(No Model.)

G. K. MOEHLE.

REVERSIBLE FRICTION GEAR.

No. 463,532. Patented Nov. 17, 1891.

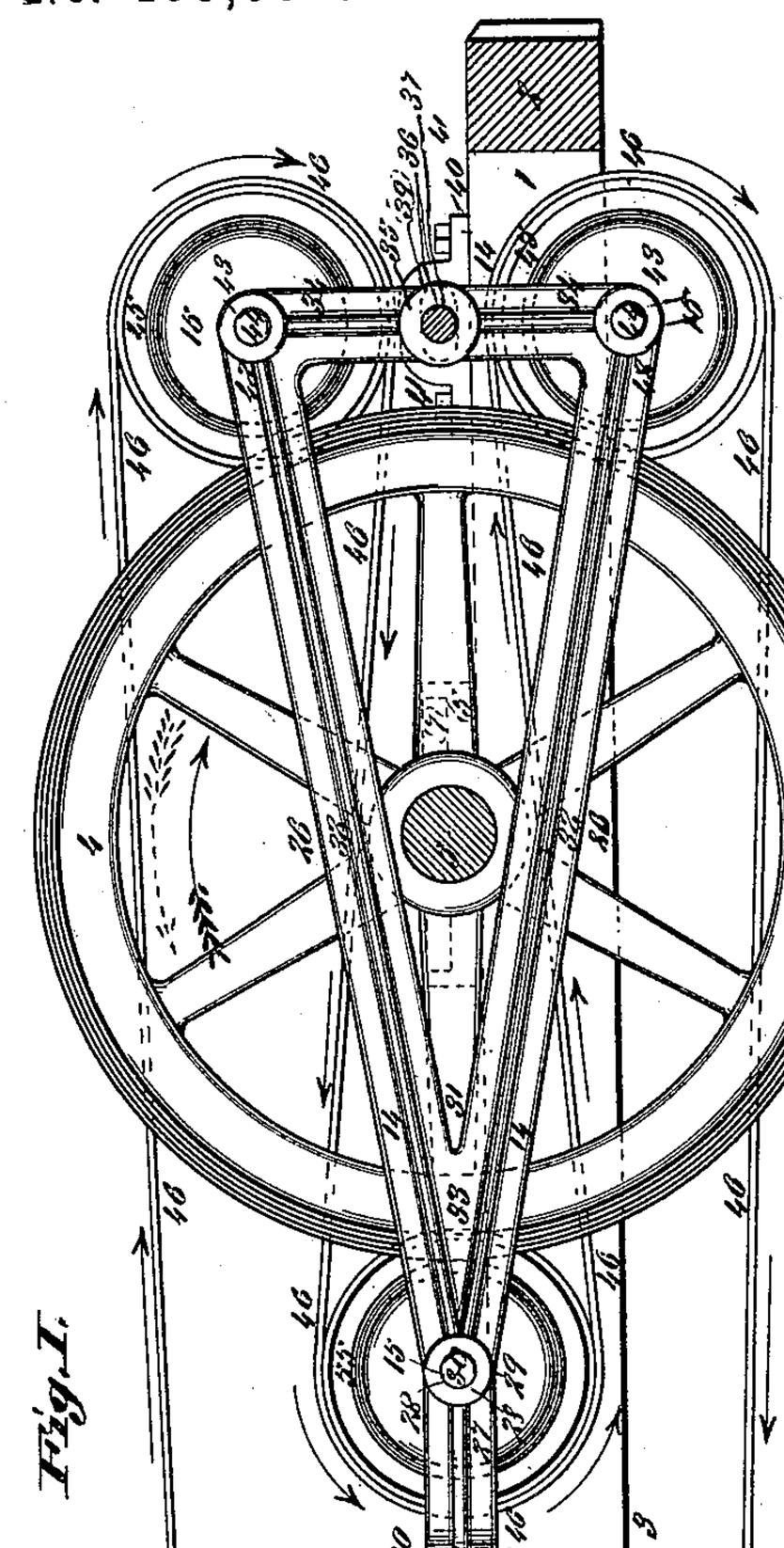

Fig. I.

