

No. 768,660.

PATENTED AUG. 30, 1904.

F. HAMACHEK.  
POWER APPARATUS.

APPLICATION FILED JAN. 31, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

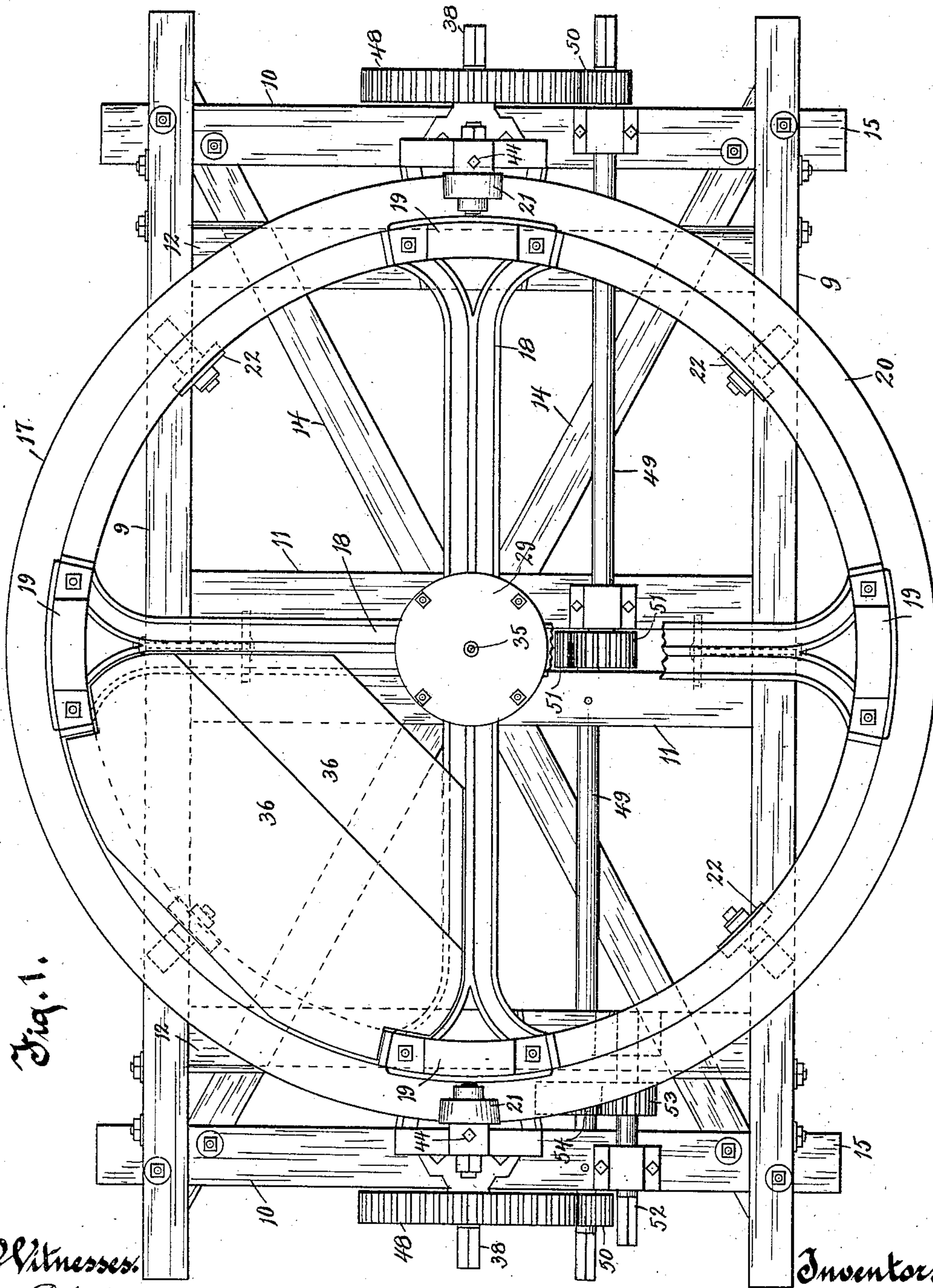


Fig. 1.

Witnesses.

*A. H. Keeney.*

*Anna F. Schmidbauer*

Inventor.

*Frank Hamachek.*

*By Benedict, Morrell & Green-  
Attorneys.*

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3 SHEETS—SHEET 2.

Fig. 2.

