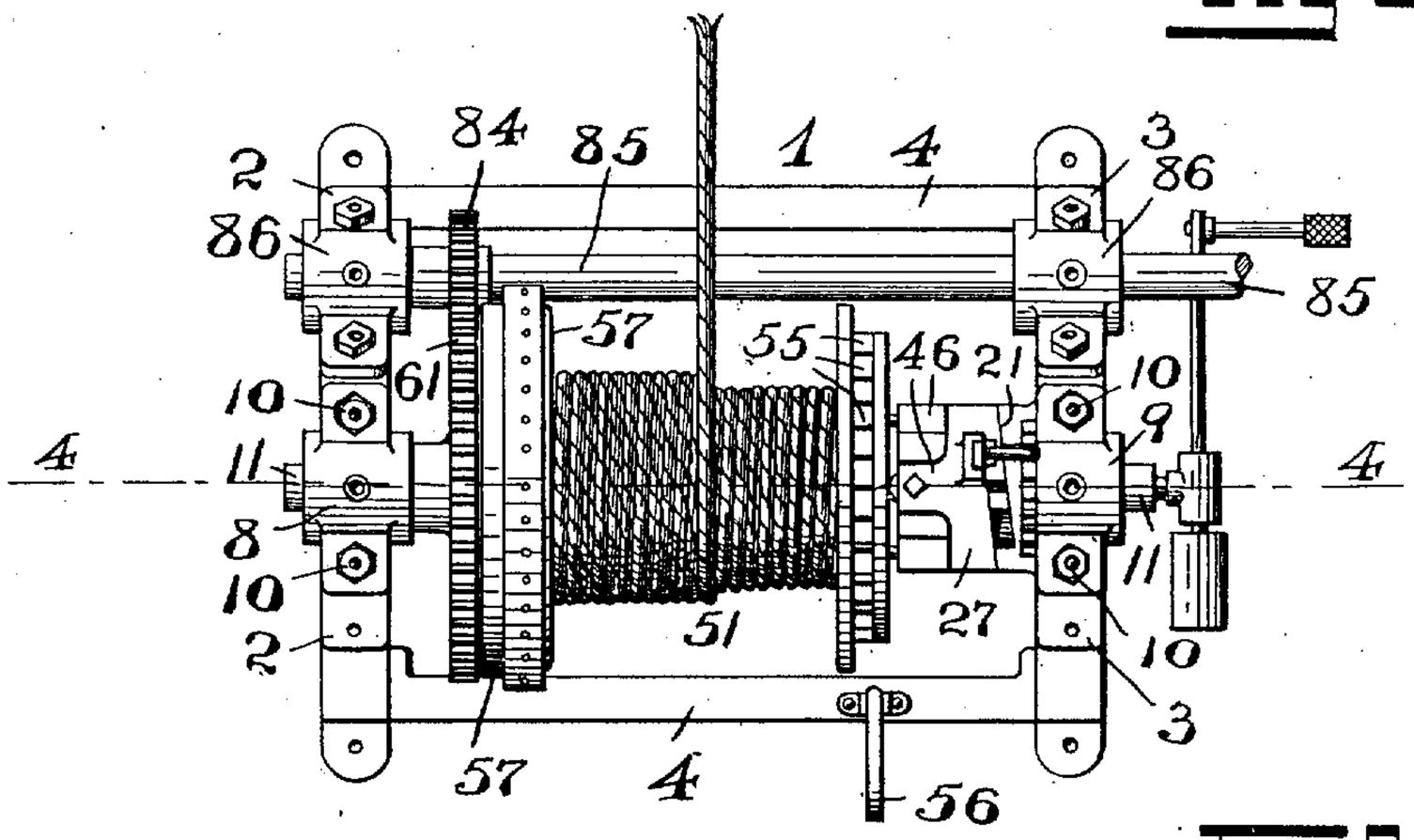

FIG 3.

WITNESSES:

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3 SHEETS—SHEET 3.

