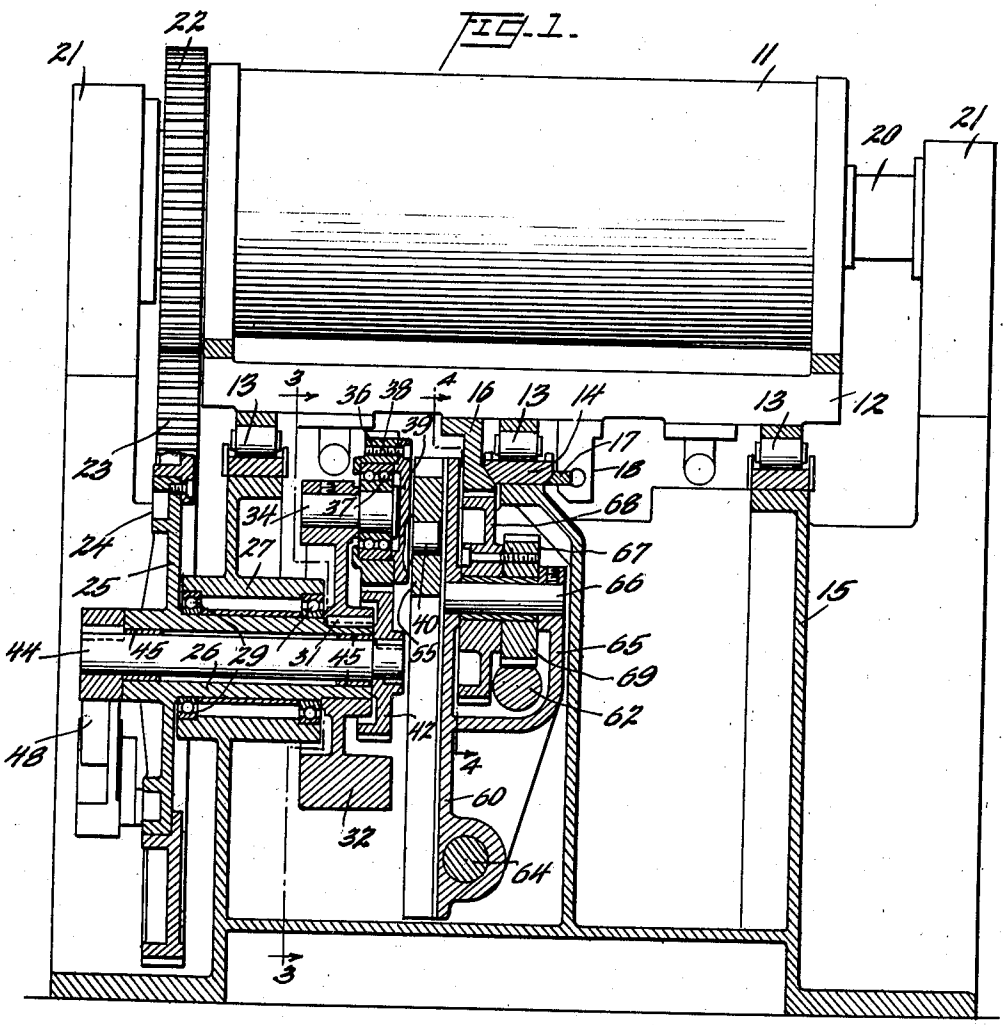
Jan. 23, 1940. F. W. SEYBOLD 2,187,759

BED MOTION

Filed July 7, 1938 4 Sheets-Sheet 1

FIG. 1.



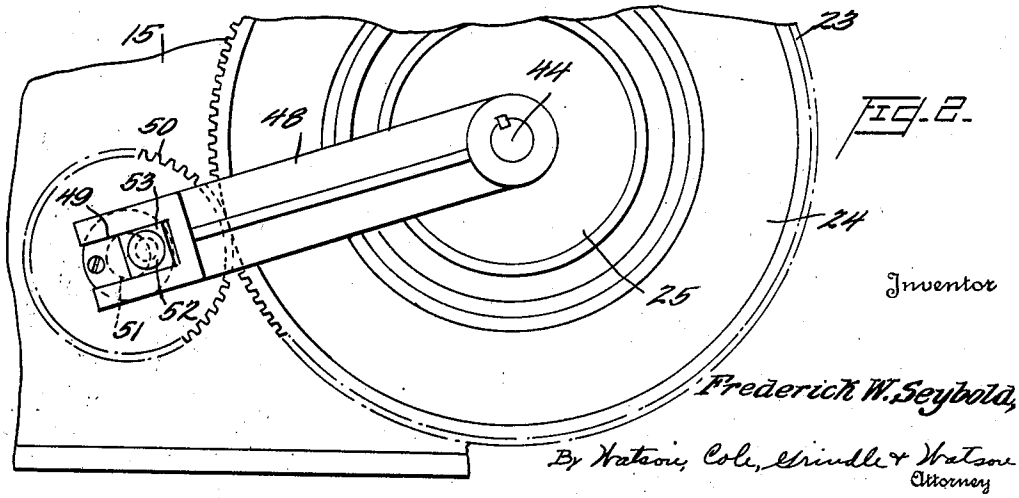


FIG. 2.

Inventor

Frederick W. Seybold,

By Watson, Cole, Grindle & Watson

Attorneys

Jan. 23, 1940. F. W. SEYBOLD 2,187,759

BED MOTION

Filed July 7, 1938 4 Sheets-Sheet 2

FIG. 3.

