March 14, 1939. H. DAVIS 2,150,672

REVERSING CLUTCH FOR PRINTING PRESSES

Filed June 13, 1936 3 Sheets-Sheet 1

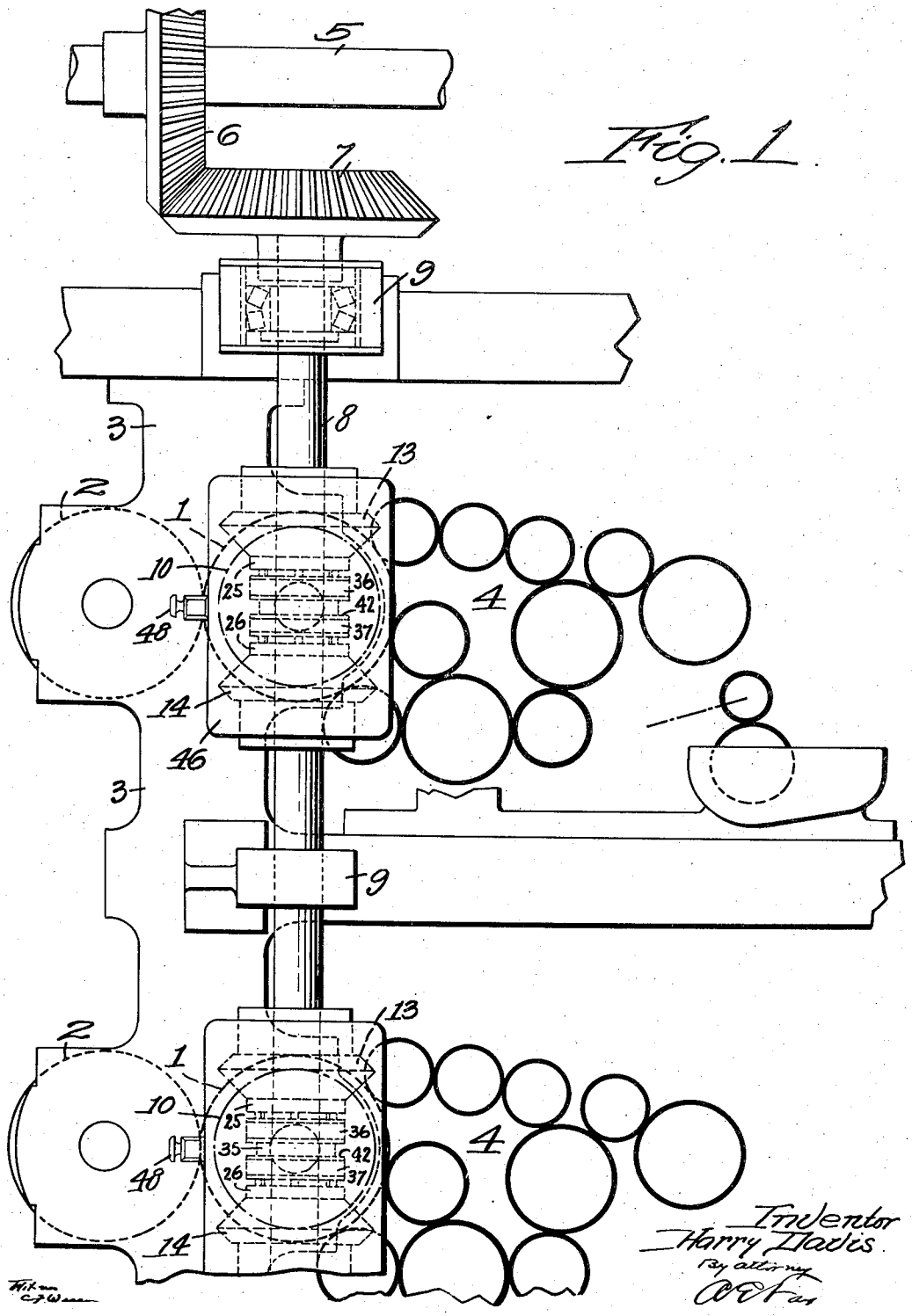


Fig. 1.