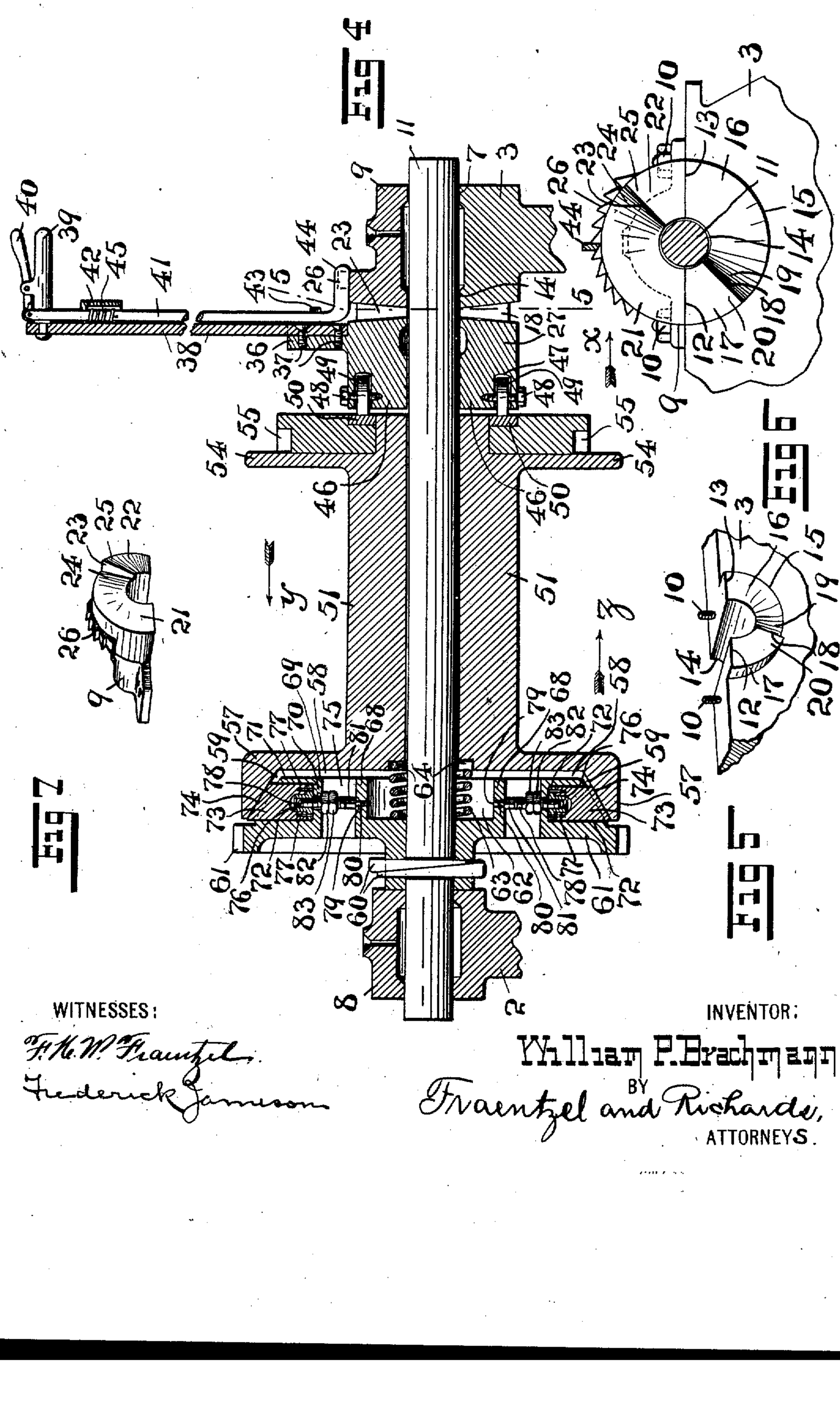

FIG 4

FIG 7

FIG 6

FIG 5

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6 SHEETS—SHEET 4.