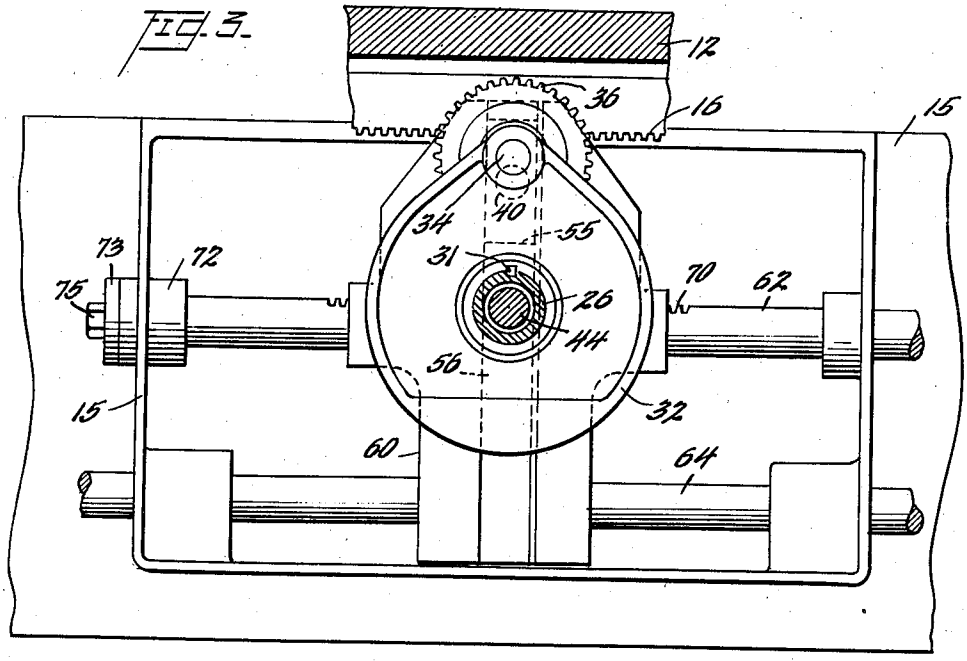


FIG. 4.

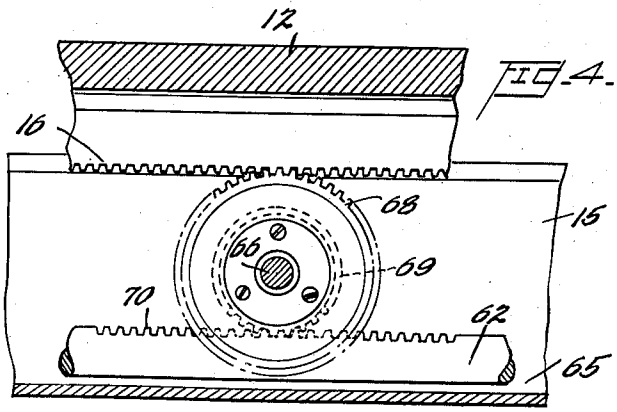


FIG. 5.

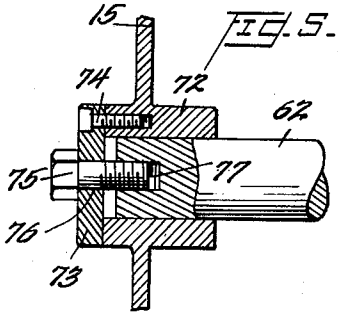
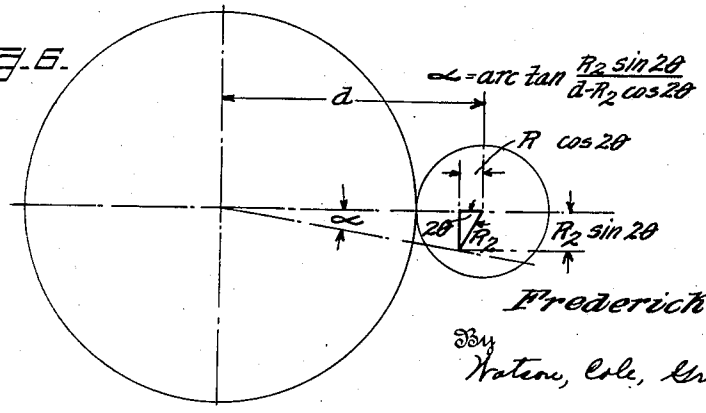


FIG. 6.



Inventor

Frederick W. Seybold,

By Watson, Cole, Grindle & Watson

Attorneys

Jan. 23, 1940. F. W. SEYBOLD 2,187,759

BED MOTION

Filed July 7, 1938 4 Sheets-Sheet 3

FIG. 7.