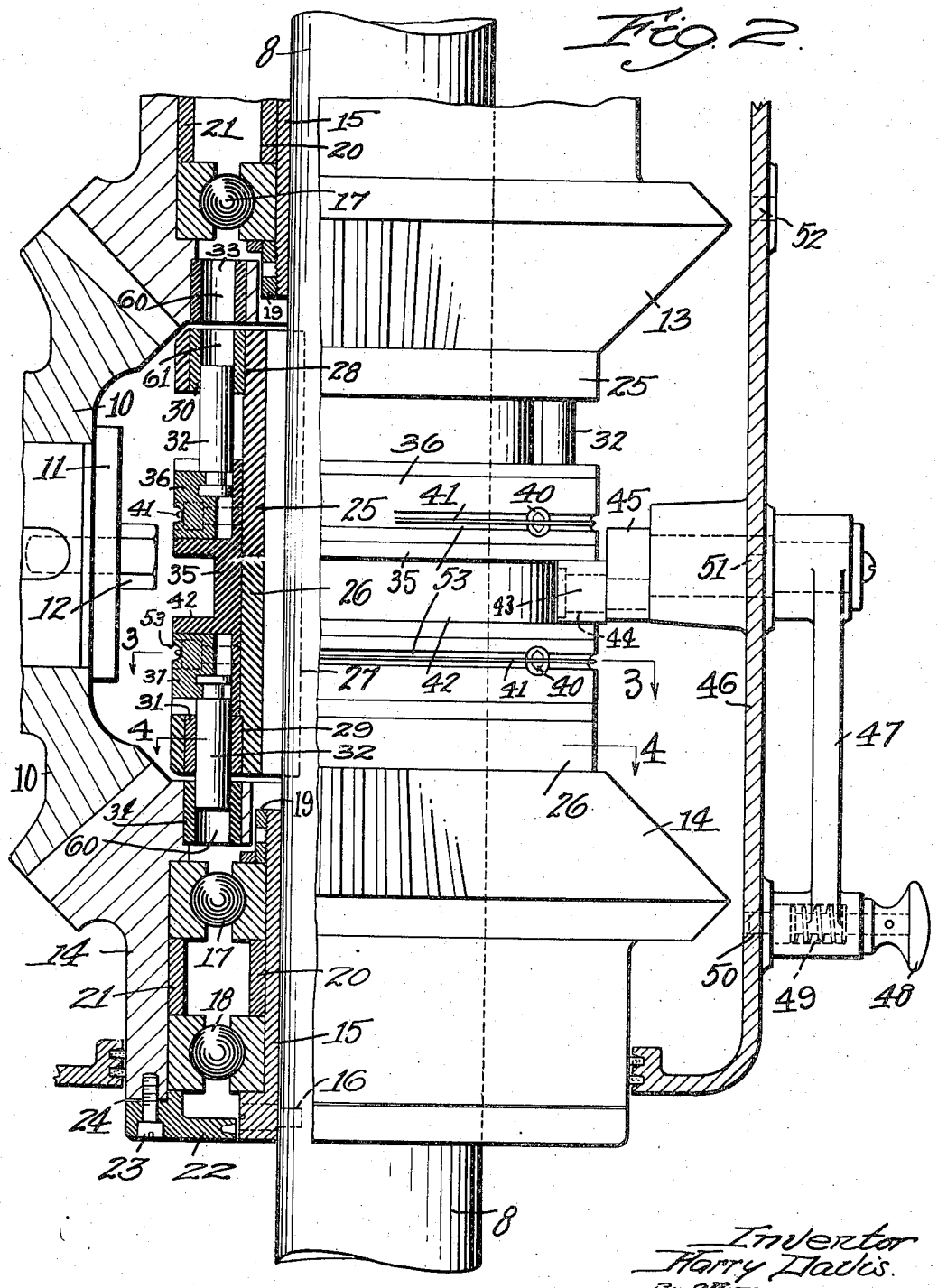
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Fig. 2.



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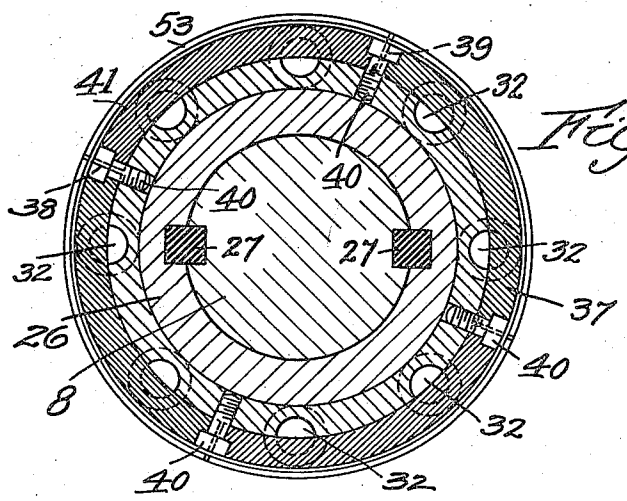


Fig. 3.