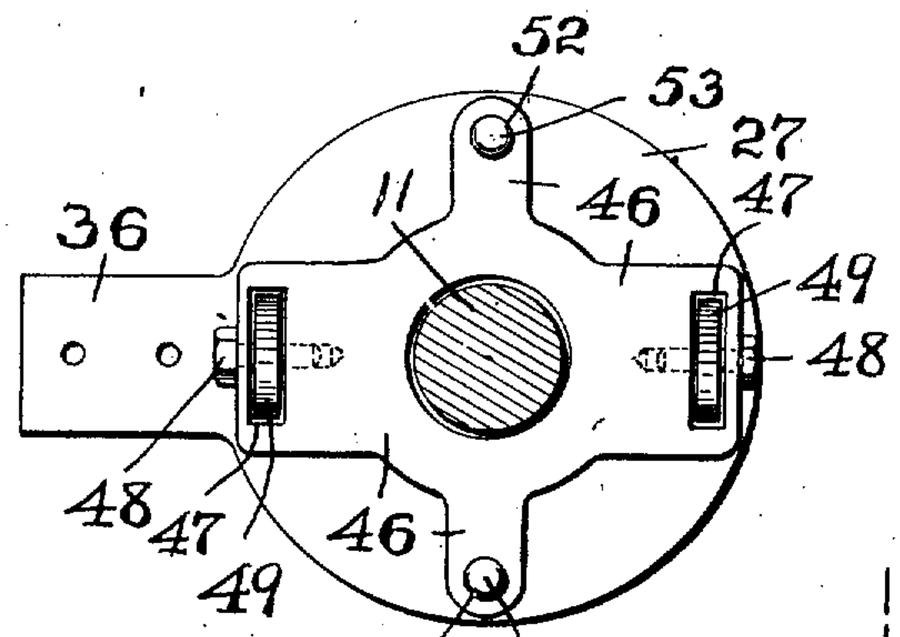

Fig 8

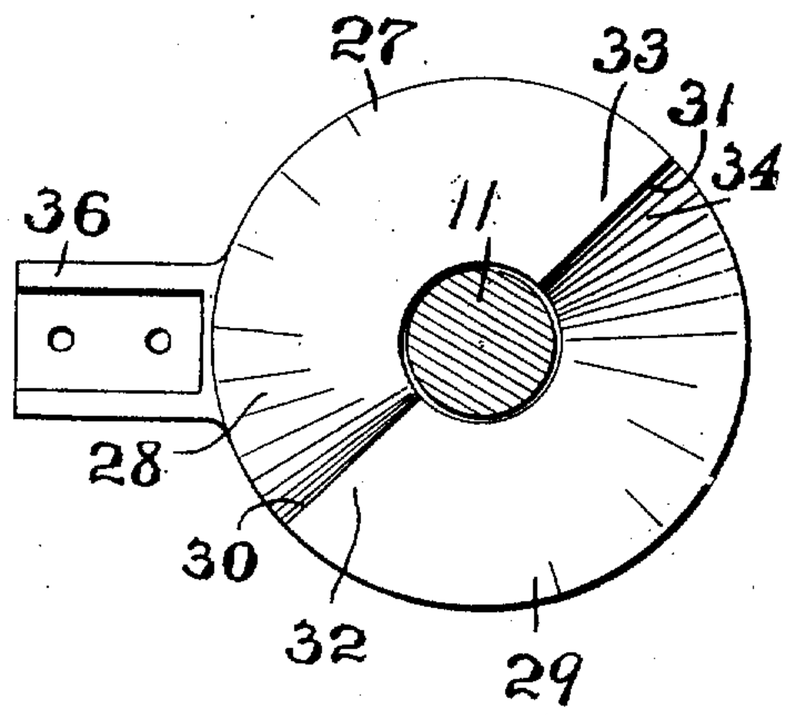

Fig 9

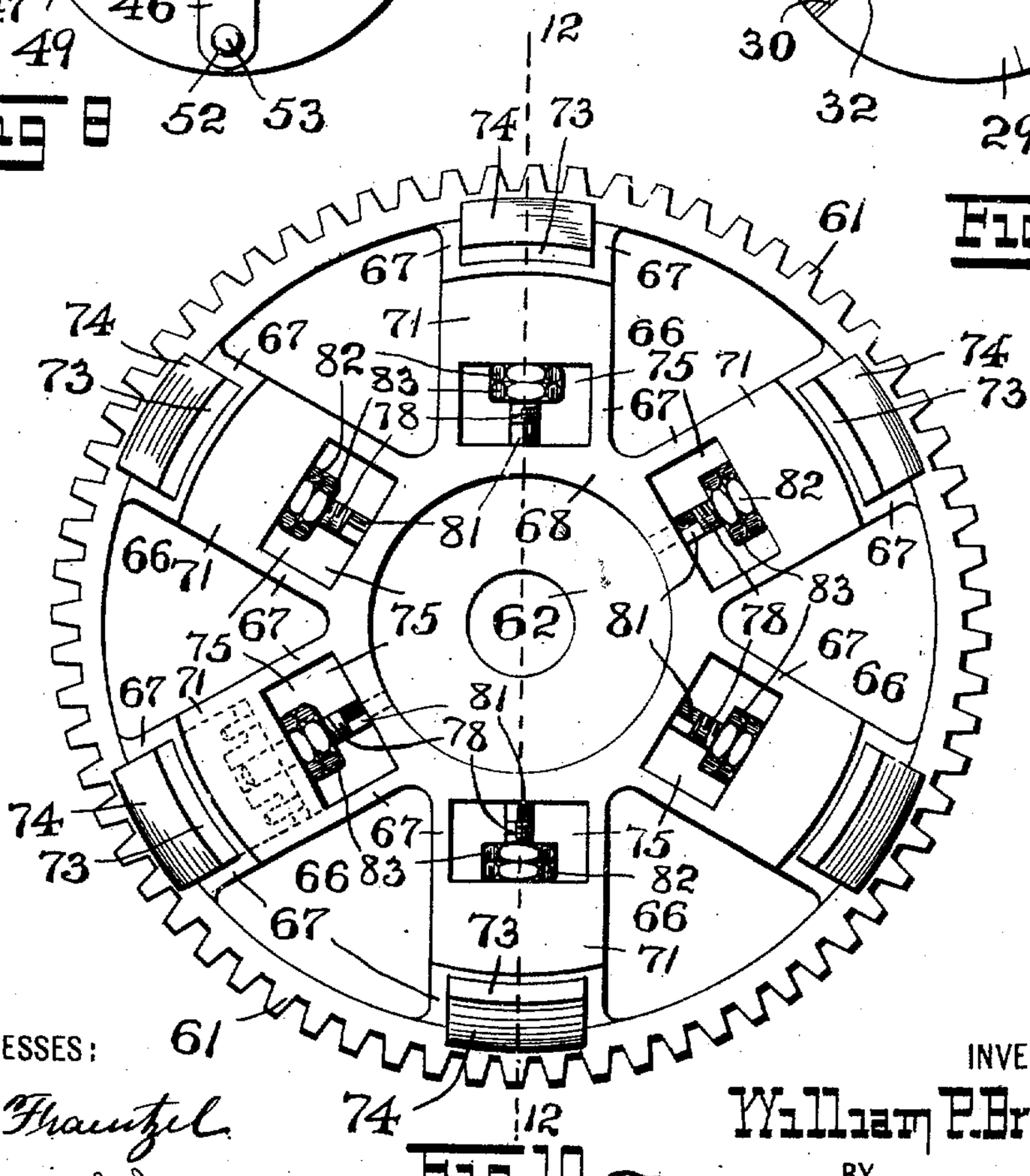

Fig 10

WITNESSES:

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6 SHEETS—SHEET 5.