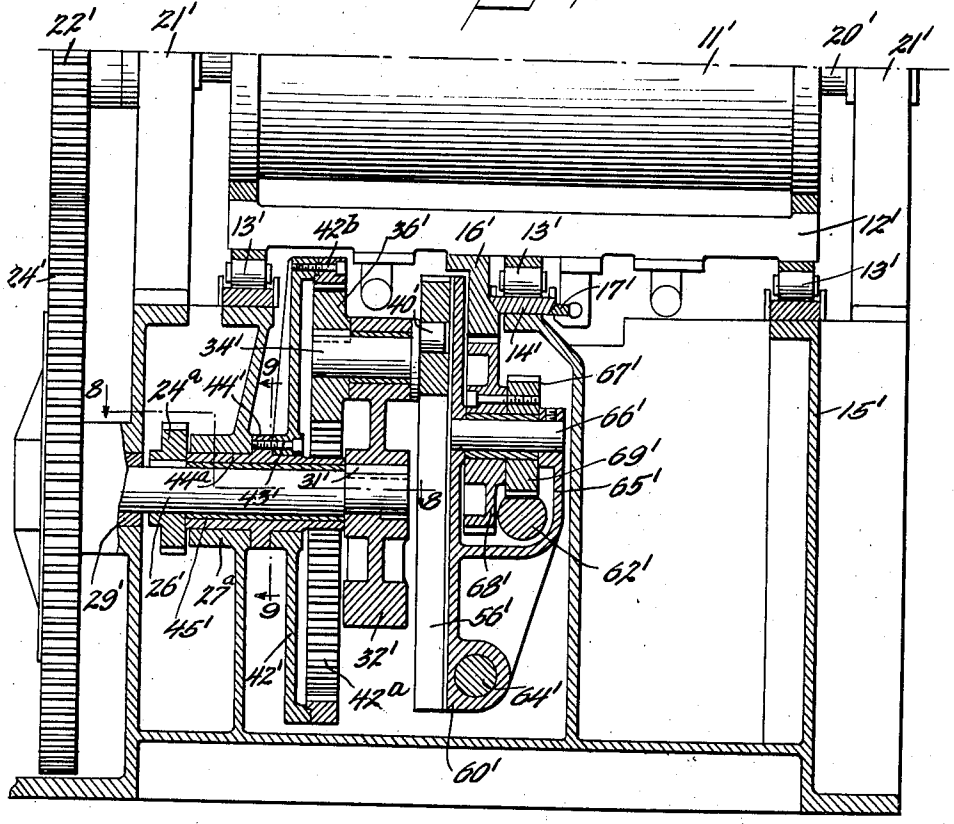


FIG. 8.

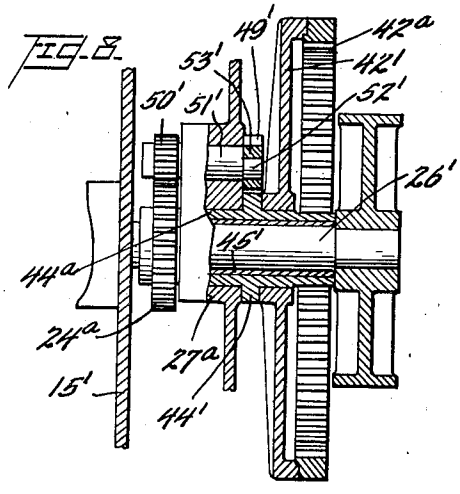
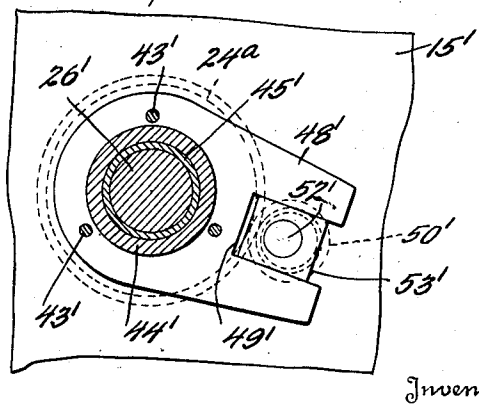


FIG. 9.



Inventor

Frederick W. Seybold,

By Watson, Cole, Grindle & Watson

Attorneys

Jan. 23, 1940. F. W. SEYBOLD 2,187,759

BED MOTION

Filed July 7, 1938 4 Sheets-Sheet 4

FIG. 11.

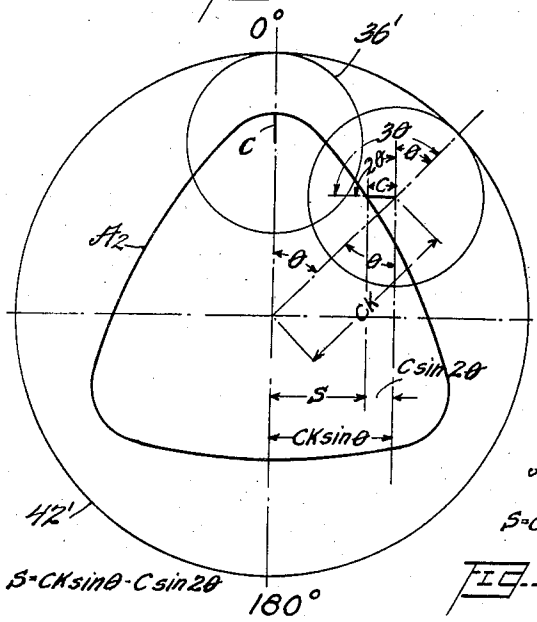


FIG. 10.

