J. G. MORRISON.

GEARING.

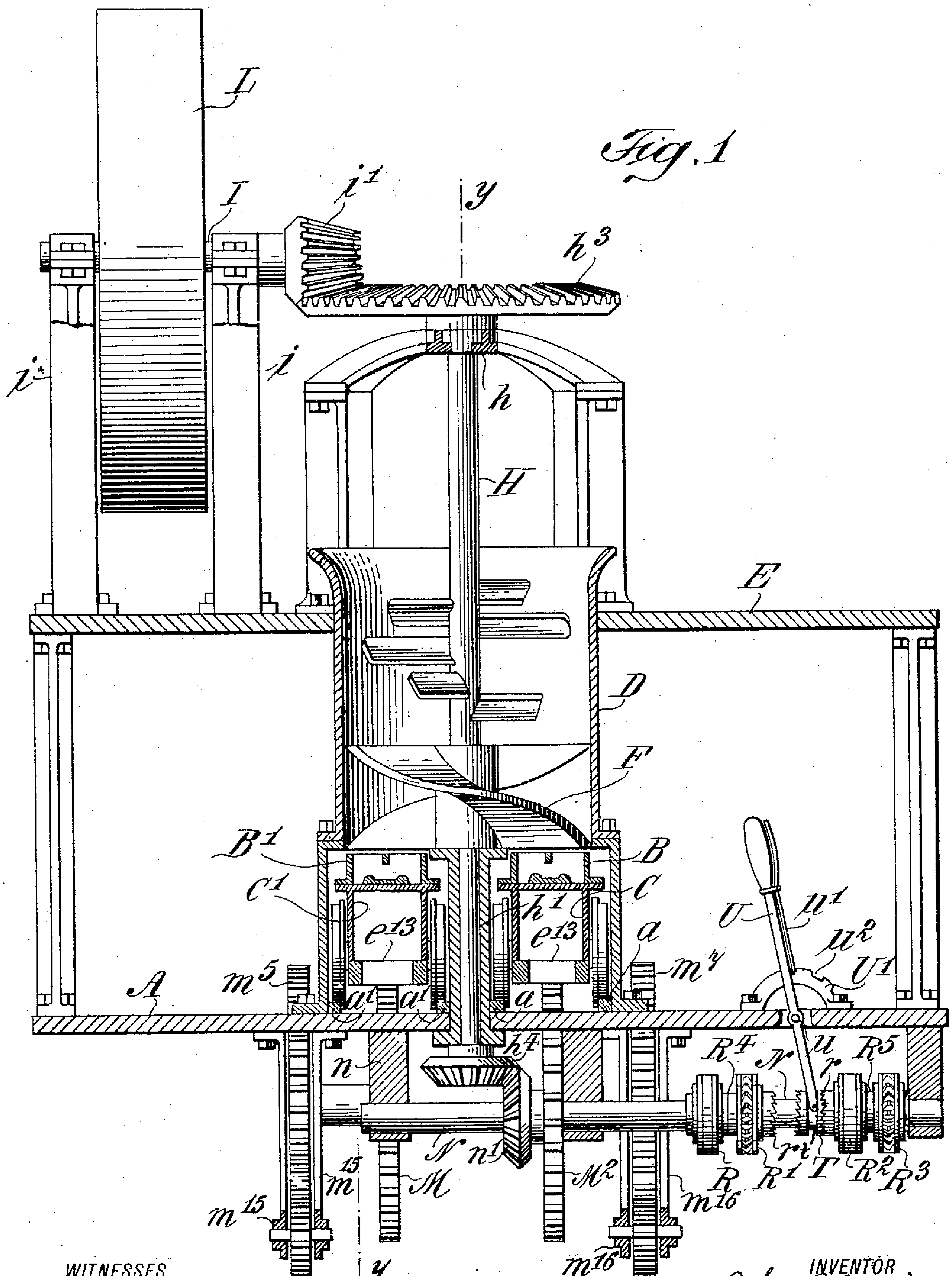
APPLICATION FILED OCT. 31, 1908.

939,153.

Patented Nov. 2, 1909.