Fig 11

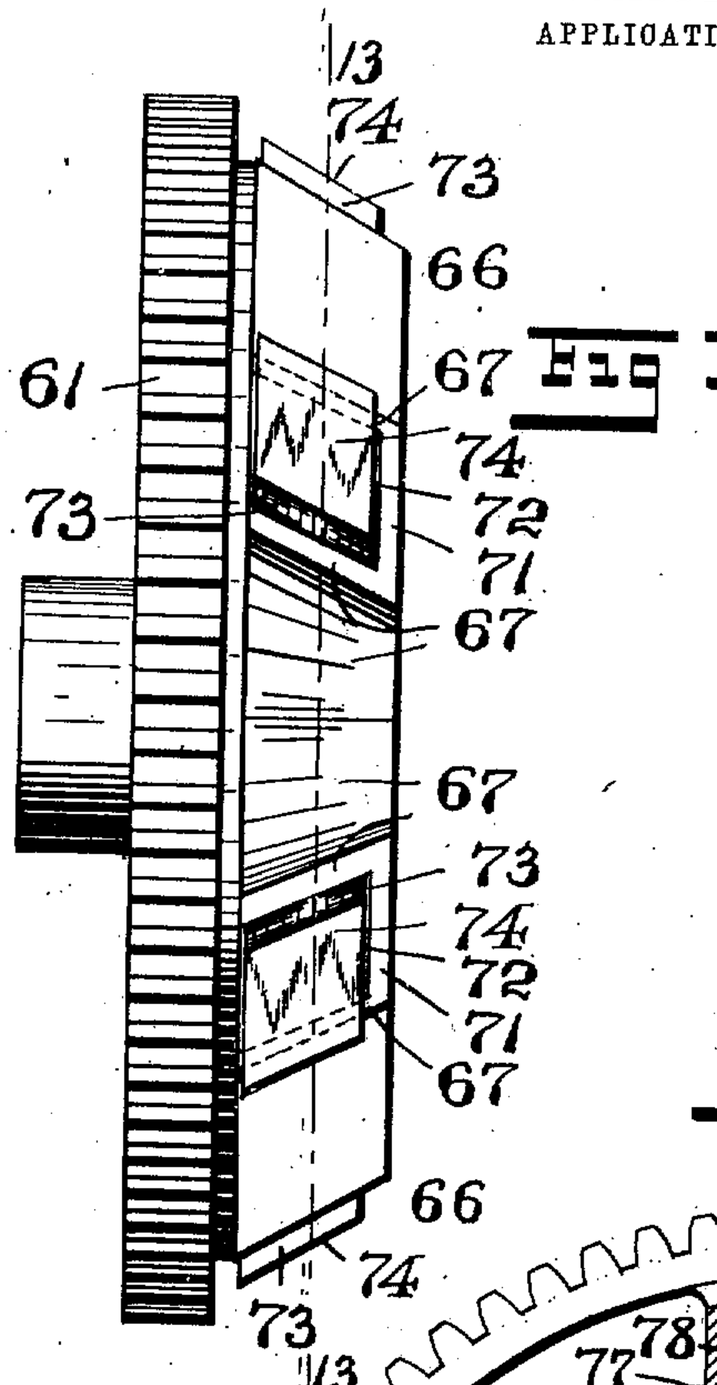


Fig 12

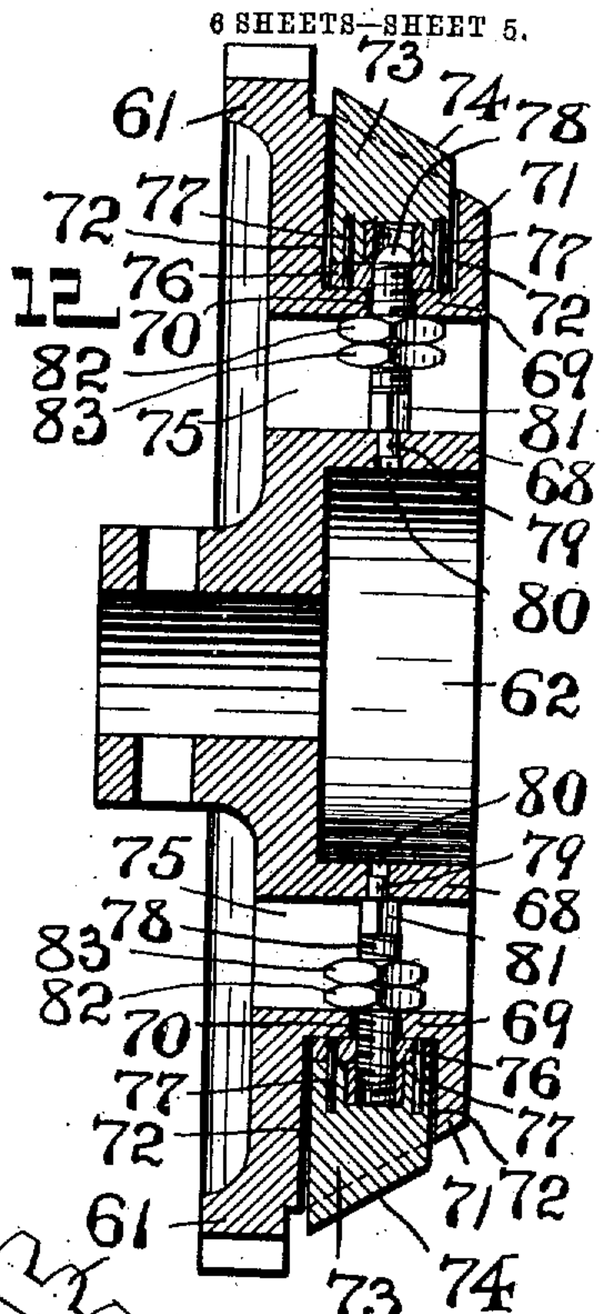
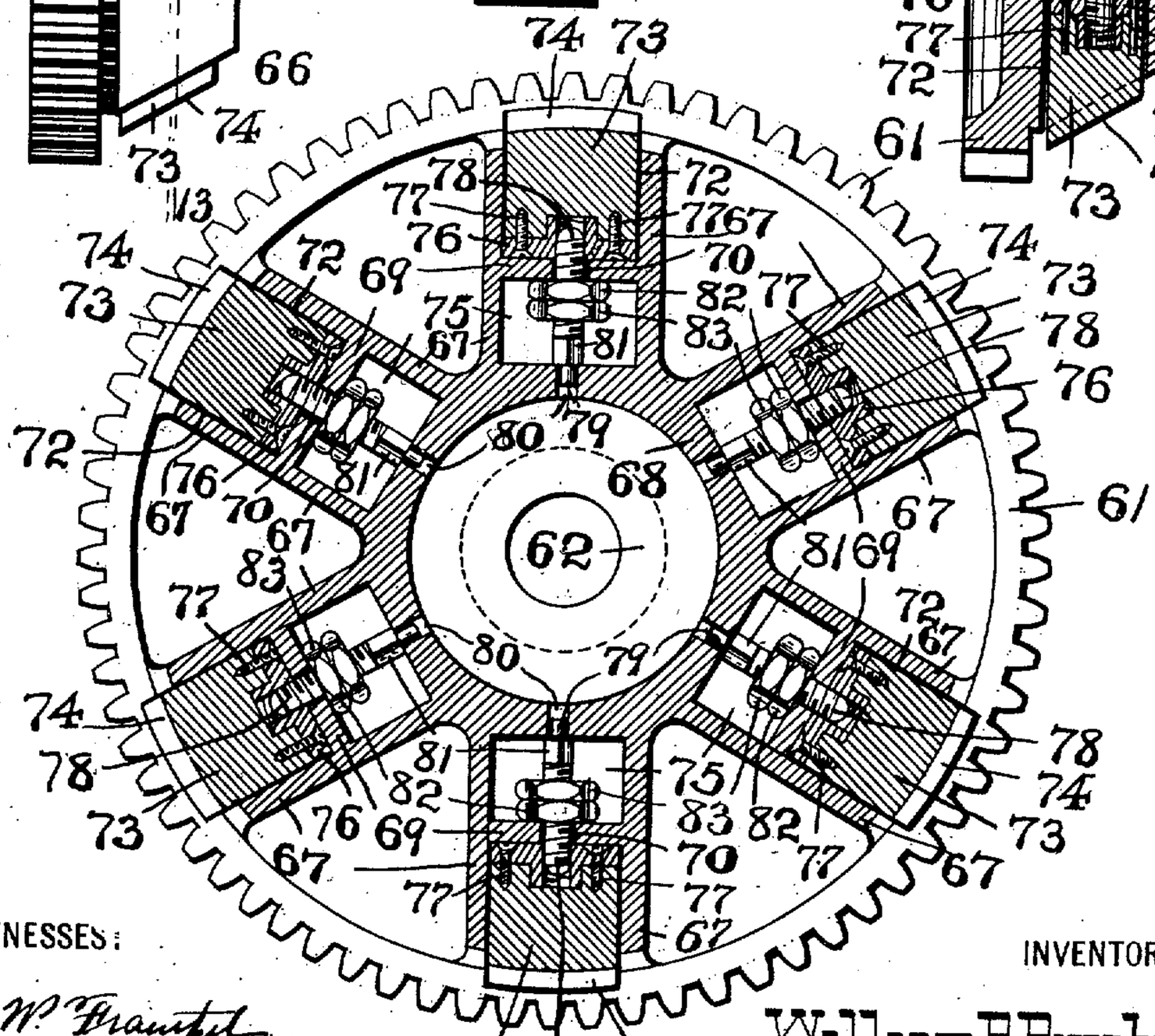


Fig 13



WITNESSES:

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6 SHEETS—SHEET 6.