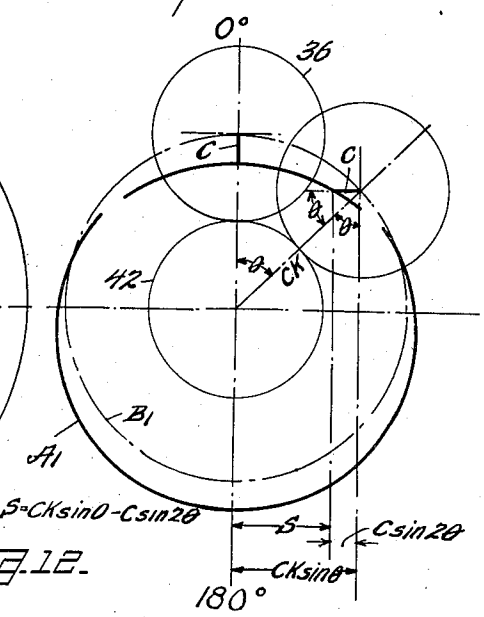
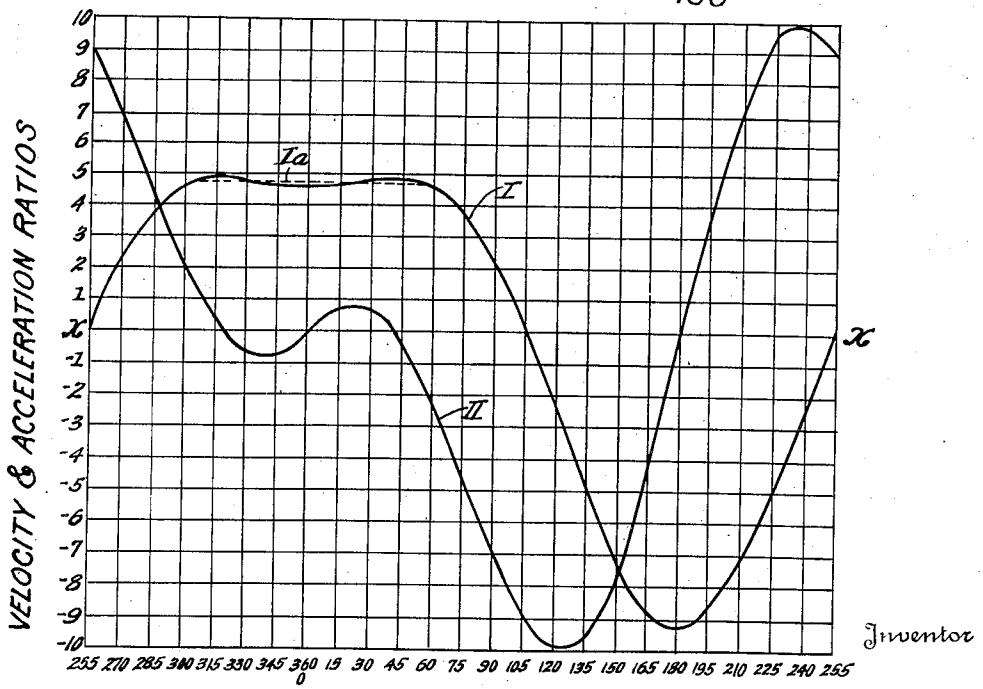


FIG. 12.



Inventor

Frederick W. Seybold,

By Watson, Cole, Grindle & Watson

Attorney

Patented Jan. 23, 1940

2,187,759

UNITED STATES PATENT OFFICE

2,187,759

BED MOTION

Frederick W. Seybold, Westfield, N. J., assignor to American Type Founders, Inc., Elizabeth, N. J., a corporation of New Jersey

Application July 7, 1938, Serial No. 217,995

11 Claims. (Cl. 74—27)

This invention relates to reciprocating bed motions or the like, and more particularly to mechanisms of this character especially adapted to be embodied in printing presses of the flat bed and cylinder type.

It is the general object of the present invention to provide a novel and improved reciprocating bed motion by means of which a bed or similar carriage member may be oscillated in a complete cycle of movement, the greater portion of the movement of the bed in one direction being at substantially constant speed.

This general object is the same as that enunciated in my copending application Serial No. 217,994, filed contemporaneously with this one, the present specification disclosing additional species of the generic invention and comprising a further application of the same broad principles governing the cognate case.

Other more particular objects of the invention in all its embodiments include the provision of a bed motion of the type described which comprises gearing which is constantly in mesh to insure a positive driving connection between the bed and a suitable source of power; and the elimination of all cams, gates, latches, locks, and intermittently operating bed reversing gearing, only such parts being used in the present construction which can be readily manufactured at low cost on standard machine tools.

As in the copending application to which reference has been made, the present embodiments make use of planetary gearing by means of which a crank element is given a cyclic movement which is modified by a periodic oscillation of the sun gear, whereby a longer period of more nearly constant velocity is produced in the movement transmitted from the crank element to the bed.

An object which is peculiar to the embodiments of the invention covered by the present Letters Patent is the provision of a transmission system of the character described which will yield this constant velocity period in the printing stroke only; the return stroke being somewhat more rapid than the printing stroke and being effected at a continually varying speed.

Another object of the present invention is the provision of a novel form of sun gear oscillating mechanism.

Further objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawings, in which two embodiments of the invention are illustrated by way of example. As in the copending specification, the principles of the invention are illustrated as applied to a printing press of the flat bed and cylinder type.