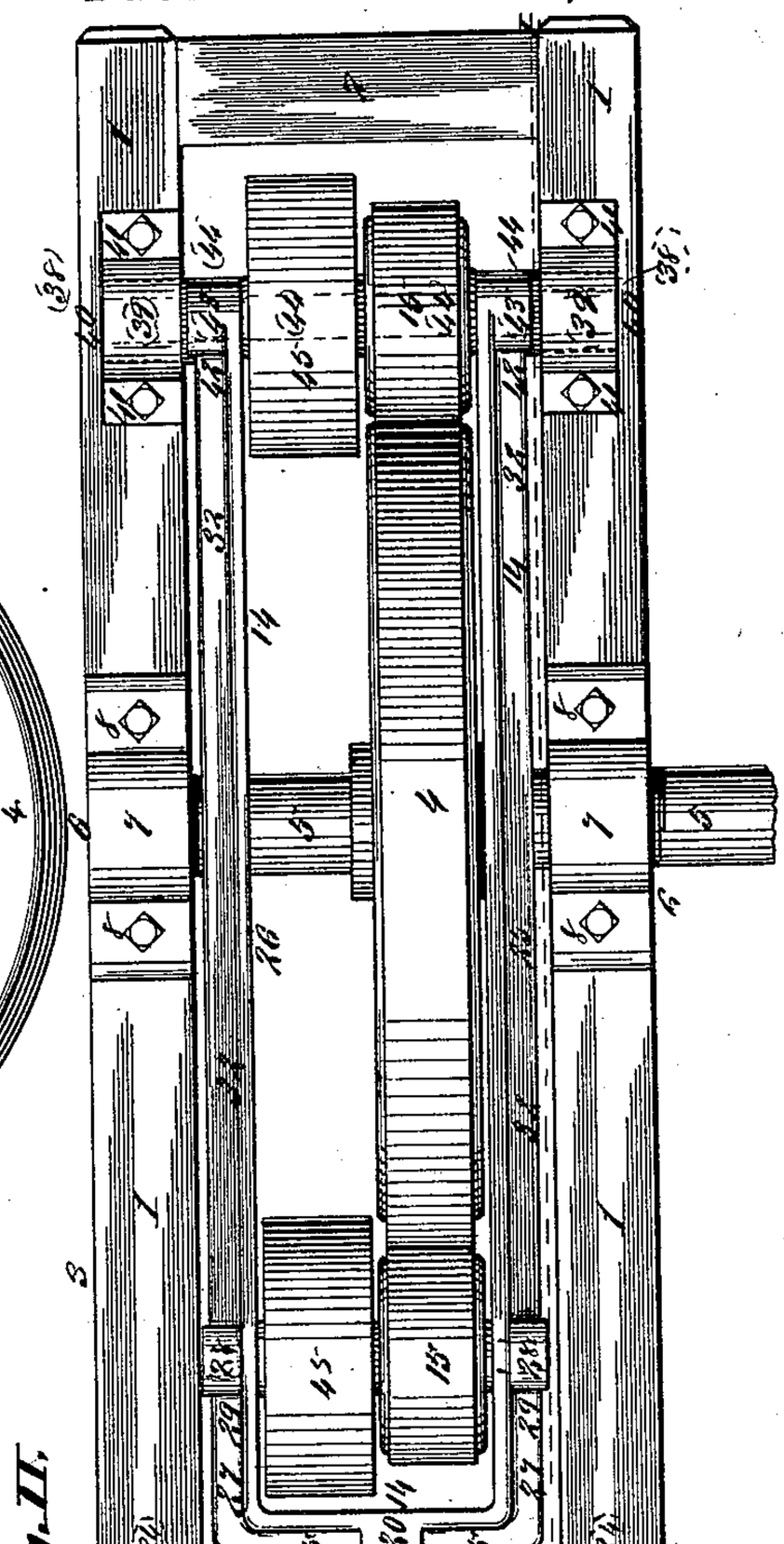

Fig. II.

Attest:

S. Cotton

Harry S. Polmer

Inventor:

Gustav K. Moehle.

By Knight Bro's.

Atty's.

UNITED STATES PATENT OFFICE.

GUSTAV K. MOEHLE, OF ARROW ROCK, MISSOURI.

REVERSIBLE FRICTION-GEAR.

SPECIFICATION forming part of Letters Patent No. 463,532, dated November 17, 1891.