3 SHEETS—SHEET 1.

Fig. 1



WITNESSES

Julius H. Fritz

Adalbert Zuzmagy

INVENTOR

John G. Morrison

BY

Wm. H. Appleton

ATTORNEY

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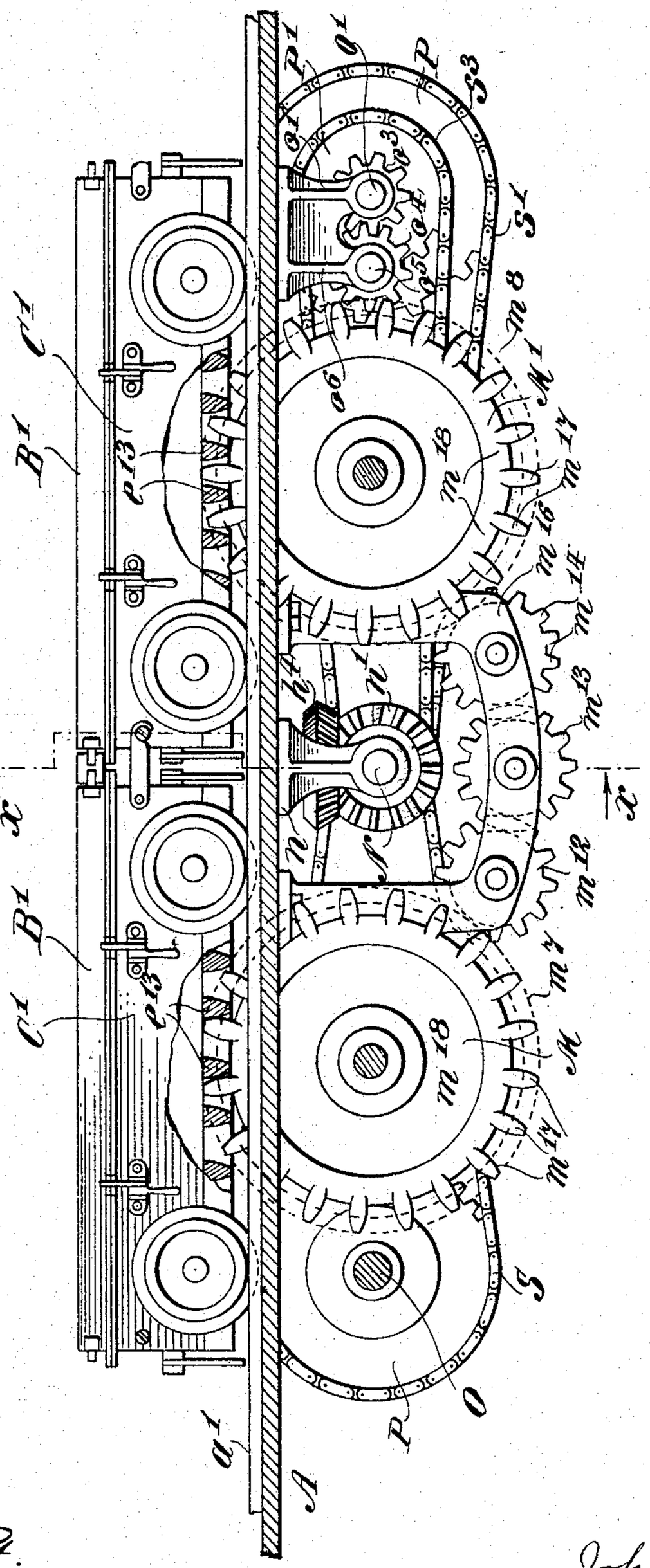

WITNESSES

Jacinth Huth.

Adalbert Fulguage.

INVENTOR

John G. Morrison

BY

Wm. H. Appleton

ATTORNEY

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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3 SHEETS—SHEET 3.

Fig. 3

WITNESSES

Julius M. Smith.

Adalbert Seligmann

INVENTOR

John G. Morrison

BY

W. H. Appleton,

ATTORNEY.

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN G. MORRISON, OF NEW YORK, N. Y.

GEARING.

939,153. Specification of Letters Patent. **Patented Nov. 2, 1909.**

Original application filed January 4, 1908, Serial No. 409,341. Divided and this application filed October 31, 1908. Serial No. 460,380.