In the drawings,

Figure 1 is a view in transverse vertical section of a printing press including the novel bed motion;

Figure 2 is a fragmentary view in side elevation of a portion of the sun gear oscillating gearing;

Figures 3 and 4 are fragmentary longitudinal vertical sectional views taken on lines 3—3 and 4—4 respectively of Figure 1;

Figure 5 is a fragmentary vertical sectional view through the adjustable end supporting connection for the stationary rack comprising part of the bed driving mechanism;

Figure 6 is a diagram of the sun gear oscillating members, applicable to either of the embodiments shown;

Figure 7 is a transverse, vertical sectional view similar to Figure 1, but showing a second embodiment of the present invention;

Figures 8 and 9 are fragmentary longitudinal sectional views taken on lines 8—8 and 9—9 respectively of Figure 7;

Figure 10 is a diagram of the movement and relationship of the essential elements of the planetary system in the embodiment illustrated in Figures 1 to 5 inclusive;

Figure 11 is a similar diagram of the movements and relationship of the system shown in Figures 7 to 9; and

Figure 12 is a graph depicting the curve representing the velocity ratios during the cycle of movement of the driving crank elements of both embodiments.

In the development of the present specification, the actual mechanism of the press and bed motions will be described and then their movements will be explained in connection with the underlying theory and mathematical derivations. In Figures 1 to 5 inclusive there is illustrated one embodiment of my invention as applied to a printing press of the two revolution, flat bed and cylinder type, in which the impression cylinder 11 makes two revolutions while the reciprocating bed 12 is executing one oscillatory cycle. The bed 12 is mounted upon rollers 13 of conventional type, which are in turn supported by portions of the press frame 15. The central rollers 13 are disposed upon a track 14 which also serves as a guide for the bed in its oscillatory movement. For this purpose, the track 14 has undercut bevelled edges which are adapted to be embraced by a portion of the bed rack 16 and the gib 17,

the latter element being carried by the bracket 18 secured to the bed 12.

The impression cylinder 11 is provided with the shaft 20 rotatably mounted in the upwardly extending portions 21 of the press supporting frame 15. Secured to the shaft at one end of the cylinder is the impression cylinder gear 22. The gear 22 meshes with the toothed annular portion 23 of the main driving gear 24, the central disc 25 of which is provided with the elongated tubular portion 26 which is mounted for rotation in the tubular frame portion 27, anti-friction bearings 29 being provided therebetween. The main drive gear 24 may be connected by any suitable means with an appropriate source of power for driving both the impression cylinder and the bed.

The transmission means by which the bed is oscillated in the desired relation to the rotation of the impression cylinder will now be described. Upon the inner portion of the tubular axle 26 of the drive gearing 24 there is keyed as at 31 the counterbalanced crank member 32. This crank member has journaled in it a stub shaft 34, upon the outer end of which is rotatably secured the ring gear 36. Anti-friction bearings 37 are interposed between the end of the shaft 34 and the gear 36. Secured as by means of the bolts 38 to the gear 36 is the plate 39 which carries the eccentric driving crank element 40 which is operatively connected with the bed by means which will be later described. The gear 36 is a planet pinion which meshes with the sun gear 42 which is keyed to the end of the rock shaft 44. This rock shaft passes through the center of the hollow hub 26 of the main driving gear 24. the bearing bushings 45 being interposed between these relatively rotating members.

Upon the outer end of the rock shaft 44 there is fixed a crank arm 48 which is bifurcated at its outer end to provide a slot 49 therein. A gear 50 is rotatably mounted as at 51 in the frame 15 and is adapted to be driven by the main driving gear 24. Rigidly secured to the gear 50 is the eccentric crank pin 52 which carries a block 53 adapted to slide in the slot 49 of the arm 48.

It will be seen from the arrangement as thus far described that the driving crank pin 40 will describe a cyclic path which will be modified by the oscillation imparted to the sun gear 42 by means of the pinion 50, crank 52, and rock shaft 44.

This motion of the crank pin 40 is transmitted to the bed 12 by the following means. Upon the crank pin 40 there is carried the block 55 which is adapted to slide in the vertical slot 56 formed in the sliding cross-head 60. The cross-head 60 is supported for rectilinear oscillation upon the upper rod or shaft 62 and the lower shaft 64, these shafts being supported at their ends by portions of the press frame 15. The cross-head 60 is provided with a bracket 65 which is laterally spaced from the major portion of the cross-head and provides means for supporting the stub shaft 66 which carries the compound gear 67. This gear comprises a larger portion 68 which meshes with the bed rack 16 and a smaller concentric portion 69 which meshes with the rack teeth 70 formed on the guiding shaft 62. It will thus be seen that the shaft 62 forms a stationary rack for the compound traveling gear 67. The traveling gear is made in this form instead of as a single gear so as to permit a reduction in the size of the crank arm 32, and of the gears 24 and 22. The movement of the cross-head 60 is thereby multiplied about 2 and ⅔ times in applying its movement to the bed.

The shaft 62 which also serves as the stationary rack is made adjustable for the purpose of initially timing the movement of the bed and the cylinder and once this adjustment has been made it need not be disturbed. This feature is shown clearly in Figure 5 of the drawings, wherein the end of the shaft 62 enters the tubular boss 72 formed on the frame 15. The outer end of the boss 72 is provided with a cover plate 73 which may be bolted thereto as at 74. A set bolt 75 passes through an opening 76 in the plate 73 and the inner threaded end thereof is received within the threaded recess 77 in the end of the shaft 62. It will be readily seen that by rotation of the bolt 75 the longitudinal position of the shaft 62 may be varied as found necessary for the correlation of the bed and the impression cylinder.