Application filed December 10, 1890. Serial No. 374,229. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV K. MOEHLE, of Arrow Rock, in the county of Saline and State of Missouri, have invented a certain new and useful Improvement in Reversible Friction-Gear Motor Attachments, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to an adjustable and reversible friction-gear for motors, &c., whose main major driven gear-wheel, the operating axle-shaft that carries it, and the drive band-wheel and its axle are mounted on the main bed-frame, and the drive friction gear-wheels and the axles that carry them are mounted on an adjustable reversible frame, which frame is operated by a lever, so that if the actuating-lever is thrown with a slight inclination to the rear the forward minor friction-gear drive-wheel is brought into operative contact with the major driven wheel and drives it in a right-hand rotation, and when said lever is inclined forward said front friction-gear drive-wheel is released and simultaneously the rear minor friction-gear drive wheel or wheels are brought into operative contact with the major driven wheel, driving it in a reversed left-hand rotation, and still, again, when the actuating-lever is placed in an intermediate position the friction-gear is stopped; and the invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a vertical section taken on line I I, Fig. II, and shows the main bed-frame with the major driven friction-wheel and major drive band-wheel journaled on said bed-frame. It also shows the friction drive-wheel adjustably-reversible frame with the reversing-lever and the direction of the endless operating-band in its eccentric circuit around the major and minor drive band-wheels; and Fig. II is a top view of the same minus the endless band, and shows the respective positions in line of the major and minor band-wheels, as also the positions in line of the major driven and the minor drive friction-wheels.

Referring to the drawings, 1 represents the longitudinal side pieces, and 2 the transverse end pieces of the main bed-frame, which form the primary mount of the friction-gear.

4 represents the major driven friction gear-wheel that is fast mounted on the operative axle-shaft 5, which shaft has its bearings in the journal-boxes 6, which journal-boxes with their caps 7 are secured to the side pieces 2 of the main bed-frame by the screw-bolts 8.

9 represents the major band drive-wheel, which is fast mounted on the drive-shaft 10, and may be directly operated by any suitable motive power, and said shaft has its bearings in the journal-boxes 11, which with their caps 12 are secured to longitudinal side pieces of the main bed-frame by the screw-bolts 13.

14 represents an adjustably-reversible supplemental frame that is preferably cast or otherwise formed of metal, and which carries the friction drive-wheels 15. The said frame, when it is constructed to carry two rear drive friction-wheels and one forward one, is constructed, as shown, with a single forward bifurcated tongue 16, that is secured to and worked by the actuating-lever 17, being pivotally attached thereto by the bolt 18, which is seated and works in its perforate bearing 19 in said forward bifurcated tongue 16 of the frame and in said actuating lever, and through integral boss-swells 20, that project from the sides of said lever and hold it against said bifurcated tongue in vertical position. The lower end of said lever is provided with a perforate bearing 21, through which it is mounted on its journal-shaft 22, the ends 23 of which journal-shaft are secured in their perforate seats 24 in the side pieces 1 of the bed-frame. The said adjustable reversible frame 14 has lateral shoulders 25, that extend to the right and left, respectively, at a right angle back of said bifurcated tongue. The said shoulders extend transversely to nearly the same width as the space between the side pieces of the main bed-frame between which said adjustable reversible frame works. The frame turns again at a right angle at the limit of said shoulders, and extends rearwards on parallel lines the whole length of said adjustable frame, forming the sides 26 thereof. When there are two rear friction drive-wheels 15, as shown in the drawings, the said sides of the frame are of eccentric novel form,

having single horizontal extensions 27 from each shoulder to the perforate journal-bearings 28, which bearings pass through said sides of the frame and through the integral boss-collars 29, that strengthen said frame at said journal-bearing points. The axle-journal 30, on which the forward friction drive-wheel is mounted, rotates within said perforate bearings 28. From said perforate swell-bearings the sides of the frame on each side form a double arm or fork 31, the two arms 32 being integral together at their joint ends, at the rear of said perforate bearings being jointly secured by the crotch 33, which crotch greatly strengthens the frame and braces the connection of the forked arms, which in position are placed vertically one above the other and rearwardly diverge from each other.

34 represents the coupling-tie arms which connect the two flaring ends of the fork-arms 32 on each side of the frame, which coupling-tie is preferably cast or formed integral with the arms of the frame that it couples.

35 represents integral boss-collars on the outside of the middle of said coupling-tie, through which boss-collars and coupling-tie is formed the perforate bearing 36 for the fast ends of the idler-shaft 37 having projecting extensions 38, which are seated and engage in the horizontally elongated bearings 39 in the journal-boxes 40, which are secured to the side pieces 1 of the main bed-frame by the screw-bolts 41.

42 represents integral boss-collars that project laterally from the junction corners of the fork-arms and coupling-ties of the adjustable reversing-frame, and through which collars and junction corners are the perforate bearings 43, in which are respectively seated and work the journal ends of the two axles 44, on which axles, respectively, the two rear friction drive-wheels 15 are fast mounted. On said two axles 44 are also respectively fast mounted the two rear minor drive band-wheels 45, whose associate forward minor band-wheel, also 45, is fast mounted on the axle-journal 30, that also carries the forward drive friction-wheel 15.

