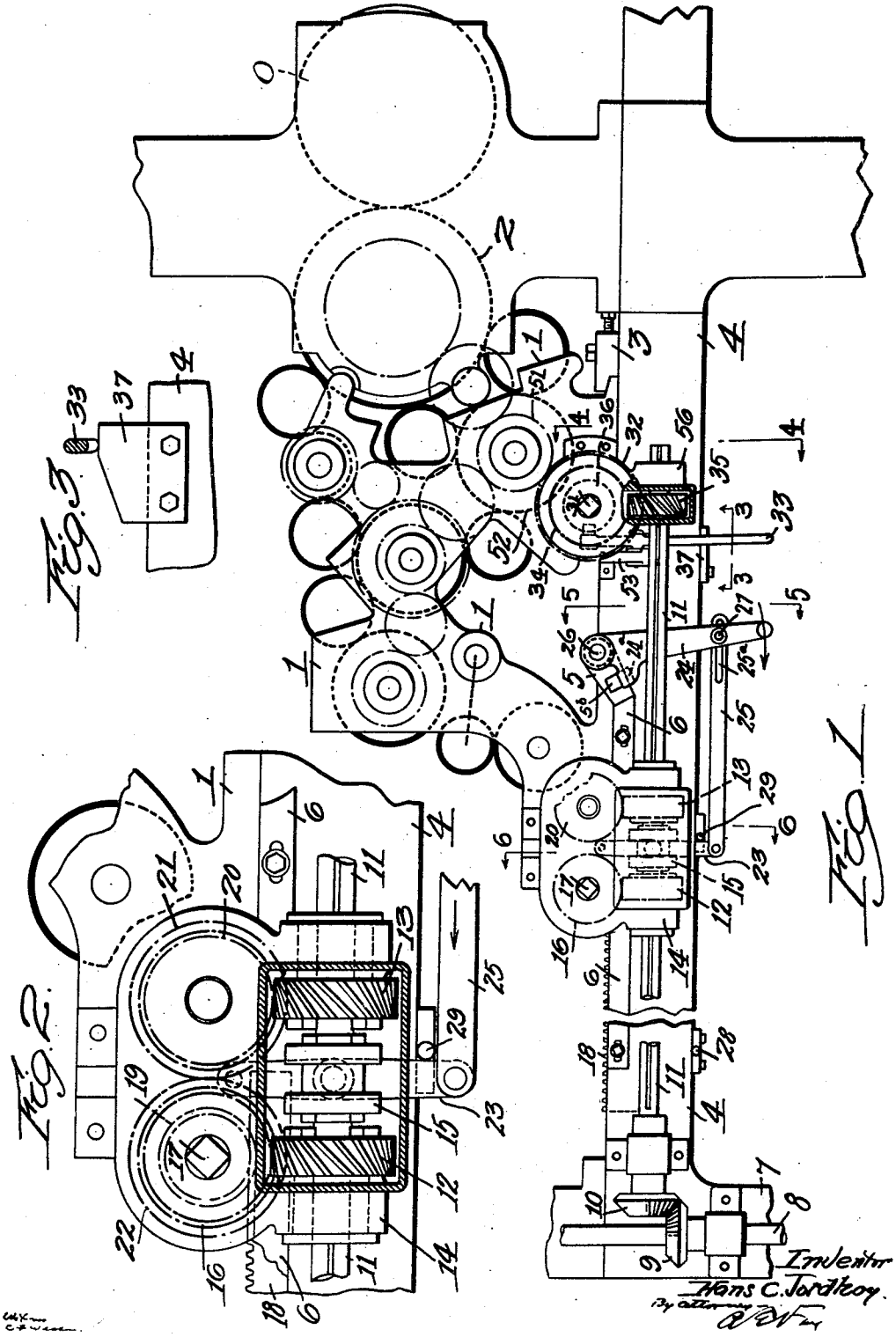
Aug. 22, 1939. H. C. JORDHOY 2,170,025

INK-MOTION CARRIAGE

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INK-MOTION CARRIAGE

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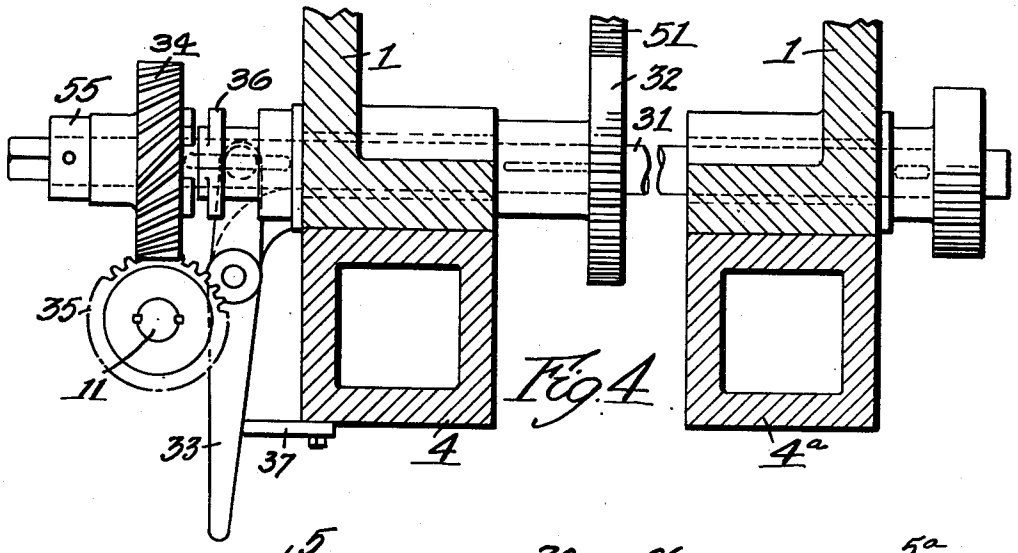