The sun gear 42 and the planet gear 36 are of equal size and the gear 24 has three times as many teeth as the gear 50, and in initially setting the transmission the gear 36 is vertically above the gear 42 with the crank 40 extending downwardly and the crank 52 extending inwardly toward the center of the rock shaft 44.

As shown diagrammatically in Figure 10 of the drawings, the path generated by the crank pin 40 is a prolate epitrochoid, this path being indicated by the reference character A_1. Sun gear 42 and the planet gear 36 are appropriately designated in this figure and the circle B_1 indicates the path described by the center of the gear 36 as it is carried around by the crank 32. The length of the crank arm of the crank 40 is designated C and other dimensions and quantities will be apparent from the mathematical derivations which will be developed later in connection with both embodiments illustrated and described herein.

The embodiment illustrated in Figures 7, 8, and 9 of the drawings differs from the embodiment first described in that an internal sun gear is employed within which the planet pinion rolls. The means for oscillating the sun gear also differs from that employed in the earlier described mechanism in which an external gear was used, this oscillating mechanism being similar to that illustrated and described in my copending application to which reference has already been made. In this latter embodiment, many of the elements are identical with those employed in the first machine, and these will be indicated by the same reference characters, with the exception of the addition of primes thereto. Thus, the impression cylinder is designated 11' and cooperates with the bed 12' to form the printing couple. The bed is mounted upon rollers 13' and is provided with the bed rack 16' which cooperates with the gibs 17' to embrace the guide track 14' which is supported by a portion of the frame 15' of the press. The impression cylinder shaft is indicated at 20' and is supported by the frame extensions 21'. The impression cylinder gear 22' in this case, however, is carried externally of the frame and meshes with the large driving gear 24' which is carried upon one end of the main driving shaft 26' which rotates in bearings 29' of the frame.

Upon the inner end of the shaft 26' there is keyed as at 31' the crank disc 32' which rotatably carries the stub shaft 34' upon which is formed the eccentric driving crank pin 40' and the planet gear 36' which meshes with the toothed

portion 42a of the internal sun gear 42' to which the ring gear is secured as by means of the bolts 42b. This sun gear 42' is in turn bolted as at 43' to the rocking member 44' which has a tubular portion 44a surrounding the shaft 26' and separated therefrom as by means of the bearing bushing 45'. The tubular part 44a of the member 44' rotates within the enlarged bearing portion 27a of the frame 15. A gear 24a is keyed to an intermediate portion of the shaft 26' and meshes with a smaller gear 50' mounted on the stub shaft 51' which also has bearings in the portions 27a of the frame and is provided upon its inner end with an eccentric crank pin 52' carrying a block 53' disposed within the slot 49' formed in the bifurcated arm 48' of the member 44'.

The transmission mechanism connecting the crank pin 40' with the bed is exactly the same as in the first described embodiment, and the description need not be repeated here. All of the elements, however, are designated by similar reference numerals with the addition of primes.

The ratio of the gears 24a and 50' is 3:1, while the internal sun gear 42' is three times as large as the planet gear 36'. The various parts are initially set so that when the gear 36' is vertically above the shaft 26' the crank 40' is directed upwardly and the crank 52' extends toward the center of the shaft 26'.

The path generated by the crank 40' is a prolate hypotrochoid, modified, of course, by the compensating gearing 24a and 50'.

The graphic and mathematical explanations of the development of the constant speed portions of the cycle generated by these two bed motions will now be described.

As depicted in Figure 11, the general displacement equation without benefit of the compensating crank and gearing can be expressed by

$$S=CK\sin\theta-C\sin(M\pm1)\theta \qquad (1)$$

In Equation 1,

S=the displacement of the cross-head 60 or 60';

C=the length of the counterbalanced crank arm 32 or 32';

M=the gear ratio, sun gear 42 or 42' to planet gear 36 or 36';

θ=the angle of rotation of the crank 32 or 32', measured from the vertical.

Substituting the proper proportions indicating the relation of the crank disc arm to the small driving crank, we have

$$S=100\sin\theta-16\tfrac{2}{3}\sin 2\theta \qquad (2)$$

In other words, the length of the small crank arm 40 or 40' is 16⅔% of the length of the large crank disc arm 32 or 32'.

The velocity ratio equation is obtained by differentiating the displacement with respect to time, just as in the case of the similar development in my copending case, and also as described in my prior Patents Nos. 2,082,183 and 2,082,184. Thus,

$$V=(100\cos\theta-33\tfrac{1}{3}\cos 2\theta)\omega \qquad (3)$$

where ω is the angular velocity of the crank disc 32 or 32' which carry the planet gears.

The above developed velocity is modified by the action of the rectifying or compensating gearing 24, 50 or 24a, 50', by which the sun gear is oscillated.

Referring now to Figure 6 in which this compensating gearing is diagrammatically portrayed, d represents the center distance between the gears 24 and 50 or 24a and 50'; R_2, the length of the crank arm 52 or 52'; and α, the angle the slotted arm 48 or 48' makes with the line connecting the centers of the gears 24 and 50 or 24a and 50'. The angle α, as graphically shown in Figure 6 of the drawings, can be expressed by the following equation:

$$\alpha=\arctan\frac{R_2\sin 2\theta}{d-R_2\cos 2\theta} \qquad (4)$$

which is the angle the sun gear 42 or 42' is oscillated by the crank 52 in order to modify the cyclic motion of the main driving crank 40 or 40'.