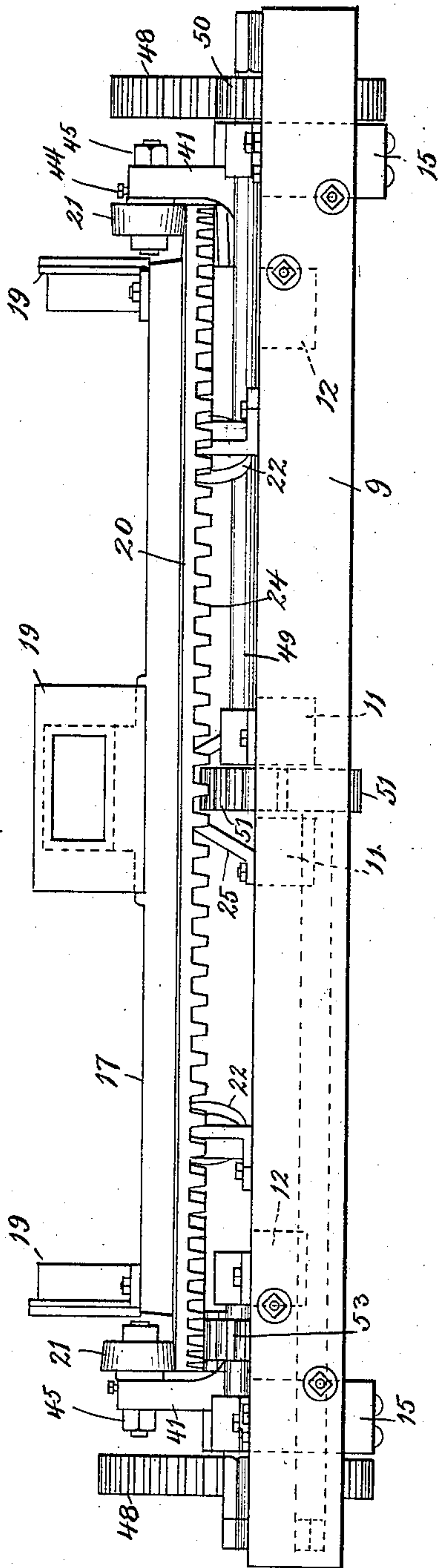
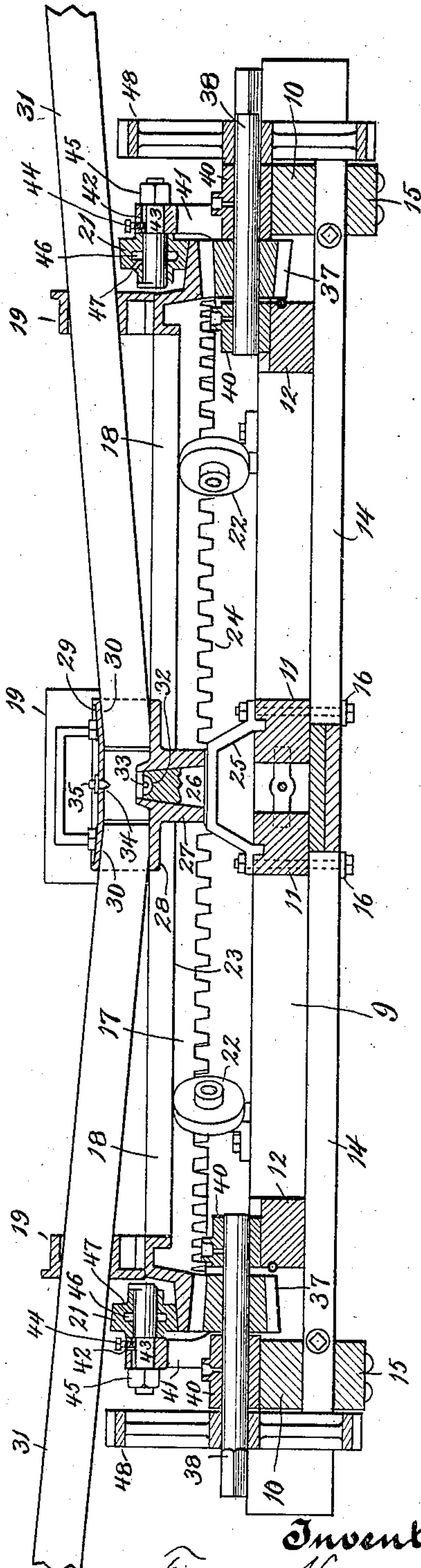


Fig. 3.