46 represents the endless friction-band that drives the friction-gear, which is operated by the major drive band-wheel 9, that is rotated by the drive-shaft 10. The said endless band has a doubling circuitous route, in which it embraces the major and all of the minor band-wheels and transfers the power from the former to the latter. The course taken by said endless band, as shown by the arrows along its course in Fig. I, is from the major band-wheel 9 rearward to and round the rear of the minor upper rear band-wheel 45, then on the return stretch and round the front of the associate minor front band-wheel, also 45, then again rearward to and round the rear of the lower rear band-wheel, also 45, and from that on the return to the starting-point of its described course at the major band-wheel 9.

The drive-shaft 10 may communicate by transfer with any steam or other power, or the power and rotary movement may be transmitted to said drive-shaft by an initial endless drive-band that transfers said power *via* the primary band-wheel 47, (shown in broken lines in Fig. II,) and in which case said band-wheel is fast mounted on the drive-shaft 10.

The reversing-lever 17 may be secured to either its forward or rearward throw by the usual ratchet-lock or by any other suitable locking device when the operator requires to withdraw his hand.

The operation of the device is as follows: The power is transmitted to the friction-gear, as stated, either direct by its drive-shaft 10 or *via* an endless band on its primary band-wheel 47. In either case said drive-shaft 10 carries the major drive-wheel 9 in the direction shown by the arrow in Fig. I, and drives the endless belt in its circuitous and doubling course around said major 9 and minor band-wheels 45 in the direction shown by the arrows in said figure, whether the friction-gear is run to a right or left hand movement. When the lever is thrown rearward, as shown in Fig. I, in the initial starting of said rear throw, the adjustable reversing-frame is moved rearward, the projecting extensions 38 of its idler-shaft 37 sliding back in their elongated bearings 39 in the journal-boxes 40 until the front friction drive-wheel 15 is brought into operative friction-gear contact with the major driven friction-wheel 4. Now as the return-section of the endless belt, which always runs as indicated by arrows in said figure, effects a left-hand turn of said friction drive-wheel it is evident that the major friction driven wheel and the operative shaft 5 it mounts must therefore be run (as shown by the arrow in full lines, in a right-hand revolution. When it is required to reverse the action, the lever is thrown forward, carrying the reversing-frame with it, the idler-shaft sliding forward in its elongated bearings in the journal-boxes 40 until the front friction drive-wheel 15 is moved out of contact with the major friction-wheel 4, and the two rear friction drive-wheels (also numbered 15) are brought into friction contact therewith, and as said rear drive-wheels move, as shown by the arrows, on a right-hand turn it follows that they turn the major friction-wheel 4 and its operating-shaft 5 in an opposite—that is, a left-hand—rotation, as shown by the arrow in broken lines in Fig. I.

It is often of the utmost importance to be able to reverse the movement of machinery or to stop its movement in the shortest possible space of time. Thus when used in the propulsion of vessels, when either in danger of collisions or from any other cause it is required to suddenly reverse the course of the vessel or to stop the movement of the paddles or screw, it is quickly accomplished where my reversible friction-gear is used; and so, also, when the device is applied as a friction-drive in other classes of machinery, where it

is either frequently or occasionally required to reverse the movement, my device is especially applicable, as in machine-shops where lathes and other machinery are operated by the friction-gear. It is frequently of great importance that there should be some means, such as is here provided in my reversible and detachable gear for both reversing and also for stopping the movement independent of the action of the engine, or of the engineer who governs it, who, with his engine, is generally in a distant engine-room or in the basement of the works or building.

I have represented a single front friction drive-wheel on one side of the driven wheel and duplex rear friction drive-wheels on the reverse side thereof for a threefold reason:

First. To illustrate that there may be either a single friction drive-wheel, as shown, in front of the major friction-wheel that it drives on each side of said drive-wheel, or there may be a multiple of said friction drive-wheels on each side thereof, as shown by the duplex friction drive-wheels in its rear.

Second. The combination of a single friction drive-wheel on one side of said driver-wheel and duplex friction drive-wheels on the reverse side provides the option of using, respectively, either the single or duplex friction drive-gear when it is immaterial whether a right or left hand movement is provided; but it is of eminent material consequence to either increase or diminish the tension of the friction-gear. Thus, on one hand, in some light and very particular work, a light friction tension is preferable, and on the other hand, in heavy work, where considerable pressure is brought to bear in effecting the work, the more commanding friction tension of the duplex friction drive-wheels is preferable.