In the case of the external planetary system in the first described embodiment, since the sun gear 40 and the planet gear 36 are of equal size, the crank 40 will move an amount equivalent to the angle α, and the displacement of the cross-head 60 can now be expressed as follows:

$$S=100\sin\theta-16\tfrac{2}{3}\sin(2\theta-\alpha) \qquad (5)$$

or

$$S=100\sin\theta-16\tfrac{2}{3}\sin\left(2\theta-\arctan\frac{R_2\sin 2\theta}{d-R_2\cos 2\theta}\right) \qquad (6)$$

In the case of the second embodiment in which there is employed the internal sun gear 42', which is three times as large as the planet gear 18', the crank 40' will turn an amount equal to 3α and the displacement of the cross-head 60' will be expressed by the following equation:

$$S=100\sin\theta-16\tfrac{2}{3}\sin(2\theta-3\alpha) \qquad (7)$$

or

$$S=100\sin\theta-16\tfrac{2}{3}\sin\left(2\theta-3\arctan\frac{R_2\sin 2\theta}{d-R_2\cos 2\theta}\right) \qquad (8)$$

By making the crank arm R_2 of the crank pin 52 or 52' of suitable length, the velocity of the type bed can be made practically uniform during 56½% of the printing stroke of the bed; but this movement consumes 59% of the time cycle; therefore, during ⅓ of the time cycle the bed will travel as a substantially constant speed (.565×.59=.333).

Referring to Figure 12 of the drawings, the velocity ratio curve I represents the motion developed by the planetary system in the driving crank pin without the benefit of the compensating gearing, while the flat portion of the curve indicated by Ia shows the leveling out effect on the velocity ratio curve produced by the compensating gears. The velocity ratio curve crosses the X—X axis at 106° 12' and 253° 48', thereby dividing the cycle into the proportion of

$$\frac{212°24'}{360°}$$

or 59% for the printing stroke and 41% for the return stroke, the return stroke being accomplished at a continuously varying velocity as indicated by the loop of the curve. The acceleration ratio curve is indicated at II.

It is understood that various changes and modifications may be made in the embodiments illustrated and described herein without departing from the scope of the invention as defined in the subjoined claims.

The phrase "without retracement" as employed in certain of the claims is used as in my prior Patents Nos. 2,082,183 and 2,082,184, to indicate that the driving element moves continuously in one direction along its closed orbit and never retraces its path therealong during any single cycle of movement.

Having thus described the invention, what is

claimed as new and desired to be secured by Letters Patent is:

1. A bed motion of the type described in which the bed during its working and return strokes is reciprocated in a plane, comprising the combination with the bed and means for supporting the same for planar movement, of a driving element, means rotatable at a constant angular velocity and adapted to move said driving element without retracement along a cyclic path at a variable angular velocity, means maintaining a continual operative connection between said driving element and said bed, and means driven by said second named means and operatively connected with said driving element for introducing certain variations in the angular velocity of said driving element whereby the bed is caused to move during one of its strokes at a continually varying velocity and for the greater part of the other stroke at a substantially uniform velocity.

2. A bed motion of the type described in which the bed during its working and return strokes is reciprocated in a plane, comprising the combination with the bed and means for supporting the same for planar movement, of a driving element, means rotatable at a constant angular velocity for moving said driving element without retracement along a cyclic path which is symmetrical about the center of rotation of said means, transmission means for maintaining a constant operative connection between said driving element and said bed, and means driven by said second named means and operatively connected with said driving element for introducing certain variations in the angular velocity and cyclic path of said driving element, whereby said bed is caused to move at a substantially uniform linear velocity during substantial portions of its working stroke, and at a continually varying velocity during its return stroke.

3. A bed motion of the type described in which the bed during its working and return strokes is reciprocated in a plane, comprising the combination with the bed and means for supporting the same for planar movement, of a main drive member adapted to be rotated at a uniform angular velocity from a suitable source of power, a crank on said drive member, a planet pinion rotatably carried by the free end of said crank, an externally toothed sun gear about which said planet pinion is adapted to roll, a crank pin carried by said pinion at a point spaced from its center, and transmission means for applying the movement of said crank pin to the bed, a gear secured to said drive member, another gear rotatably mounted in said supporting means, and a crank connection between said last named gear and the sun gear whereby the latter may be oscillated periodically during the cycle of movement of the bed motion to modify the motion developed by the crank pin and transmitted to the bed, the ratio of the sun gear to the planet gear being 1:1, whereby the bed is caused to move at a substantially constant linear velocity during the greater portion of one of its strokes, and at a continually varying velocity during its return stroke.

4. A bed motion of the type described in which the bed during its working and return strokes is reciprocated in a plane, comprising the combination with the bed and means for supporting the same for planar movement, of a main drive member adapted to be rotated at a uniform angular velocity from a suitable source of power, a crank on said drive member, a planet pinion rotatably carried by the free end of said crank, an externally toothed sun gear about which said planet pinion is adapted to roll, a crank pin carried by said pinion at a point spaced from its center, and transmission means for applying the movement of said crank pin to the bed, a gear secured to said drive member, another gear rotatably mounted in said supporting means, and a crank connection between said last named gear and the sun gear whereby the latter may be oscillated periodically during the cycle of movement of the bed motion to modify the motion developed by the crank pin and transmitted to the bed, the ratio of the sun gear to the planet gear being 1:1, the ratio of the gear carried by the drive member to the gear rotatably carried by the supporting means being 3:1, and the length of the crank arm of the first named crank pin being 16⅔% of the length of the arm of the crank on said drive member, whereby the bed is caused to move at a substantially constant linear velocity during the greater portion of one of its strokes, and at a continually varying velocity during its return stroke.