FIG 15

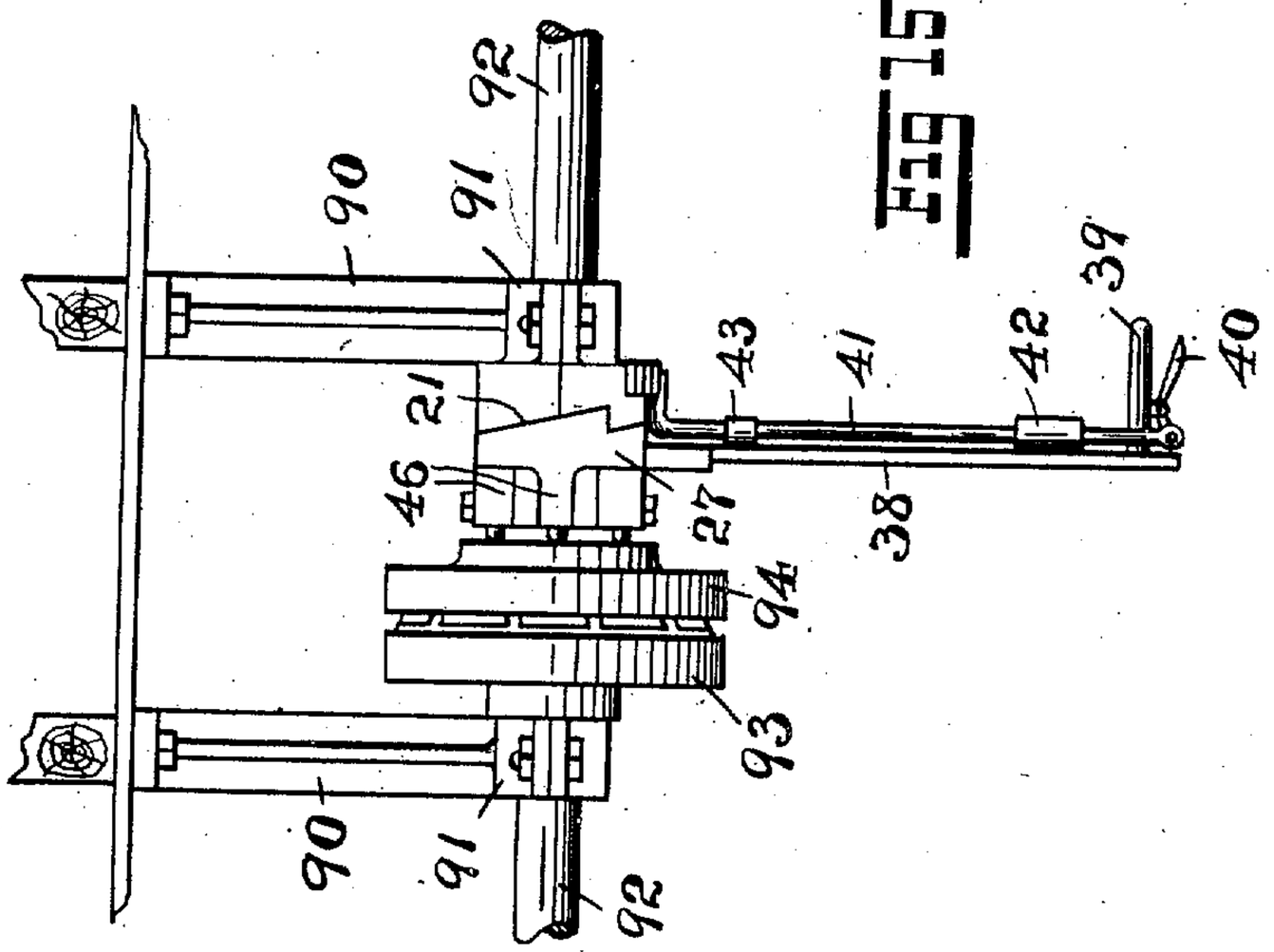
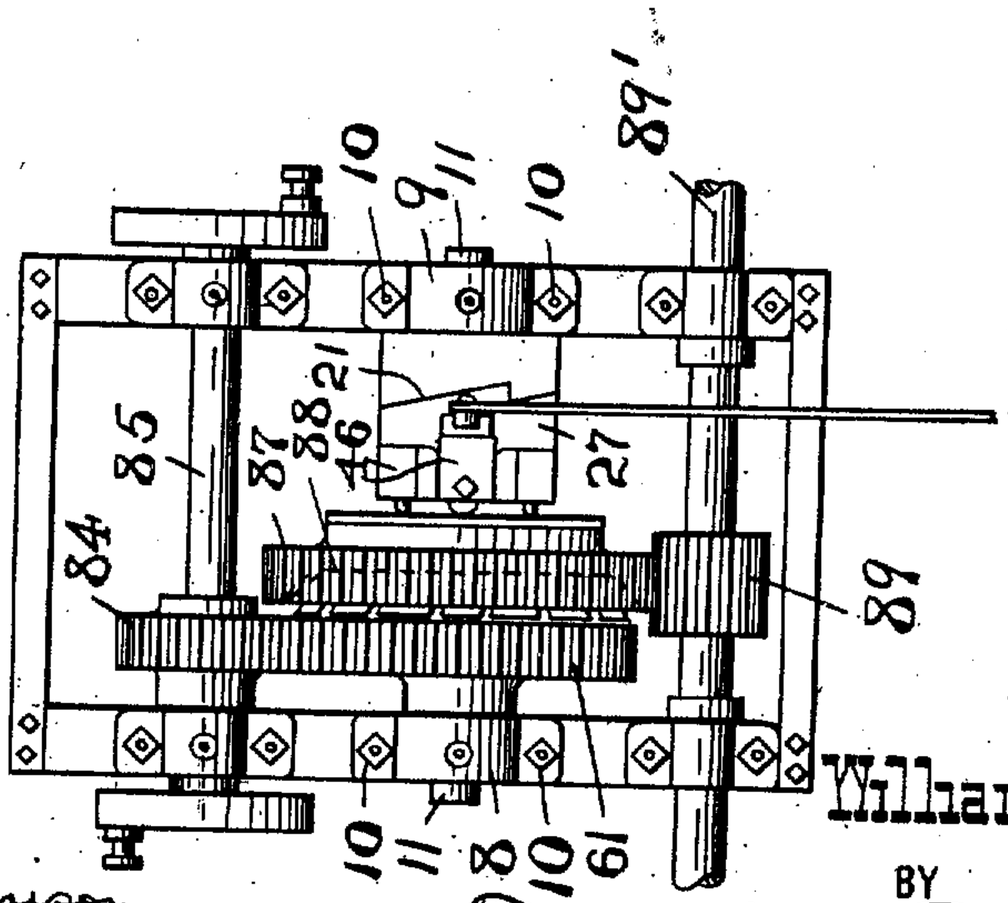


FIG 14



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM P. BRACHMANN, OF NEWARK, NEW JERSEY.

POWER-TRANSMITTING DEVICE OR MECHANISM.

No. 858,789. Specification of Letters Patent. Patented July 2, 1907.

Application filed July 24, 1906. Serial No. 327,496.