Witnesses:

*Chas. Keeney,*

*Anna F. Schmidtbauer*

Inventor:

*Frank Hamachek.*

*By Benedict, Morsell & Green,*  
*Attorneys.*



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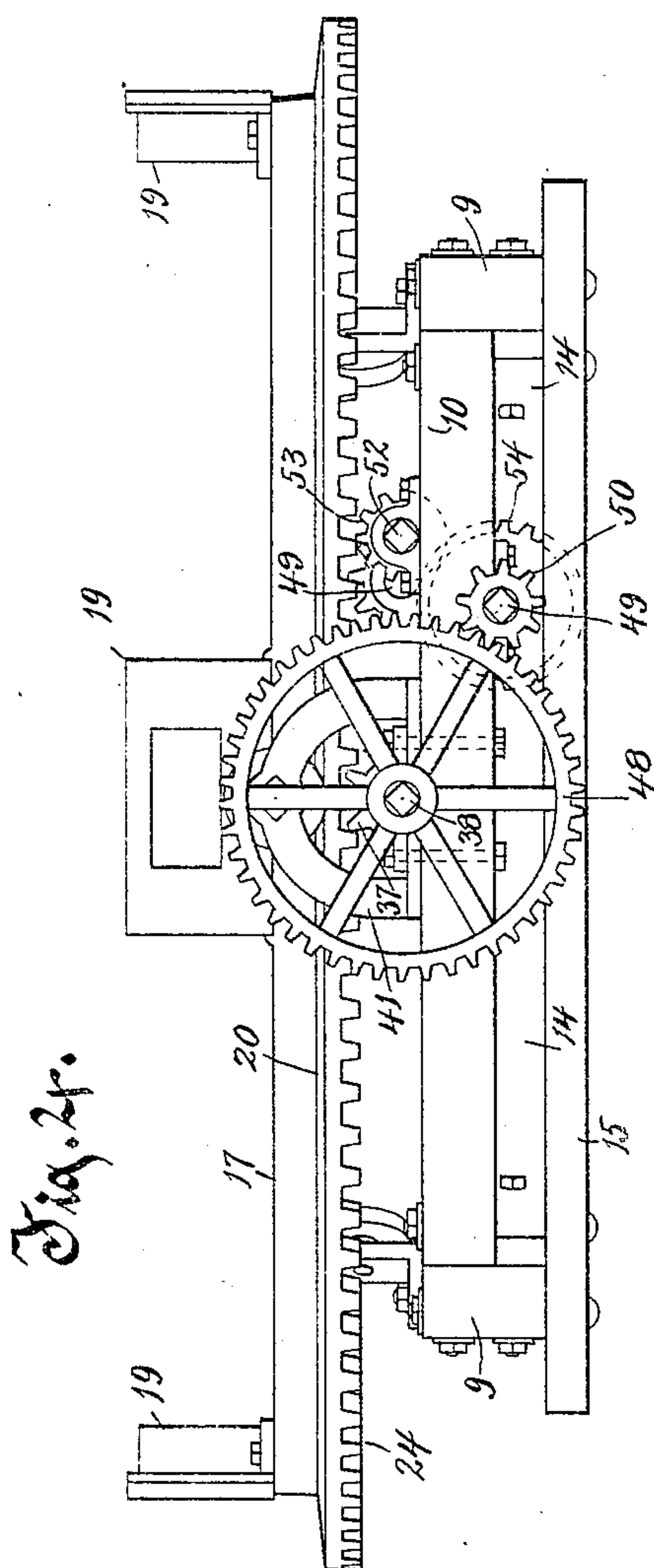