5. A bed motion of the type described in which the bed during its working and return strokes is reciprocated in a plane, comprising the combination with the bed and means for supporting the same for planar movement, of a main drive member adapted to be rotated at a uniform angular velocity from a suitable source of power, a crank on said drive member, a planet pinion rotatably carried by the free end of said crank, an internally toothed sun gear about which said planet pinion is adapted to roll, a crank pin carried by said pinion at a point spaced from its center, and transmission means for applying the movement of said crank pin to the bed, a gear secured to said drive member, another gear rotatably mounted in said supporting means, and a crank connection between said last named gear and the sun gear whereby the latter may be oscillated periodically during the cycle of movement of the bed motion to modify the motion developed by the crank pin and transmitted to the bed, the ratio of the sun gear to the planet gear being 3:1, the ratio of the gear carried by the drive member to the gear rotatably mounted in the supporting means being 3:1, and the length of the crank arm of the first named crank pin being 16⅔% of the length of the arm of the crank on said drive member, whereby the bed is caused to move at a substantially constant linear velocity during the greater portion of its working stroke, and at a continually varying velocity during its return stroke.

6. In a bed motion of the class described, in combination, a supporting frame, a reciprocating bed, and means for reciprocating said bed, said means comprising a tubular drive member rotatably mounted in said frame, a planetary system actuated by said drive member and operatively connected to said bed, said system including a sun gear disposed coaxially with said member, an axle extending through said tubular drive member and having said sun gear rigidly secured to one end thereof, a gear rigidly carried by said tubular member, and gearing driven by said last named gear and operatively connected with said axle for applying periodic oscillations to said sun gear in order to modify the motion developed by said planetary system.

7. In a bed motion of the class described, in combination, a supporting frame, a reciprocating bed, and means for reciprocating said bed, said

means comprising a tubular drive member rotatably mounted in said frame, a planetary system actuated by said drive member and operatively connected to said bed, said system including a sun gear and a planet gear, a crank arm carried by said drive member and connected with said planet gear whereby it is rolled about said sun gear, said sun gear being disposed coaxially with said drive member, an axle extending through said tubular drive member and having said sun gear keyed to one end thereof, a slotted arm fixed to the opposite end of said axle, a gear carried by said tubular member, a gear rotatably mounted upon said frame, and a crank pin on said last named gear adapted to engage within the slot of said slotted arm, whereby periodic oscillations may be effected in said sun gear during the cycle of movement of said planetary system.

8. In a printing press of the bed and cylinder type, in combination, a supporting frame, a type bed mounted in said frame for rectilinear reciprocation, and means for driving said bed through successive cycles of variable linear speeds, said means comprising a main driving gear adapted to be rotated at a uniform angular velocity from a suitable source of power, a tubular drive shaft rigid with said main driving gear and rotatably supported in said frame, a crank carried by an end of said tubular drive shaft, a planet gear carried by said crank, a sun gear disposed coaxially with said tubular drive shaft, meshing with said planet gear and keyed to the end of an axle which extends through and has bearings within said tubular drive member, a slotted arm fixed to the opposite end of said axle and upon the opposite side of said main gear and tubular shaft from said sun gear, a gear rotatably mounted upon said frame and meshing with said main driving gear, and a crank pin on said last named gear adapted to engage within the slot of said slotted arm, whereby periodic oscillations may be effected in said sun gear to modify the motion developed by said planetary system, and means for transmitting said motion to said bed.

9. A bed motion of the type described comprising a supporting frame, a bed mounted for rectilinear reciprocation in said frame, a driving element, and means for transmitting motion from said driving element to said bed, said means comprising a cross-head mounted for sliding reciprocatory movement upon guides carried by said supporting frame, a compound traveling gear rotatably supported by said cross-head, a rack carried by said bed, a stationary rack supported by said frame, one portion of said traveling gear meshing with said bed rack and another portion of said gear meshing with said stationary rack.

10. A bed motion of the type described comprising a supporting frame, a bed mounted for rectilinear reciprocation in said frame, a driving element, and means for transmitting motion from said driving element to said bed, said means comprising a guide shaft supported at spaced points by said supporting frame, a reciprocating cross-head adapted to slide upon said guide shaft, rack teeth formed in one surface of said guide shaft, a compound traveling gear carried by said cross-head, and a rack on said bed, one portion of said compound gear meshing with said bed rack and another portion thereof meshing with the teeth on said guide shaft.

11. In a printing press of the bed and cylinder type, in combination, a supporting frame, a type bed mounted in said frame for rectilinear reciprocation, means for driving said bed through successive cycles of variable linear speeds, said means including a driving mechanism, a reciprocating cross-head having an operative connection therewith, a traveling gear carried by said cross-head, a rack on said bed, a guide shaft carried by said frame and received within a portion of said cross-head for relative sliding movement, rack teeth formed upon one side of said shaft, said traveling gear meshing with said bed rack and with said rack teeth, and means for adjusting the longitudinal position of said toothed guide shaft for establishing the proper initial relation of said bed with said impression cylinder.

FREDERICK W. SEYBOLD.