Fig. 4

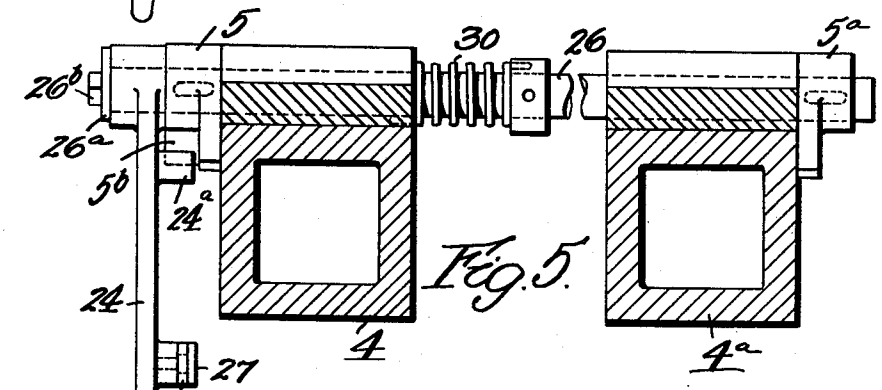



Fig. 5

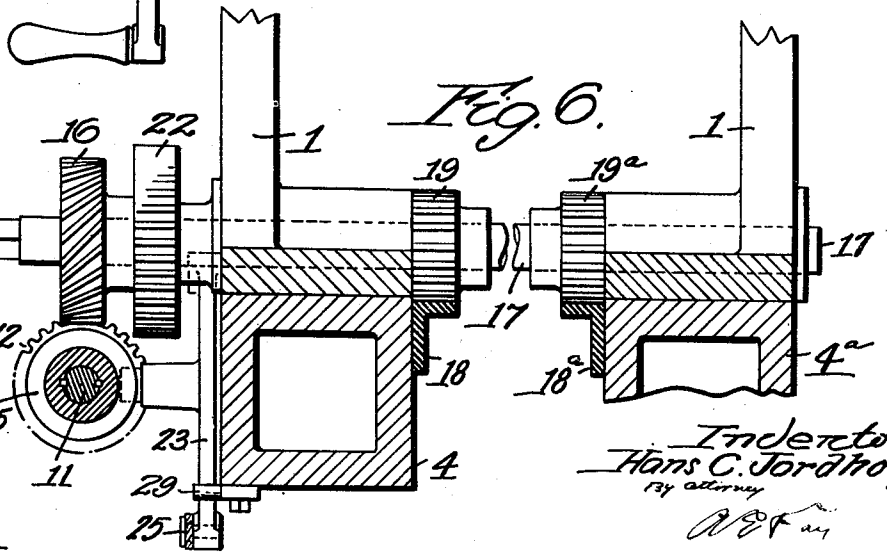


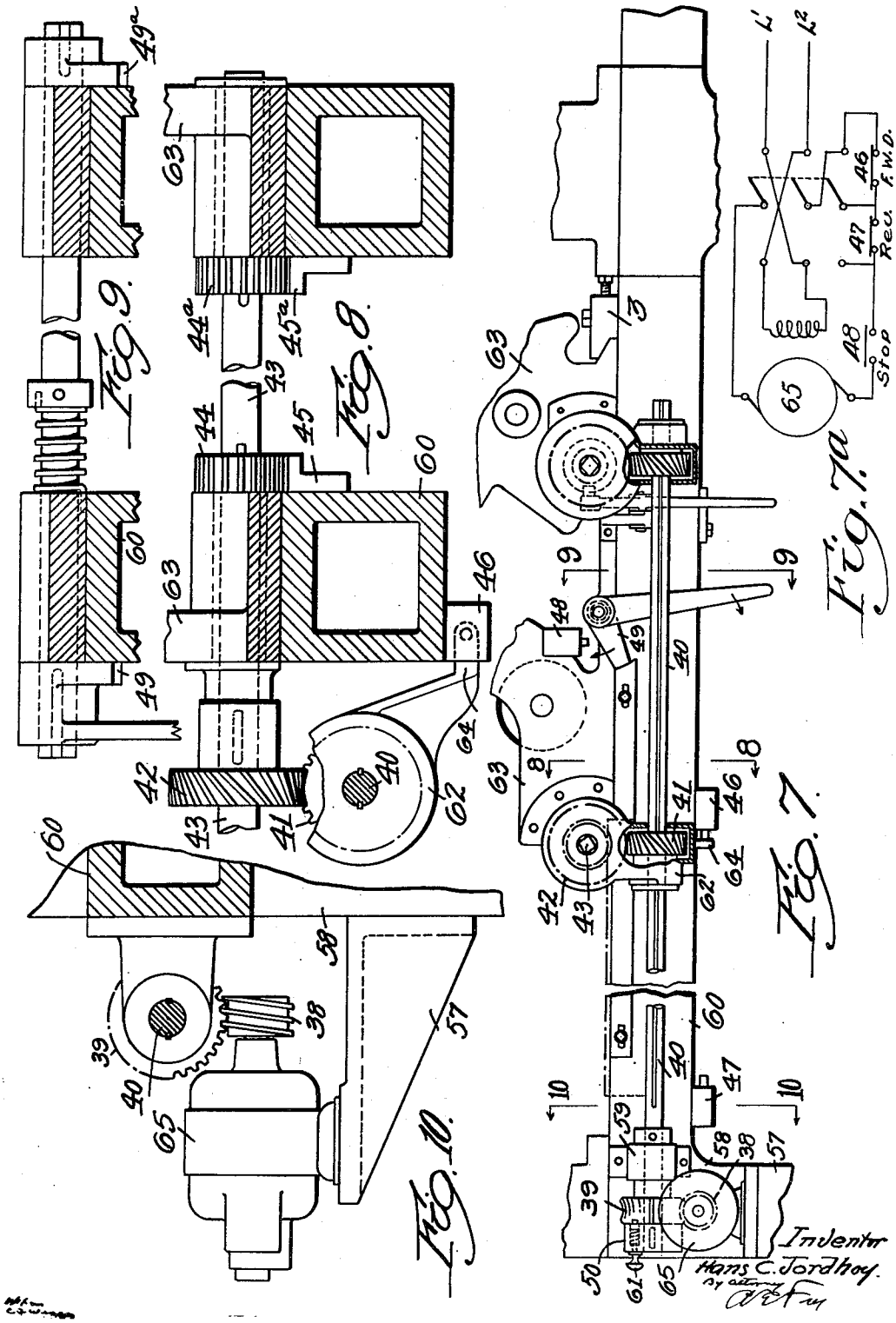

Fig. 6.