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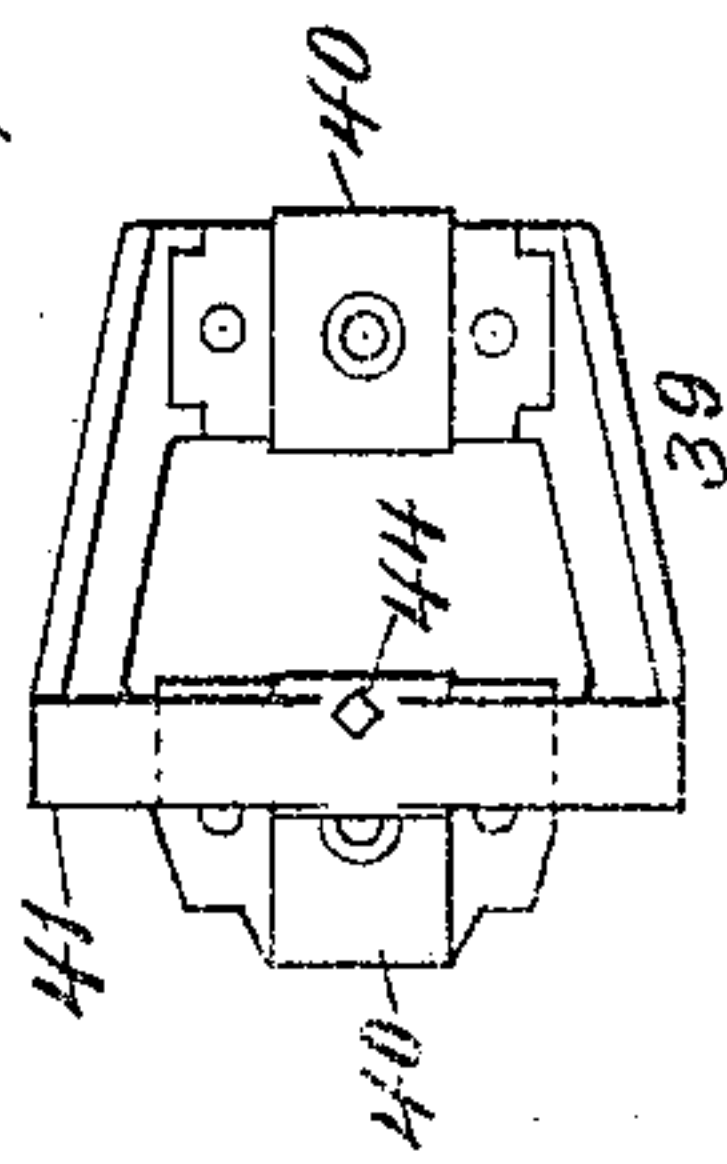
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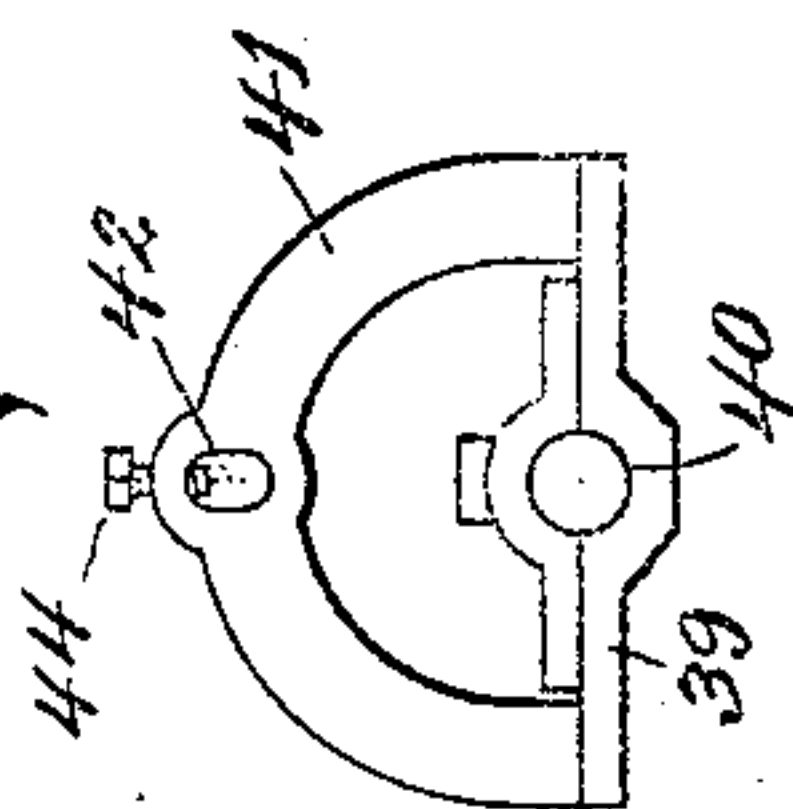
3 SHEETS—SHEET 3.