To all whom it may concern:

Be it known that I, WILLIAM P. BRACHMANN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Power-Transmitting Devices or Mechanisms, and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates, generally, to that class of mechanisms known in the art as frictions which are used with power-transmission devices, hoisting machinery, and the like; and, the principal object of my present invention is to provide a simply constructed mechanism for the transmission of power, comprising a novel construction of friction and novel and improved means for actuating the friction, all with a view of producing an efficiently operating means which may be used in connection with the friction drum of a hoisting machine or other similar machines, elevator-drums; or, as a power-transmission for shafting, where power is to be transmitted from one floor or room to another; or, it may be used in connection with the transmission gearing of automobiles and other similar machines or engines; and, in fact my invention is capable of use with machinery and mechanisms of the various kinds where one part is to be brought in operative frictional engagement with another part, for transmitting the power from the one part to the other part, without interrupting or shutting off the main supply of the power.

Other objects of this invention not at this time more particularly mentioned will be clearly understood from the following detailed description of the invention.

With the various objects of the invention in view, the same consists in the general arrangements and combinations of the devices and parts, as well as in the details of the construction of the same, all of which will be hereinafter more fully set forth, and then finally embodied in the clauses of the claims which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of a hoisting engine and the power-transmission mechanism which embodies the principles of the present invention. Fig. 2 is a top or plan view of the laterally movable hoisting drum and frame in which it is mounted, showing in connection therewith a power-transmission gear and the friction-devices for producing the operative frictional engagement of the sliding drum with the transmission gear, the parts being shown in their normally disengaged relation; and Fig. 3 is a similar view of the same parts shown in their operatively connected relation. Fig. 4 is a longitudinal vertical section, on an enlarged scale, said section being taken on line 4—4 in said Fig. 3, certain portions of the supporting frame and the end standards or supports being omitted from this view; and Fig. 5 is a detail sectional representation, taken on line 5—5 in said Fig. 4, looking in the direction of the arrow *x*. Figs. 6 and 7 are two perspective views, respectively, of the upper end-portion of the one standard or support and the box to be used therewith for producing one of the bearings of the main shaft, said views showing in connection with said parts, certain hub-portions forming integral parts of said standard and box and each hub-portion being formed with helical wedge-shaped face-portions. Figs. 8 and 9 are the two end-faces of a shifting member, and transverse sectional representations of the main shaft upon which said member is slidably arranged; and Fig. 10 is a face view, on an enlarged scale, of a spur-gear adapted to be fixed upon the main shaft, provided with a series of adjustable and readily replaceable friction devices, with which the sliding or movable hoisting drum can be brought in operative holding engagement. Fig. 11 is an end elevation of said spur-gear and its parts; Fig. 12 is a transverse vertical section of the same, said section being taken on line 12—12 in said Fig. 10; and Fig. 13 is a sectional representation of the said device, taken on line 13—13 in Fig. 11. Fig. 14 is a plan view of a power-transmission gear for automobiles, and similar purposes, the same being provided with the various devices and parts which embody the principles of this invention; and Fig. 15 is a side view of a pair of hangers and a shafting provided with a power-transmission device embodying the leading features of this invention.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to Figs. 1 to 13 inclusive, the reference character 1 indicates the complete power-transmission device or mechanism, the same comprising a pair of end-pedestals or supporting standards 2 and 3, and arranged upon and suitably secured to a suitable foundation, base or casting 4 carrying the usual hoisting engine 5 and its boiler 6. Each pedestal is provided in its upper surface with the usual semi-cylindrical bearing-portion 7, and suitably secured upon the standards or pedestals 2 and 3, by means of bolts 10 are the bearing-boxes 8 and 9, respectively, thus providing the complete bearings for the main shaft 11.

The pedestal or standard 3, as will be seen more particularly from an inspection of Figs. 5 and 6 is formed,

contiguous to its semi-cylindrical bearing-portion 7, and extending from the upper part of its inner face, with an integral projection which is bounded at the top by the straight marginal portions 12 and 13 and the semi-cylindrical bearing-portion 14, which is in alinement with the bearing-portion 7, and also by the semi-cylindrical marginal surface-portion 15. The reference characters 16 and 17 indicate a pair of helical wedge-shaped surface-portions, 18 indicating an off-set or step formed between the lowest part 19 of the portion 16 and the highest part 20 of the portion 17. In a like manner, the bearing-box 9 is made with a projection having a pair of helical wedge-shaped surface-portions 21 and 22, forming an integral part of the one side of the bearing-box, 23 being an off-set or step formed between the lowest part 24 of the portion 21 and the highest part 25 of the portion 22. The angular inclinations of the various surface-portions are such, that when the parts have been secured in their assembled positions, shown in Fig. 5, the surface-portions 16 and 22, and the surface-portions 17 and 21 form two pairs of unobstructed flat, but angularly disposed faces, which are separated by the two diametrically and oppositely located off-sets or shoulders 18 and 23, substantially as illustrated. Upon its upper surface the projection formed upon the side of the bearing-box 9 is provided with a series of ratchet-teeth or holding serrations 26.

Loosely arranged upon the main shaft 11, and capable of an oscillatory, as well as a slidable motion longitudinally upon the shaft, is a sleeve 27, said sleeve being provided upon its one face, next to the helical wedge-shaped surface-portions of the respective projections which extend from the sides of the pedestal 3 and the bearing-block or box 9, with a pair of helical wedge-shaped surface-portions 28 and 29, the same being separated by a pair of oppositely located and diametrically extending shoulders or off-sets 30 and 31, the angular inclinations of the surface-portions 28 and 29 being such that the highest parts 32 and 33 and the lowest parts 34 and 35 of the respective portions will be arranged as clearly shown in Fig. 9 of the drawings. When the sleeve 27 is in its operative position upon the main shaft 11, then the helical wedge-shaped surface-portions of the sleeve are in rotatable sliding engagement or contact with the helical wedge-shaped surface-portions of the projections of the upper part of the pedestal 3 and the bearing-block or box 9, either as shown in Fig. 2 of the drawings, when the parts are in their normal initial positions; or, as represented in Fig. 3, when the various parts are in their operatively connected relations. Extending from an outer marginal edge-portion of said sleeve 27 is a socketed receiving arm or projection 36 to which is secured by means of screws 37, or other suitable fastening means, a post 38. At its upper end, the said post 38 has an outwardly extending arm 39 upon which is pivoted an actuating hand-lever 40. Pivotally connected with the one end of said lever 40 is a downwardly extending rod 41 which extends through a pair of guides 42 and 43 upon the post 38, and has a forwardly extending finger 44 at its lower end which can be brought into its operative holding or locking engagement with any one of the ratchet-teeth or serrations 25, as shown. By depressing the finger-piece end or handle-portion of the lever 40, the rod 41 is lifted against the action of a suitable spring, as 45, whereby the finger 44 is raised above the ratchet teeth 25, and a rotative movement of the sleeve 27 upon the shaft 11 in a direction away from the operator can be produced, at the same time resulting in a sliding motion in the direction of the arrow *y*, see Fig. 4, upon the main shaft. By releasing the pressure from the lever 40, the finger 44 is again thrown into its holding or locked engagement with another ratchet-tooth 25, whereby the sleeve 27 is held in its adjusted position, as will be clearly understood. By a similar operation of the lever 40, and the pulling of the post 38, and its parts toward the operator, the sleeve 27 can again be rotated in the opposite direction upon the shaft 11, thereby again returning the parts to their normal initial positions, indicated in Fig. 2 of the drawings. Upon the opposite face, the said sleeve 27 is formed with the thickened or enlarged portion 46, said enlarged portion being made with suitably disposed receiving sockets 47 across which extend the pins 48, substantially as illustrated. Rollers or wheels 49, preferably of steel, are rotatively arranged upon said pins 48 within the receiving sockets 47, each roller or wheel having a portion extending from its socket, and being in rolling engagement with a steel or other suitable ring 50 which is let in or is otherwise secured to the end of a hoisting drum 51. If desired, the said thickened or enlarged portion 46 may be provided, also, with other suitably disposed receiving sockets 52 in which may be placed suitable wearing-pins 53, the ends of which extend from said sockets 52 and are in sliding engagement with the ring 50 of the hoisting drum 51, substantially as shown and for the purposes to be presently more fully described.