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INK-MOTION CARRIAGE

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# UNITED STATES PATENT OFFICE

2,170,025

## INK-MOTION CARRIAGE

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Application July 15, 1936, Serial No. 90,678

11 Claims. (Cl. 101—352)

The principal objects of this invention are to provide means whereby the ink motion carriage can be moved readily in or out of printing position by merely moving a lever or using a button and to provide a power driven means for the ink motion, operative when the ink motion is out of contact with the printing cylinder.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a side view of a press showing an ink motion cooperating with the printing cylinder in accordance with this invention;

Fig. 2 is a sectional view showing in side view, on enlarged scale, the mechanism driven from the longitudinal shaft;

Fig. 3 is a cross section on the line 3—3 of Fig. 1;

Fig. 4 is a cross section on the line 4—4 of Fig. 1;

Fig. 5 is a cross section on the line 5—5 of Fig. 1;

Fig. 6 is a cross section on the line 6—6 of Fig. 1;

Fig. 7 shows a modification, similar to Fig. 1, where an individual motor is provided for each ink carriage;

Fig. 7a is a wiring diagram;

Fig. 8 is a cross section on the line 8—8 of Fig. 7;

Fig. 9 is a cross section on the line 9—9 of Fig. 7, and

Fig. 10 shows the method of mounting a reversing motor.

On printing presses arranged with the ink motion mounted in a carriage for the purpose of removing it from the printing cylinder, it is customary to roll the carriage back by hand power. This is usually done by turning a hand wheel mounted at the side of the carriage, or, in some cases, a long ratchet lever is used instead of the hand wheel. Locking mechanisms of different kinds must also be released before the carriage can be moved. This method is bothersome, unhandy and too slow, as ink carriages must be moved very often, as for instance, when plating, adjusting, inspecting, and cleaning the plates on the printing cylinder.

It is also customary with these presses to provide some means for revolving the ink motion while the carriage is out of contact with the printing cylinder. The purpose of this is to ink up the motion and be ready for printing as soon as the carriage is moved against the printing cylinder so as not to waste paper. This is also done by hand power up to date. The invention is shown in connection with a printing couple comprising a printing cylinder 2 and an impression cylinder O.

The ink carriage 1 is held in place at one end by a block 3 which is adjustably mounted on a rail 4. The rail 4 is secured to the frame 7 of the press. The carriage is prevented from moving back by spring-seated dogs 5 and 5a, each of which stops against the cam shaped end of a stop block 6. This block 6 is adjustably mounted on the side of the rail 4.

At the center of the frame 7 is mounted a vertical drive shaft 8. This shaft may be driven by a separate motor drive. It may connect with a plurality of ink motions. Through mitre gears 9 and 10 this shaft 8 drives a shaft 11. On the shaft 11 are mounted spiral gears 12 and 13 free to rotate. Each of these gears is kept in place by a head and collar connection with a bracket 14 fastened to the side of the carriage 1.

The inside faces of the gears 12 and 13 have clutch jaws which match those of a double throw clutch 15 splined to the shaft 11. The spiral gear 12 meshes with a spiral gear 16 which is keyed to a pinion shaft 17, thereby driving it. This shaft 17 extends across the press and is supported by the ink motion carriage 1. Immediately inside the rail 4, on both sides of the press, are mounted racks 18 and 18a. These mesh with pinions 19 and 19a which are keyed to the shaft 17. Therefore, the racks are engaged equally and simultaneously by this construction.