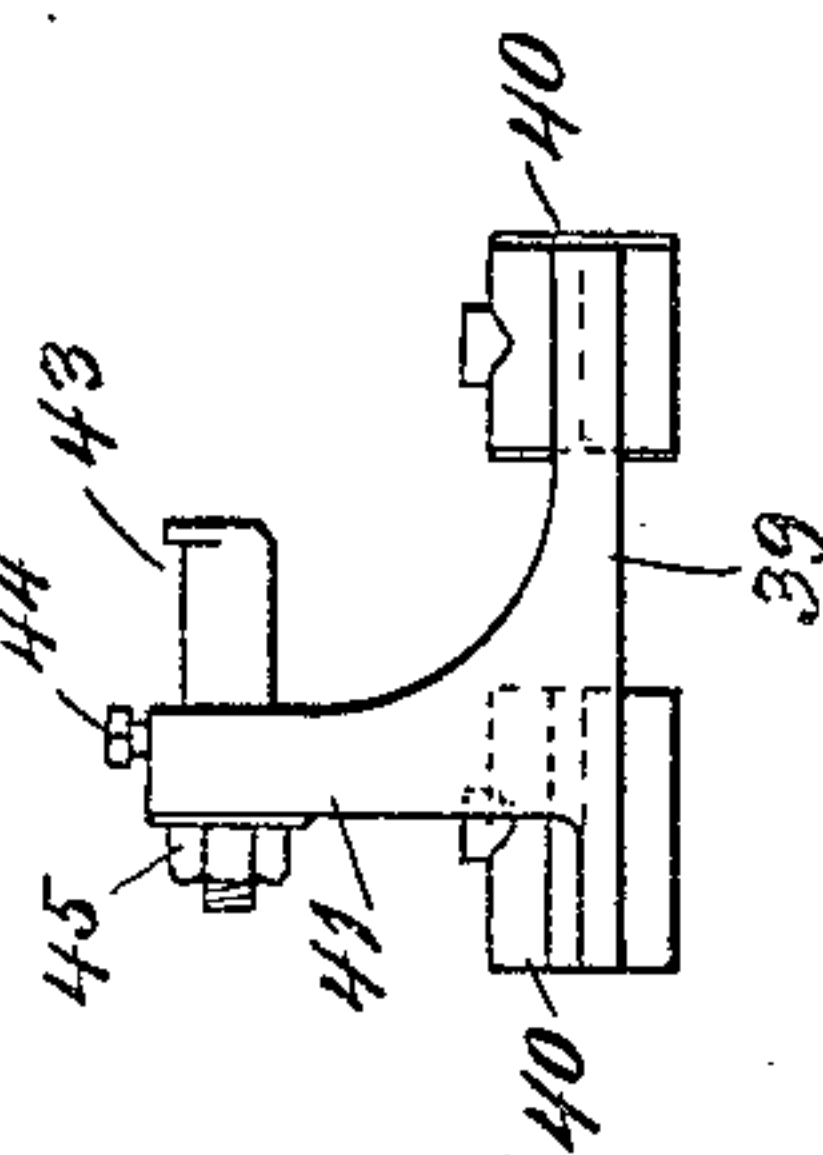
*Fig. 8.*



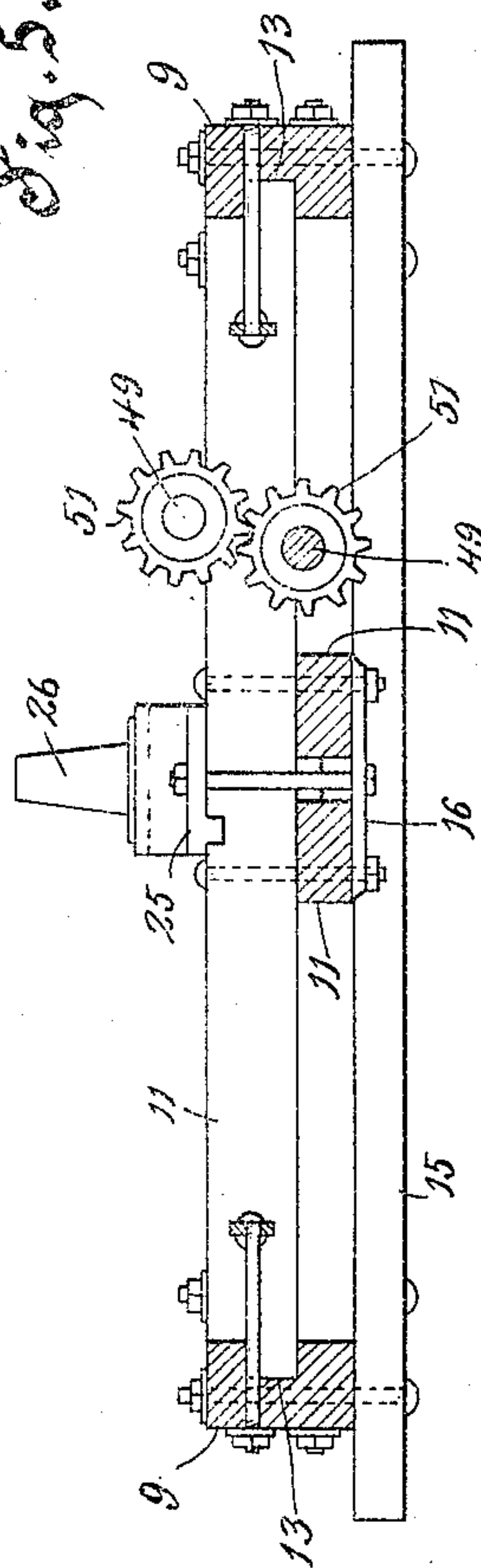
*Fig. 7.*



*Fig. 6.*



*Fig. 5.*



Witnesses.