To all whom it may concern:

Be it known that I, JOHN G. MORRISON, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Gearing, of which the following is a specification.

My invention, while relating to gearing in general, has reference more particularly to that form thereof which is employed for propelling a plurality of bodies, or a plurality of series of bodies, in opposite directions, while yet permitting of changing the speeds at which they may be thus propelled, and is especially applicable for use in moving flask-supporting carriers of sand molding machines in opposite directions beneath the sand compacting devices, to subject the flasks carried by them to the action of such devices, as shown, for instance, in application for Letters Patent of the United States No. 409,341, which was filed by me in the United States Patent Office January 4th, 1908, and of which the present application is a division. While thus especially applicable for use in sand molding machines, my invention is not necessarily restricted thereto, but may be applied in connection with various other forms of machine in which the movements of bodies in opposite directions—whether in curvilinear or in rectilinear lines—and at different rates of speed are required; the object of the invention being to provide a motion transmitting and speed changing device of this character, which, while capable of more or less general application, shall, at the same time, be simple in construction and efficient in operation.

To these ends, the invention consists in certain peculiarities of construction and combinations of parts, of which the specific form preferred in practice will be first described, and the features of the invention then pointed out in the subjoined claims.

Referring to the accompanying drawings, which form a part of this specification, and in which my invention is shown as applied in connection with a sand molding machine, Figure 1, is a vertical transverse section, of a sand molding machine, with my invention applied in connection therewith, taken in the line *x x* of Fig. 2 with certain of the parts shown in elevation; Fig. 2, a longitudinal section of the same, taken in the line *y y* of Fig. 1, with parts broken away, and the portion of the molding machine above the flasks removed, and Fig. 3, is a reversed plan view of a portion of the bed or platform of the molding machine, with my invention applied thereto.

In all the figures, like letters of reference are employed to designate corresponding parts.

A indicates the bed or platform upon and from which the various parts of the machine are supported; B and B^1 respectively indicate the flasks in which the molds for the various articles to be cast are formed; C and C^1 the carriers upon which the flasks B and B^1 are respectively carried; *a* and a^1 pairs of parallelly disposed rails along which the respective carriers C and C^1 are caused to travel; D the hopper to which the sand to be used in the molding operation is supplied, and to which it is fed to the flasks as they are caused to travel back and forth beneath it with their respective carriers C and C^1; E the platform in which the hopper D is supported; F the compacter by means of which the feeding of the sand downward through the hopper and its compacting within the flasks are effected; H the shaft upon which the compacter is fixedly secured, and which, extending downward axially through the bed or platform A, is mounted in bearings *h* and h^1; the shaft through which the shaft H is rotated, the same being mounted in suitable hangers *i*, and, provided with a driving pulley L, is operatively connected with the shaft H through the intervention of bevel gears h^3 and i^1, all of which parts, with their constructions, arrangements, organizations, and operations, are or may be the same as the corresponding parts shown and described in the application hereinbefore referred to, and which, forming no part of my present invention, require no further description herein.

For transmitting the requisite movements in opposite directions to the carriers C and C^1 or to the other devices to be operated in place of them and for changing the rate of speed at which these carriers or these devices move relatively to the speed of the driving shaft, various means may be employed, and it is to these means that my present invention more particularly relates. I prefer however to employ for these purposes spur-gears M, M^1, M^2, and M^3, which, operated