The spiral gear 13, which is of the same hand as the spiral gear 12, meshes with a spiral gear 20. On the hub of the spiral gear 20 is keyed a gear 21 which meshes with a spur gear 22. The spur gear 22 is keyed to the spiral gear 16. The spiral gears 16 and 20 are far enough apart so as not to interfere with each other.

The clutch 15 is operated by a lever 23 pivoted on the bracket 14 and connected to an operating lever 24 by a connecting link 25. The operating lever 24 is loosely fitted on a shaft 26 and held in place by a washer 26a and screw 26b. A knob 5b on the dog 5 interferes with a projection 24a on the lever 24.

When the carriage is to be moved, the shafts 8 and 11 are rotating from any source of power, not shown. The operating lever 24 is pushed to the left, as shown in Fig. 1, thereby raising the dogs 5 and 5a. By the time these dogs are all released, a stud 27 on the operating lever 24 has reached the end of a slot 25a in the connection

25. The lever 23 will now be pushed to the left until the clutch 15 engages with the jaw face on the spiral gear 12. This gear 12, because of its meshing with the spiral gear 16, will therefore turn the shaft 17.

Since the pinions 19 and 19a, which are keyed to the shaft 17, engage with the racks 18 and 18a, which are fastened to the rails 4 and 4a, it will be understood readily that the ink motion carriage will move backward when the shaft 17 revolves. Unless the operating lever 24 is pulled to the right so as to release the clutch from the spiral gear 12, the ink carriage will continue moving until the lever 23 strikes a limit stop 28 mounted on the rail 4. This automatically releases the clutch and stops the travel.

The operation for bringing the carriage toward the printing cylinder will now be readily understood. The lever 24 will be pushed to the right until the clutch 15 engages the spiral gear 13. This gear, being of the same hand as the gear 12 but driving the shaft 17 through an intermediate 21, will turn the shaft 17 in the opposite direction. This causes the carriage 1 to move toward the printing cylinder until the lever 23 strikes against a limit stop 29, mounted on the rail 4, which releases the clutch. The dogs 5 and 5a will, at this point, drop into locking position actuated by a spring 30, which tends to turn the shaft 26 in a counter-clockwise direction, as viewed in Fig. 1.

The ink motion can be revolved for the purpose of inking up, or other reasons, while the ink motion is out of contact with the printing cylinder. On the shaft 31, which runs across the ink motion, is securely mounted a gear 32 which engages with a gear 51 on the lower ink cylinder 52 of the ink motion. The cylinder 52 is geared to the rest of the ink motion in a well known manner.

The shaft 31 extends outside the carriage 1 and on the outside end is placed a clutch 36 slidably keyed to the shaft 31 and operated by the hand lever 33, which is pivoted on a bracket 53 secured to the ink carriage 1. A free running spiral gear 34 is mounted on the shaft 31 and held in place by a collar 55. The side of this gear 34 next to the clutch has jaws to match the jaws of the clutch 36. This spiral gear 34 engages with the spiral gear 35 which is slidably keyed on the shaft 11 and moved along with the carriage 1 by cooperation with the bracket 56 secured to carriage 1. From this it will be seen that, when the shaft 11 is running, the spiral gear 35 will drive the free running gear 34. Then the gear 34 will idle on the shaft 31 until the clutch 36 is pushed into contact with the jaws on the gear 34. It will then turn the ink motion through the gearing described above.

The cam 37, secured to the rail 4, is a safety guide which will push the clutch operating lever 33 to disengage the clutch 36 from the gear 34. This stops the ink motion before the same contacts with the printing cylinder 2. This is desirable since the ink motion gearing meshes with gearing on the printing cylinder 2, and the printing cylinder 2 is at rest when the ink motion is moved into operating position, as in Fig. 1.

A somewhat simpler modification for moving the ink motion is indicated in Fig. 7. A reversible motor 65 is mounted on a bracket 57 secured to a frame 58 and adapted to operate on an individual carriage. On the motor shaft is mounted a worm 38 which engages with a worm wheel 39 on the splined shaft 40, which latter is mounted on the one end in a pillow block 59 secured to a rail 60. This worm wheel 39 is loose running on the shaft 40 but kept from revolving thereon by a pin 61 in the clutch 50 which latter is keyed to the shaft 40. The reason for this clutch will be explained later.