*Chas. H. Keeney*

*Anna F. Schmidtbauer*

Inventor.

*Frank Hamachek*

*By Benedict, Morsell & Green*

*Attorneys.*

# UNITED STATES PATENT OFFICE.

FRANK HAMACHEK, OF KEWAUNEE, WISCONSIN.

## POWER APPARATUS.

SPECIFICATION forming part of Letters Patent No. 768,660, dated August 30, 1904.

Application filed January 31, 1903. Serial No. 141,313. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK HAMACHEK, residing at Kewaunee, in the county of Kewaunee and State of Wisconsin, have invented a new and useful Improvement in Power Apparatuses, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements in power apparatuses designed especially to be operated by horses and when so operated generally known as "horse-powers."

One of the principal objects of my invention is to provide an improved construction of such character that I am enabled to employ a central pivot or axis for the sweep-wheel, and yet at the same time obtain a proper distribution and equalization of the strain throughout the gearing.

A further object resides in the provision for securing a rapid rotation of the counter-shafts.

With the above primary and other incidental objects in view the invention consists of the devices and parts or their equivalents, as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a top plan view of the complete device with one of the arms of the sweep-wheel broken away. Fig. 2 is an elevation of the complete device. Fig. 3 is a central longitudinal vertical sectional view. Fig. 4 is a view at right angles to Fig. 2. Fig. 5 is a central cross-sectional view with the sweep-wheel removed. Fig. 6 is a side view, Fig. 7 a front view, and Fig. 8 a plan view, of one of the bearing-boxes carrying the short shaft for the guide-roller and the long shaft for the pinion.

The frame of the machine may be of any desirable construction adapted for supporting the operative parts of the mechanism. I prefer, however, to employ the form of frame shown in the accompanying drawings. This frame is constructed of two main side pieces 9 9, outer cross-pieces 10 10, intermediate cross-pieces 11 11, and other cross-pieces 12 12 adjacent to the outer cross-pieces 10. The several cross-pieces referred to are

provided at opposite ends with tenons, (see Fig. 5,) and these tenons fit in grooves 13 13, formed on the inner sides of the side pieces. The tenons are at the lower portions of the ends of the end pieces and cross-pieces, so that the remaining upper portions of said ends of the end pieces and cross-pieces will lie flat against the inner side faces of the side pieces. The frame also includes diagonal beams 14 14, which not only serve as braces, but also as supports for the several cross-pieces.

Sills 15 are disposed directly beneath the cross-pieces 10, and their ends extend outwardly beyond the side pieces 9. These sills carry the side pieces 9 and support the diagonal brace-beams 14. It will be noticed that the under sides of the diagonal brace-beams 14 are flush with the under sides of the side pieces 9. The frame thus constructed, with the several portions bolted together, as shown, is not only strong and enduring, but also most economical in construction. It is adapted to receive the bearing-boxes of the shafts, hereinafter referred to, on the upper and under surfaces of the transverse beams. Bottom support-plates 16 are also provided in connection with the frame, and these plates are placed directly beneath the diagonal brace-beams 14 at a point where said beams cross the intermediate cross-pieces 11.

Quite an advantage is obtained by having the diagonal beams 14 pass beneath the transverse beams 10, 11, and 12, inasmuch as when so arranged and bolted together the diagonal beams are prevented from springing and warping, thus keeping the frame and machinery in line. The frame is also materially strengthened from the fact that the sills 15 are bolted to the under side of the frame. Also in case said sills become damaged they can be easily replaced. The construction of the frame, furthermore, is such that the machinery can be put in place or removed and the frame taken apart for shipment and may again be readily put together, so that its parts, as well as the machinery, will be in line.

Mounted above the frame is a large sweep-wheel 17. This wheel is braced and strengthened by intersecting arms 18 18. The rim of



the wheel at the points where the arms 18 unite therewith is reinforced to receive the bolts for sweep-eyes 19. The rim of the wheel is also provided with an outwardly-extending flange 20, which forms a rail on which guide-rollers 21 rotate as the sweep-wheel is revolved. Beneath the sweep-wheel are other guide-rollers 22, which bear against a bearing-surface 23, formed on said under side of the sweep-wheel. The under side of the sweep-wheel is further provided with a series of teeth 24, arranged annularly therearound.