While it may be preferable to use the wearing-pins 53 in addition to the rollers or wheels 48, it will be evident, that the use of the pins 53 may be dispensed with, in which case the rollers only are used.

The hoisting drum, just mentioned, is loosely and slidably arranged upon the main shaft 11, the same being provided at one end with the usual annular flange 54, and the usual series of holding depressions 55 with any one of which can be brought in holding engagement the usual pivoted or swinging holding or retaining dog 56, see Fig. 1, and ordinarily used with the usual constructions of hoisting engines. At its opposite end, the drum 51 is made with another element or annular flange 57, formed with a chambered portion 58 which is provided with an inclined annular binding surface 59, as clearly illustrated in Fig. 4 of the drawings. Suitably secured in a fixed position upon the main shaft 11, by means of wedges or keys 60, or other suitable fastening devices, is an element in the form of a spur-gear 61 for driving the said main shaft 11. Upon its inner face, the said spur-gear is provided with a centrally disposed chamber or socketed portion 62 through which the main shaft extends, a coiled spring 63 being arranged in said chamber, and said spring encircling the shaft and having its one end extending into a depression 64 in the end of the hoisting drum. The coils of the spring are at all times more or less compressed so as to tend to distend and exert a pressure in the direction of the arrow *z* in said Fig. 4. Upon its inner face the spur-gear is made with any suitable number of radially disposed friction-block holding or carrying members 66, each member comprising a pair of side-walls 67 extending from the cir-

cular wall 68 of the chamber 62 toward the outer peripheral or toothed surface of the gear. The forward end-portions of each pair of said side walls are connected by a suitable partition 69 formed with a perforation or hole 70, and an upper or top-plate 71, forming a receiving pocket 72 in which is arranged the friction block 73 provided with the inclined or chamfered holding surface 74 adapted to engage with the inclined surface 59 of the hoisting drum substantially in the manner to be hereinafter more fully described.

Openings 75 are formed between each pair of side-walls 67 and the annular wall 68 and respective partitions 69, as clearly illustrated, these openings being for the purpose of readily getting at an adjusting means connected with each friction block 73, that the said blocks can be moved in outward directions to have their inclined surfaces 74 more readily and properly bind with the inclined surface 59 of the hoisting drum. The adjusting device which is connected with each block 73 consists, essentially, of a screw-threaded nut or metal disk 76 suitably secured upon the end of the block by means of pins or screws 77, a screw-threaded rod or stem 78 being arranged in the screw-threaded nut or disk 76 of each block 73, and extending through the hole 70 and across the opening 75. The opposite and slightly reduced ends 79 of the rods or stems 78 are rotatively arranged in a bearing 80 in the wall 68, each rod being provided with a wrench-receiving portion 81 and a pair of nuts 82 and 83, the purposes of which are evident; and, when slightly loosened, permit of the rod or stem 78 to be turned by means of a spanner-wrench which is inserted in the opening 75 and upon the portion 81, so as to move the friction-block in an outward direction for its proper adjustment.

The spur-gear 61 is driven from a pinion 84 upon a shaft 85, rotatably arranged in bearings 86 secured to the pedestals or supports 2 and 3, the shaft 85 being driven from the engine 5 in the usual manner, and as will be clearly seen from an inspection of Fig. 1 of the drawings.

The operations of the mechanisms and parts just described will be clearly understood from an inspection of the drawings, and more especially from Fig. 4, and need not therefore be further set forth.

In Fig. 14 of the drawings, I have illustrated the application of my present invention as a power-transmission mechanism for automobiles and the various power driven machines. In this construction, in lieu of the hoisting drum 51, I use a gear 87, which is made with the cone-shaped interior or chamber 88, as indicated in dotted outline in said Fig. 14. The arrangements and constructions of the spur-gear and of the shifting device are similar to those shown in Figs. 1 to 13 inclusive, and as described in the foregoing specification, and need not therefore, be further set forth. The power from the gear 87 is transmitted to a pinion 89 arranged upon a shaft 89′, as shown.

In Fig. 15 is shown a pair of hangers 90 provided with bearings 91 which carry a main shaft 92, said shaft being provided with a friction drum 93 similar in construction to the spur-gear previously described, with which can be brought in frictional engagement, a cone-chambered drum or pulley-wheel 94 which is shifted back and forth upon the main shaft by means of the shifting device described in the foregoing. In all other respects the arrangements of the parts are similar to those already set forth in connection with the construction shown in said Figs. 1 to 13 inclusive.

I claim:

1. In a power-transmission mechanism, the combination with a driving shaft, of a friction-clutch comprising a main body-portion for use as a driving element, said body being provided with a centrally disposed hole for arranging said body upon said shaft, a laterally extending and centrally disposed annular wall on one side of said body-portion, said wall forming a receiving chamber through which the shaft extends, side-walls arranged in pairs and extending radially from said annular wall, a socketed friction-block holding member carried by each pair of side walls, each member being closed at its bottom and surrounding side, but open at the end opposite said bottom, the edge-portions which surround said open end being tapered, as set forth, and a friction-block adjustably arranged in each holding member, said blocks having inclined engaging surfaces projecting beyond the tapered open end of each holding member, and a cone-shaped driven element arranged upon said shaft with which the engaging surfaces of said blocks are adapted to be brought in frictional engagement, all combined with a means of adjustment connected with each friction-block and arranged in the open space between each pair of radially extending side-walls, substantially as and for the purposes set forth.