Slidably keyed to the shaft 40 is a spiral gear 41 which engages with a spiral gear 42 and the spiral gear 42 is keyed to the shaft 43 which carries two pinions 44 and 44a which engage with racks 45 and 45a in a manner similar to the other arrangement.

For the control of the motor, it is well known to use a two-button system whereby the pressing of one button turns the motor in one direction and the other in the opposite direction. In Fig. 7a there is shown a three-pull hand switch which may be thrown to the forward side or to the reverse side. Then, if the dog 49 contacts with the button 48, the motor will run to move the carriage in a forward or reverse direction and when the switch 46 or 47, as the case may be, is opened, the motor stops. The motor 65 is operated from the line $L_1$ $L_2$ which supply the field. The current to the armature has to pass through the closed switch 48 and through either one of the limit switches 46 or 47. Otherwise the motor cannot run because the armature is not supplied with current.

Limit switches 46 and 47 may be used to limit the motion of the carriage by stopping the motor 65 when either switch is contacted by a toe 64 of the spiral gear guard 62 which moves along the shaft 40 with the splined gear 41. Another limit switch 48 may be used which when open will make the motor 65 inoperative until this switch 48 contacts with a hand operated lock dog 49 which locks the carriage 63, as shown in Fig. 7. This insures that the carriage 63 will be unlocked before an attempt is made to move the carriage 63. Wiring may also be so arranged that when the lock dog 49 contacts with the limit switch 48, the motor will be energized and start the carriage moving away from printing position.

If, for some reason, it becomes necessary to move the ink carriage manually as, for instance, in case of a motor break down, it is only necessary to pull back the lock pin 61 in the clutch 50, which releases the worm wheel 39. A hand lever placed on the square end of the shaft 43 may then be used to operate the carriage.

It is, therefore, evident that means are shown for shifting a movable ink carriage to and from a printing cylinder by power and selective means are shown for inking up the rollers carried by the carriage by power-driven means, when the carriage is away from the printing cylinder. It is understood, of course, that a number of these mechanisms may be used in combination to make up a printing press. The parts 31, 33, 35 and 36 are the same as in Fig. 1 and will turn the ink motion through a clutch when closed as in Fig. 1.

While I have shown a single motor for moving the ink motion carriage to and from the printing cylinder, and for rotating the ink motion when the carriage is away from the printing cylinder by the use of mechanical clutches, it will be understood that I may employ a separate motor for moving each carriage back and forth and another motor for rotating the ink motion when the carriage is away from the printing cylinder.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details of construction herein disclosed,

otherwise than as set forth in the claims, but what I claim is:

1. In an ink motion, the combination of a frame for carrying said ink motion and bodily movable, of a power shaft adjacent to said frame, a pair of spiral gears rotatably mounted on said shaft, a clutch movable in two directions to clutch either spiral gear to the shaft, a second pair of spiral gears, one meshing with each of said spiral gears, a shaft on which one of said second spiral gears is fixed, two gears for connecting the other of the last pair of spiral gears with the last named shaft, means connected with said shaft for moving the frame toward and from a printing couple, and two stops arranged on the ink motion carriage for shifting the clutch at each end of the stroke of the carriage.

2. In an ink motion, the combination of a movable carriage for carrying the ink motion, a pair of rails to which the carriage is adjustably fixed, a pair of racks carried by the rails, a shaft, a pair of spiral gears movably mounted on the shaft, means for clutching either of the spiral gears to the shaft, a second pair of spiral gears meshing with the first named spiral gears individually and both of the same hand, a shaft to which one of said spiral gears is fixed, a pair of pinions on said shaft, each meshing with one of said racks so that the turning of the shaft in either direction will move the carriage in one direction or the other, a pair of gears for connecting one of the second spiral gears with the shaft.