Secured at its ends to the intermediate cross-pieces 11 is a bracket 25, said bracket having projecting upwardly from its upper portion a pivot or axis 26. This pivot or axis is surrounded by a hub 27, which hub is provided with an outstanding flange 28, which connects with or forms a part of the arms 18. Arranged above the flange is a hood 29, and this hood, in connection with the flange, forms a series of sockets or eyes 30 to receive the inner ends of sweep-arms 31. These eyes are located directly over the arms 18. The said sweep-arms 31 extend outwardly through the sweep-eyes 19, and each sweep-arm projects a sufficient distance outwardly from the sweep-eyes 19 as to permit a horse to be harnessed thereto.

It will be noticed that the upper end of the pivot-pin or axis 26 is provided with the oil cavity or recess 32, and leading from this recess is a passage 33, leading to the outer edge of the pivot or axis. The hood 29 is provided with the oil-opening 34, which is normally closed by means of a plug 35. When it is desired to introduce oil into the oil-recess 32, the plug is turned out and the oil poured through the opening. This oil will pass into the recess 32 and will be free to flow therefrom through the passage 33 and will finally pass from said passage downwardly between the pivot or axis and the inner surface of the hub, whereby said parts are kept thoroughly lubricated. The oil cavity or recess 32, being of concave form, permits any foreign matter or sediment in the oil to settle in the bottom of said recess.

The openings formed between the arms 18 of the sweep-wheel are closed by means of platforms or floorings 36. In Fig. 1 only one opening between the arms 18 is shown as so covered; but it will be understood that similar platforms are provided for each of the openings. These platforms form a safety device to prevent injury to a person by being caught in the machinery beneath the sweep-wheel, and it also protects said machinery from dirt and sediment. Each platform for each space between the arms 18 is preferably made up of two separate parts, as shown in Fig. 1. From the fact that the sockets or eyes 30 are located directly above the arms 18 the sweep-arms 31 when placed in said sockets serve to hold the platforms 36 in place.

The upper and lower guide-rollers 21 and 22, respectively, serve to keep the sweep-wheel in proper mesh with driven pinions 37. These pinions are carried at the inner ends of shafts 38, located diametrically opposite to each other, and said pinions mesh with the annular teeth 24 on the under side of the sweep-wheel. I provide improved forms of bearings for these shafts, said bearings being shown in detail in Figs. 6, 7, and 8 of the drawings. The said bearings consist of base portions 39, having the sleeves 40 40, forming the bearings for shafts 38, and at their outer ends provided with upwardly-extending arches 41, said arches provided at their crowns with oblong openings 42, adapted to receive the short shafts 43 of the upper guide-rollers 21, and a set-bolt 44 turns through the crowns of each arch and bears against each shaft 43. By the provision of these bolts the shafts 43 can be adjusted so as to bring the rollers 21 into proper position. The end of each shaft which enters the oblong opening 42 is reduced in diameter, and a nut 45 is turned onto its extremity in order to draw the square shoulder of the shaft firmly against the inner side of the arch. From the above description of the construction illustrated in Figs. 6, 7, and 8 it will be seen that the bearings for the shafts of the pinions and the bearings for the shafts of the upper guide-rollers are all in one piece. This is a decided advantage, inasmuch as the bearing-boxes are thereby always maintained in line with each other.

It will be understood that when the sweep-wheel is rotated there is a tendency for said wheel to rise. By means of the guide-rollers 21, however, the annularly-arranged teeth on the under side of the sweep-wheel are kept in proper mesh with the pinions 37, and the strain upon the arches 41 is equally distributed. Were the bearing-boxes and the arches separate parts, extra bolts would be required to be employed, and it would be impossible to keep them in proper alignment. It is also to be stated that by means of the set-bolts 44, bearing upon the shafts 43, all possible wear can be compensated for.

The guide-rollers 21 are provided with interior circular oil-cavities 46, to which feed-passages 47 lead, (see Fig. 3,) and the under guide-rollers 22 are provided with similar oil cavities and passages. (Not shown.) By this arrangement the bearings of the rollers are automatically lubricated as said rollers revolve on the shafts.