Third. The fork reversible frame that carries the friction drive-wheels makes a stiffly-braced frame that commands a more equable movement to the friction-gear and not as subject to vibration as is the friction-gear carried by a simple horizontal frame; but I do not confine myself to the number of drive friction gear-wheels, for there may be either less or more than the three shown and described. When there are only two of said friction drive-wheels provided, the reversible frame being then a simple horizontal one, the said frame, as also the main bed-frame, should be extended somewhat farther back in the rear, as also the journal-boxes 40, thus allowing room for the introduction of the then single rear friction-gear drive-wheel on a horizontal line with the front friction-wheel.

I have represented the actuating-lever 17 as presented upward from the main bed-frame on which it is pivoted, as when said reversible friction-gear plant is located near the floor, such will be the preferable position of the lever; but frequently in machine or work-shops it is found more convenient to elevate said friction-gear, and thus utilize some of the unoccupied portions of the work-room near the ceiling. In such case the lever may hang pendent below its perforate bearings, respectively 19 and 21, reversing their positions, so that said lever may be within reach of the machinist, as the lever is then inverted and it fulcrums through its lower bearing on the journal-shaft 22, and the perforate end of said lever engages on the draft-bolt 18, that governs the adjustment of the reversible frame, so as to reverse said frame and its friction-gear wheels, as also when required to throw them out of gear.

I claim as my invention—

1. In a friction drive-gear, the immovable bed-frame, the driven friction-wheel and major drive band-wheel mounted on said frame, the movable reversible frame 14, the drive friction-wheels, and minor band-wheels carried by said reversible frame, the endless belt 46, having a circuitous doubling course, and the actuating-lever that reverses said movable frame without change of tension of said belt on the major and minor band-wheels that carry it, substantially as and for the purpose set forth.

2. In a friction drive-gear, the combination of the main bed-frame, the major friction-gear driven wheel and its operating-shaft mounted on said bed-frame, the reversible friction drive bearer-frame 14, the reversing-lever that actuates said frame, and the friction drive-wheels that are mounted on said reversible frame at opposite ends of the frame, with the driven wheel between them, substantially as and for the purpose set forth.

3. In a friction drive-gear, the combination of the main bed-frame, the major driven wheel 4, the operative shaft 5, on which said wheel is mounted and by which it is mounted on said bed-frame, the reversible friction drive bearer-frame 14, the idler-shaft 37, on which said frame is mounted, the journal-boxes 40, provided with elongated bearings 39, in which the journal ends of said idler-shaft are seated and slide during the reversion of said frame, the actuating-lever 17, by which said frame is thrown to reverse its gear, the friction drive gear-wheels 15, and the axle-shafts that carry them, substantially as and for the purpose set forth.

4. In a friction drive-gear, the combination of the main bed-frame, the major driven wheel 4, the operative shaft 5, the major band drive-wheel 9, the drive-shaft on which it is mounted, the said wheels and shafts mounted on said bed-frame, the reversible friction drive bearer-frame 14, the idler-shaft 37, on which said frame is mounted, the journal-boxes 40, provided with elongated bearings 39, in which the journal ends of said idler-shaft are seated and slide during the reversion of said frame, the actuating-lever 17, by which said reversible frame is thrown to reverse its gear, the friction drive gear-wheels 15, the minor band-wheels 45, the axle-shafts that carry said wheels 15 and 45, and the end-

less band 46, substantially as and for the purpose set forth.

5. In a friction drive-gear, the combination of the main bed-frame, the major driven wheel 4, the operating-shaft 5, by which said wheel is mounted on said bed-frame, the major band drive-wheel 9, the drive-shaft 10, by which said band-wheel is mounted on said bed-frame, the reversible friction drive bearer-frame 14, constituted of the forward bifurcated tongue 16, the transverse shoulders 25, the horizontal extensions 27, the angular forked duplex arms 32 and the coupling-tie arms 34 of the idler-shaft 37, on which said reversible frame is mounted, the journal-boxes 40, provided with elongated bearings 39, in which the journal ends of said idler-shaft are seated and slide during the reversion of said frame, the actuating-lever 17, by which said frame is thrown to reverse its gear, the friction drive gear-wheels 15, the minor band-wheels 45, the axle-shafts that carry said wheels 15 and 45, the primary band drive-wheel 47, and the endless drive-band 46, that has a circuitous doubling course that retains an equal tension during all reversions of the adjustable drive-frame 14, substantially as and for the purpose set forth.

GUSTAV K. MOEHLE.

In presence of—
ROBT. M. REYNOLDS,
O. W. LACY.