from the shaft H, are adapted to engage with appropriate teeth e^{13} formed on or carried by the carriers or other parts to be actuated from them. As thus employed, these gears are preferably arranged in pairs, with the gears of one pair separated the proper distances apart and lying in one plane of rotation, and the gears of the other pair similarly separated and lying in another plane of rotation, which is or may be parallel to the first or otherwise. In the drawings however, I have shown these planes of rotation as arranged in parallel relationship to each other, and as being co-incident with longitudinal vertical planes extending upward centrally of the respective parts to be operated, with the gears M and M^1 constituting one coöperative pair, and the gears M^2 and M^3 constituting the other coöperative pair. The gears M, M^1, M^2, and M^3, being thus arranged, they are preferably secured to the respective shafts m, m^1, m^2, and m^3, which are rotatively mounted in suitable hangers m^4 secured to the under side of the bed or platform A, with the gears of each pair extending upwardly to the proper distance above the upper surface of such bed or platform to engage with the teeth e^{13} of the carriers or other devices to be operated from them and such gears so connected as to revolve in unison and in the same direction. The means by which this connection of the gears M, M^1, M^2, and M^3 is effected may be of various forms, but, as here shown, it consists of the spur-gears m^5 and m^6, or m^7 and m^8, with which their respective shafts m and m^1, or m^2 and m^3, are provided, and also of coöperating intermediate idler gears m^9, m^{10} and m^{11}, or m^{12}, m^{13} and m^{14}, which in turn are respectively mounted in stands m^{15} or m^{16} that are secured to the under side of the bed or platform A as shown. With the gears M, M^1, M^2, and M^3 thus operatively connected in pairs, these pairs are in turn operatively connected with each other and with the shaft H, or other source of power, whereby to be caused to operate in unison with respect to each other and also with respect to their propelling means. To this end, I make use of the shafts N, O, and O^1, which are respectively journaled in suitable bearings n, o, and o^1 secured to the under-side of the bed or platform A, and of which the shaft N is preferably connected with the shaft H, through the intervention of the bevel gears n^1 and h^4, with which those shafts are respectively provided; while the shaft O is connected with the gear m^6 by a gear o^2, and the shaft O^1 similarly connected with the gear m^7 through the intervention of a gear o^3 and other appropriate appliances as will hereinafter appear; with the pairs of gears M, M^1 and M^2, M^3 thus connected with the shafts O, O^1, these latter shafts are connected with the shaft N whereby to be rotated in unison with it. The means by which this connection is effected may be of various kinds. The means however which I have selected for this purpose consists of sprocket wheels and sprocket chains; and, in order to provide for the rotation of the gears M, M^1, M^2, and M^3, and through them of the movement of the parts operated from them at different rates of speed with respect to the rate of speed of their propelling means, I find it desirable to employ two sets of sprocket wheels and sprocket chains. To this end, I provide each of the shafts O and O^1 with two sprocket wheels P and P^1, of which the sprocket wheel P on each is made somewhat larger than the sprocket wheel P^1, and connect these respective wheels with sprocket wheels R, R^1, R^2, and R^3 on the shaft N, through the intervention of sprocket chains S, S^1, S^2, and S^3, which pass around them. As thus connected the sprocket wheels R and R^1 are preferably secured upon a common hub R^4 or otherwise secured together, while the sprocket wheels R^2 and R^3 are similarly connected by a hub R^5; and in order, to provide for bringing either of these pairs of sprocket wheels into operation with the shaft N while carrying the other pair out of operation therewith, I preferably mount both of these pairs of sprocket wheels loosely upon the shaft and provide each of their hubs R^4 and R^5 on its inner end with a clutch member r, which coöperates with a second clutch member T that is splined upon the shaft N in such a manner as to be capable of movement longitudinally thereon to bring it into engagement with the clutch member r upon either of the hubs R^4 or R^5. With the parts thus constructed and arranged, either of the pairs of sprocket wheels R and R^1, or the pairs R^2 and R^3 may be brought into operation when the shaft N is in rotation, by bringing the clutch member T into engagement with its respective clutch member r, and thereby the gears M, M^1, M^2, and M^3 rotated at their faster or slower speeds, as one or the other of these pairs of sprocket wheels are locked to the shaft N by such clutch member T.

For sliding the clutch member T longitudinally upon the shaft N to bring it into engagement with the clutch member r of either of the pairs of sprocket wheels R, R^1 or R^2, R^3 as may be desired, various expedients may be adopted. I find it convenient however to employ for this purpose a lever U, which, pivoted in the bed or platform A by a suitable pivot u, and provided with a locking dog u^1 for engagement with suitable notches u^2 formed in the curved segment U^1, engages at its other end with a circumferential groove t formed in the clutch member T, as shown. With the gears M, M^1, M^2, and M^3 thus connected with their propelling means, the movement of the carriers or other