For the purpose of developing power and speed I provide on the outer ends of the shafts 38 spur-wheels 48. I also provide two shafts 49 49, having mounted on their outer ends spur-pinions 50 50, meshing with the spur-wheels 48. At their inner ends the shafts 49 carry pinions 51 51, which mesh with each other. By this arrangement the auxiliary gears coöper-



ate with each other, and thereby equalize the strain upon the crown-wheel. For instance, should the horse give a jerk or pull at one point of the periphery of the sweep-wheel the strain on said wheel is distributed equally in view of the intermeshing of the spur-wheels 48 with the spur-pinions 50 and the intermeshing of the pinions 51. Heretofore a distribution of power has generally been attempted by a peculiar arrangement of bevel-gearing; but the construction has necessarily been such as to necessitate the omission of a central pivot for the sweep-wheel. Constructions of this character are objectionable in view of the fact that the strain on the sweep-wheel causes said sweep-wheel to be thrust out of its true position, owing to the omission of the pivot. For developing the still higher speed I employ an additional shaft 52, carrying a pinion 53, meshing with a pinion 54 on one of the shafts 49. The outer ends of all the several shafts may be provided with universal connections for transmitting the power developed.

In the operation of my device when the sweep-wheel is rotated by the animal harnessed to the sweep-arms said rotation is imparted to the shafts 38 by reason of the intermeshing of the annular rack 24 on the under side of the sweep-wheel with the pinions 37 on the inner ends of the shafts 38, and the rotation of said shafts 38 is imparted to the other shafts 49 and 52 by the intermeshing gears hereinbefore described.

It will be seen that by my improved construction no bevel-gearing whatever is employed in the construction of the auxiliary gears, and the several rotations are effected solely by spur-gears, said gears being so arranged as to admit of the employment of a central pivot, and thereby obviating any danger of the sweep-wheel being thrust out of true position. Where no central pivot is employed, as is the case with all existing high-speed powers, the sweep-wheel invariably gets out of line when any strain is brought upon it and produces unavoidable friction, and as a consequence the power is weakened.

It is to be added that power is transmitted by this device from either of the shafts 38 or from either of the shafts 49 or from the shaft 52, or the power may be transmitted from a plurality of said shafts or from all of said shafts simultaneously, the same being accomplished by connecting said shafts to whatever the power is to be transferred to.

What I claim as my invention is—

1. In a power apparatus, the combination of a toothed sweep-wheel, a central pivot therefor, means for rotating said sweep-wheel, radial shafts having pinions on their inner ends meshing with the teeth of the sweep-wheel at diametrically opposite points of said sweep-wheel, large gear-wheels carried by the

said shafts at their outer ends beyond the periphery of the sweep-wheel, and a pair of connecting-shafts provided with pinions in mesh with the gear-wheels, said connecting-shafts being geared together.

2. In a power apparatus, the combination of a toothed sweep-wheel, a central pivot therefor, means for rotating said sweep-wheel, radial shafts having pinions on their inner ends meshing with the teeth of the sweep-wheel at diametrically opposite points of said sweep-wheel, large gear-wheels carried by said shafts at their outer ends beyond the periphery of the sweep-wheel, a pair of connecting-shafts provided with pinions meshing with the gear-wheels, said connecting-shafts being geared together, and a power-shaft geared to one of the connecting-shafts.

3. In a power apparatus, the combination of a sweep-wheel having a central hub portion, a central pivot-post surrounded by the hub, the upper end of said pivot-post being provided with the central concave oil recess or cavity having a radial passage extending therefrom and leading to the space between the pivot-post and the inner surface of the hub, and means for rotating the sweep-wheel.

4. In a power apparatus, the combination of a sweep-wheel having the central hub portion, said hub provided with a projecting flange, a central pivot surrounded by the hub, said pivot provided in its upper end with an oil cavity or recess and with a passage extending from the recess and leading to the space between the pivot and the inner wall of the hub, a hood above the flange of the hub and forming in connection with said flange a series of sockets, said hood also provided with an oil-opening through which oil is fed into the recess or cavity of the pivot, and sweep-arms having their inner ends fitted in the sockets.

5. In a power apparatus, the combination of a sweep-wheel provided with an annular rack, means for rotating said sweep-wheel, a bearing provided in its base with sleeves and also provided with an upwardly-extending integral portion having an elongated opening therein, a short shaft slidably fitted in said opening and carrying a roller bearing against the sweep-wheel, means for adjusting the short shaft in the elongated opening, and another shaft fitting in the sleeves of the base of the bearing and carrying a gear-wheel between said sleeves in mesh with the annular rack of the sweep-wheel.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK HAMACHEK.

Witnesses:

F. J. STANGEL,  
VOJTA A. HAMACHEK.