3. In an ink motion, the combination with an ink motion carriage carrying the ink motion, a power shaft, a pair of spiral gears movably mounted on the power shaft, a clutch keyed to the shaft, means whereby the clutch can be moved in either direction to clutch either of the gears, a second pair of spiral gears, each meshing with one of the first named spiral gears, a shaft on which one of said spiral gears is fixed, two gears on the last named shaft on opposite sides, a pair of racks meshing with the respective gears, and a pair of rails adjacent to the carriage and to each of which one of said racks is fixed.

4. In an ink motion, the combination of a carriage carrying the ink motion, a power shaft, a spiral gear on the power shaft and connected to the carriage to move along the shaft therewith, a spiral gear carried by the carriage, a shaft on which the second named spiral gear is freely mounted, a clutch for connecting the second named gear to its shaft, a spur gear on the shaft and an ink cylinder connected with said spur gear to be rotated thereby, whereby the power shaft will operate the ink motion, a lever for operating the clutch, and a cam for engaging the lever after the carriage is moved a predetermined amount to put over the lever.

5. In an ink motion, the combination of a movable carriage for supporting the ink motion, a pair of rails adjacent to said carriage, each having a rack extending along it, a power shaft under the carriage, two spiral gears slidable on said shaft, each having the same direction of motion, a clutch for connecting either of said spiral gears to the shaft, a link connected with the clutch for operating it and having a slot, a lever having a stud located in the slot and adapted to move from one end of the slot to the other to change the clutch from one of the spiral gears to the other, a shaft on which the lever is pivoted, a dog pivoted on the last named shaft, a projection on the lever for engaging the dog and moving it out of engagement with the carriage, and means operated by the two spiral gears for moving the carriage back and forth.

6. In an ink motion, the combination with an ink carriage, said carriage being movable, of a shaft, means connected to said carriage for holding the carriage back, a shaft at right angles to the first named shaft, means for driving the second shaft from the first named shaft, a clutch for connecting the driving means with the second shaft, and means for throwing the clutch out when the carriage is moved to a certain point.

7. In an ink motion, the combination with an ink carriage for a printing press, said carriage carrying a series of ink rollers, said carriage being movable, of a shaft located adjacent to the carriage, means connected to said carriage for moving it back from the press, a shaft at right angles to the first named shaft, means for driving the second shaft from the first named shaft, a clutch for connecting the driving means with the second shaft, a lever for operating said clutch, and a cam for throwing the clutch out when the carriage is moved to a certain point.

8. In an ink motion, the combination of a frame, an ink motion carried by said frame, a power shaft, a clutch on said shaft, a shaft at right angles to the first named shaft and adapted to receive power therefrom, a spiral gear on the last named shaft, a spiral gear on the first named shaft meshing with the spiral gear so that when the clutch is closed to connect the first named gear with the second named gear, the second shaft will be rotated, a handle connected to the clutch for operating it to connect the gears, means in stationary position for engaging said handle to disconnect the shaft from the power after a predetermined amount of travel of the ink motion, and a dog in stationary position adapted to engage the handle at the other end of the stroke and stop the travel of the ink motion device.

9. In an ink motion, the combination with a printing couple, of an ink motion carriage movable toward and from the printing couple, a motor, a motor shaft, a shaft adjacent to the motor shaft, means for driving the latter shaft from the motor shaft, means connected with the latter shaft for moving the carriage out of inking position, a pivoted stop for the carriage to hold it in position, and means for applying power to the carriage moving means only when the carriage is released.

10. In a movable ink motion carriage, the combination of rails upon which it is movable, a shaft carried by said rails, a spiral gear on the shaft, a second spiral gear meshing therewith, a second shaft on which the second spiral gear is mounted, means connected with the latter shaft for moving the ink motion carriage out of printing position, a pair of stops, means moving with the first spiral gear for operating said stops at the ends of the travel, and means connected with said stops for stopping the first named spiral gear.

11. In a movable ink motion having ink cylinders, the combination of a movable frame carrying the ink motion, a power shaft, a gear slidingly keyed to the power shaft, a gear on the ink motion and meshing with the first named gear, means for rotating the ink cylinders from the second named gear, and means driven from said shaft for moving the ink motion bodily.

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