2. In a power-transmission mechanism, the combination with a driving shaft, of a friction-clutch comprising a main body-portion for use as a driving element, said body being provided with a centrally disposed hole for arranging said body upon said shaft, a laterally extending and centrally disposed annular wall on one side of said body-portion, said wall forming a receiving chamber through which the shaft extends, side-walls arranged in pairs and extending radially from said annular wall, a socketed friction-block holding member carried by each pair of side-walls, each member being closed at its bottom and surrounding side, but open at the end opposite said bottom, the edge-portions which surround said open end being tapered, as set forth, and a friction-block adjustably arranged in each holding member, said blocks having inclined engaging surfaces projecting beyond the tapered open end of each holding member, and a cone-shaped driven element arranged upon said shaft with which the engaging surfaces of said blocks are adapted to be brought in frictional engagement, all combined with a means of adjustment connected with each friction-block and arranged in the open space between each pair of radially extending side-walls, consisting of screw-threaded adjusting rods, each rod having an end-portion rotatively connected with the annular wall of said main body-portion, and having its opposite end-portion extending through the bottom of a holding member and screwed into a block, a wrench-receiving portion upon each rod, and lock-nuts upon the screw-threaded portion of each rod, substantially as and for the purposes set forth.

3. In a power-transmission mechanism, the combination with a driving shaft, of a friction-clutch comprising a main body-portion for use as a driving element, said body being provided with a centrally disposed hole for arranging said body upon said shaft, a laterally extending and centrally disposed annular wall on one side of said body-portion, said wall forming a receiving chamber through which the shaft extends, side-walls arranged in pairs and extending radially from said annular wall, a socketed friction-block holding member carried by each pair of side walls, each member being closed at its bottom and surrounding side, but open at the end opposite said bottom, the edge-portions which surround said open end being tapered, as set forth, and a friction-block adjustably arranged in each holding member, said blocks having inclined engaging surfaces projecting beyond the tapered open end of each holding member, and a cone-shaped driven element arranged upon said shaft with which the engaging surfaces of said blocks are adapted to be brought in frictional engagement, all combined with a means of adjustment connected with each friction-block and ar-

ranged in the open space between each pair of radially extending side-walls, consisting of screw-threaded adjusting rods, each rod having an end-portion rotatively connected with the annular wall of said main body-portion, and having its opposite end-portion extending through the bottom of a holding member a screw-threaded metal disk secured to each block into which the screw-threaded end-portion of the adjusting rod is screwed, a wrench-receiving portion upon each rod, and lock-nuts upon the screw-threaded portion of each rod, substantially as and for the purposes set forth.

4. In a power-transmission mechanism, a main shaft, bearing members in which said shaft is mounted, each bearing member comprising a standard formed with a semi-cylindrical bearing portion, a bearing-block secured upon each bearing-portion of a standard, one of said standards being provided upon the side of its bearing portion with a helical wedge-shaped surface-portion formed with radially extending off-sets, and the bearing block which is secured upon said standard being provided upon its side with a corresponding helical wedge-shaped surface-portion formed with radially extending off-sets, a sleeve arranged upon said shaft, said sleeve being provided upon its side with a pair of helical wedge-shaped engaging surfaces, all combined with a friction clutch comprising a driving element fixed upon said shaft, and a driven element loosely mounted upon said shaft, said driven element being driven from said sleeve, substantially as and for the purposes set forth.

5. In a power-transmission mechanism, a main shaft, bearing members in which said shaft is mounted, each bearing member comprising a standard formed with a semi-cylindrical bearing-portion, a bearing-block secured upon each bearing-portion of a standard, one of said standards being provided upon the side of its bearing portion with a helical wedge-shaped surface-portion formed with radially extending off-sets, and the bearing block which is secured upon said standard being provided upon its side with a corresponding helical wedge-shaped surface-portion formed with radially extending off-sets, a sleeve arranged upon said shaft, said sleeve being provided upon its side with a pair of helical wedge-shaped engaging surfaces, all combined with a friction clutch comprising a driving element fixed upon said shaft, a driven element loosely mounted upon said shaft, and wearing pins extending from said sleeve for actuating said driven element, substantially as and for the purposes set forth.

6. In a power-transmission mechanism, a main shaft, bearing members in which said shaft is mounted, each bearing-member comprising a standard formed with a semi-cylindrical bearing-portion, a bearing-block secured upon each bearing-portion of a standard, one of said standards being provided upon the side of its bearing portion with a helical wedge-shaped surface-portion formed with radially extending off-sets, and the bearing block which is secured upon said standard being provided upon its side with a corresponding helical wedge-shaped surface-portion formed with radially extending off-sets, a sleeve arranged upon said shaft, said sleeve being provided upon its side with a pair of helical wedge-shaped engaging surfaces, all combined with a friction-clutch comprising a driving element fixed upon said shaft, said sleeve being provided with receiving-sockets, a roller in each socket, a driven element loosely mounted upon said shaft and a ring connected with said driven element with which said rollers are in rolling engagement, substantially as and for the purposes set forth.

7. In a power-transmission mechanism, a main shaft, bearing members in which said shaft is mounted, each bearing member comprising a standard formed with a semi-cylindrical bearing-portion, a bearing-block secured upon each bearing-portion of a standard, one of said standards being provided upon the side of its bearing portion with a helical wedge-shaped surface-portion formed with radially extending off-sets, and the bearing block which is secured upon said standard being provided upon its side with a corresponding helical wedge-shaped surface-portion formed with radially extending off-sets, a sleeve arranged upon said shaft, said sleeve being provided upon its side with a pair of helical wedge-shaped engaging surfaces, all combined with a friction clutch comprising a driving element fixed upon said shaft, said sleeve being provided with receiving-sockets, a roller in each socket, a driven element loosely mounted upon said shaft and a ring connected with said driven element with which said rollers are in rolling engagement, and wearing pins extending from said sleeve for actuating the driven element, substantially as and for the purposes set forth.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 21st day of July, 1906.

WILLIAM P. BRACHMANN.

Witnesses:
FREDK. C. FRAENTZEL,
F. H. W. FRAENTZEL.