parts to be operated will be accomplished whenever the propelling means are actuated; and in order to provide for the rotation of the gears M^2 and M^3 in an opposite direction to that of the gears M and M^1, whereby the carriers or other devices appropriate to one pair of gears may be moved in one direction, while those of the other pair moved in an opposite direction, I interpose between the gears m^7 and o^3 an intermediate idler gear o^4, supported upon a shaft o^5, which is secured to the under-side of the bed or platform A by stands o^6. While the movement of the carriers C and C^1 or other devices is thus effected by the direct engagement of the gears M, M^1, M^2, and M^3 with the teeth e^{13} carried by them, I find it desirable, when employed in connection with sand molding and other similar machines, to so construct these gears as to prevent the accumulation of sand on their peripheries intermediate their teeth m^{17}, and, to that end, cut away the portions m^{18} on both sides of the gears between such teeth, whereby to form their peripheries at those points as substantially sharp edges, as shown more particularly in Fig. 2.

With the parts constructed and organized as above explained a convenient form of mechanism for transmitting motion and changing speeds is produced, which, while capable of application to a wide variety of machines, in which either a rotary or rectilinear movement is to be imparted to certain of their parts, or, through such machines, to other devices and a frequent change of speed at which such parts or devices are operated is required, is, at the same time, simple in construction, positive in its action, and adapted for use in many locations where other forms of motion transmitting devices are not practicable.

While in the foregoing I have described the embodiment of my invention which I prefer to employ in practice, I wish it distinctly understood that I do not restrict myself thereto, as it is obvious that the same may be modified in various ways without departing from the spirit of the same.

Having now described my invention, and specified certain of the ways in which it is or may be carried into effect, I claim and desire to secure by Letters Patent of the United States—

1. The combination, with two pairs of actuating wheels, devices that are to be operated from them, and intermediate mechanism by which the wheels of each pair are connected and caused to move in unison, of a shaft for each of such pairs of gear wheels connected with its respective pair, a large and a small wheel carried by each of these shafts, a connecting shaft common to both of said pairs of actuating wheels, mechanism for rotating this connecting shaft, wheels carried by this last mentioned shaft, means for connecting these last mentioned wheels with the large and small wheels carried by each of the first mentioned shafts, and mechanism whereby either the large or the small wheels with their carrying shafts may be brought into operative connection with the common connecting shaft as the other wheels are released therefrom, substantially as described.

2. The combination, with two pairs of actuating wheels, devices that are to be operated from them, and an intermediate train of gear wheels by which the wheels of each pair are connected and caused to move in unison, of a shaft O or O^1 for each of such pairs of gear wheels connected with its respective pair, a large and a small wheel carried by each of these shafts, a connecting shaft N common to both of said pairs of actuating wheels, mechanism for rotating this connecting shaft, wheels carried by this last mentioned shaft, means for connecting these last mentioned wheels with the larger and smaller wheels carried by each of the shafts O and O^1, and a clutch mechanism carried by the shaft N for engaging with the wheels carried by the shaft, whereby either the larger or the smaller wheels carried by the shafts O and O^1 may be operatively connected with the shaft N as the other wheels carried by such shafts O and O^1 are released therefrom, substantially as described.

3. The combination, with two pairs of gear wheels M M^1 and M^2 M^3, devices that are to be operated from them, and intermediate gears by which the gear wheels of each pair are connected and caused to move in unison, of shafts O and O^1 respectively connected with such pairs of gear wheels, a larger and a smaller sprocket wheel P and P^1 on each of said shafts, a connecting shaft N, mechanism for rotating this connecting shaft, connected pairs of sprocket wheels R R^1 and R^2 R^3 for respectively coöperating with the larger and smaller sprocket wheels P and P^1 on the said shafts O and O^1 loosely mounted upon the shaft N and provided on their inner sides with clutch members, a second clutch member splined upon the said shaft N, and mechanism for bringing this second clutch member into engagement with the clutch member of either of the pairs of sprocket wheels R R^1 or R^2 R^3 as may be desired, substantially as described.

In testimony whereof I have hereunto, in the presence of two witnesses, affixed my signature this 29th day of October, 1908.

JOHN G. MORRISON.

Witnesses:

LÉON DION,

GRACE T. DIXON.