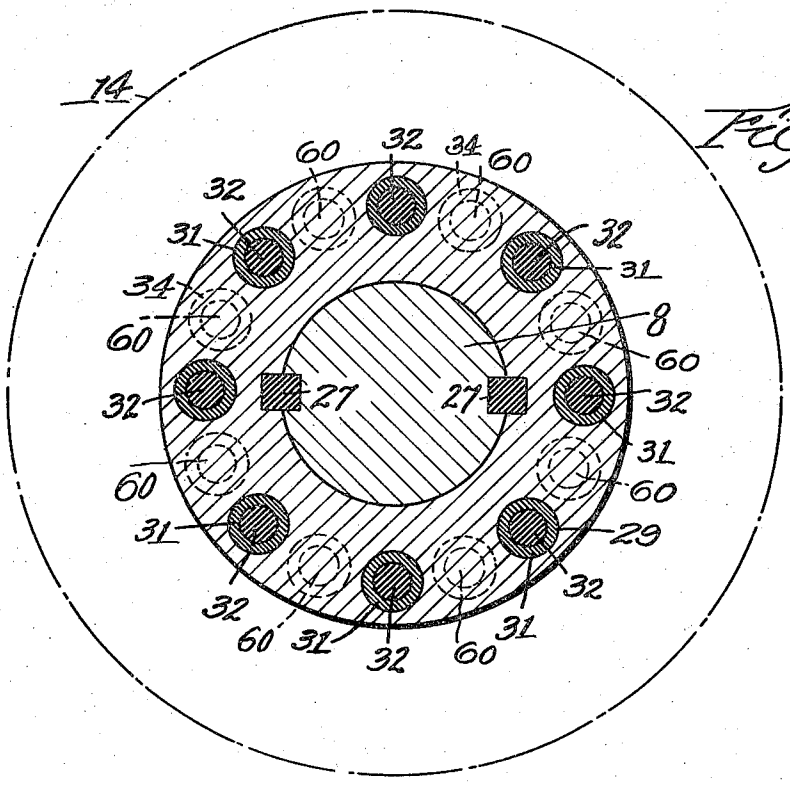


Fig. 4.

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UNITED STATES PATENT OFFICE

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REVERSING CLUTCH FOR PRINTING PRESSES

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Application June 13, 1936, Serial No. 85,045

2 Claims. (Cl. 192—67)

Although the clutch mechanism, which is the subject of this invention, can be used for other purposes, it is particularly adaptable to printing presses for the reason that one of the objects of the invention is to prevent chattering and lost motion which is particularly objectionable in printing machines. This lost motion in old machines is due to the play between the main driving shaft and the printing cylinder which is practically eliminated by this invention.

Other objects of the invention are to provide a sliding member with pins for clutching the drive shaft to a driving gear for the plate cylinder of the printing couple and thrusting these pins longitudinally through connecting guide members secured to the shaft before having them enter the driving gear, and to provide a construction in which the reversing gears are always in mesh with a gear carried on the end of the plate cylinder to afford a more rigid connection and a better construction than is customary where the gears are individually held in place by split collars.

Other objects and advantages of the invention will appear hereinafter.

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

Fig. 1 is an end view of a stack of printing couples having clutches made in accordance with this invention;

Fig 2 is an elevation, partially in section, of the end of one plate cylinder and the reversing clutch mechanism;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2, and

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2, both looking in the same direction.

This invention is shown in connection with a plate cylinder 1 cooperating with an impression cylinder 2 to form a printing couple. These cylinders are rotatably supported by suitable bearings in the frame 3 of the machine. Typical inking motions 4 are provided for furnishing the ink to the plates on the several plate cylinders.

A horizontal driving shaft 5 drives the whole system and may be itself driven by any suitable source of power. On this shaft 5 is carried a bevel gear 6 which meshes with a bevel gear 7 mounted on and fixed to a vertical shaft 8 to furnish power to serve the several printing couples of a single unit of the press. Suitable pillow blocks 9 are secured to the frame 3 and rotatably carry the vertical shaft 8.

A bevel gear 10 is secured to the end of each plate cylinder 1 by means of a washer 11 and bolt 12. The bevel gear 10 meshes with two bevel gears 13 and 14, both of which are mounted in a similar manner and are carried by ball bearings 17 and 18. The gears 13 and 14 are loose on the shaft 8 and either one is adapted to be coupled to it by the clutch mechanism so that they can drive the plate cylinder in either direction.

On the shaft 8 are mounted two sleeves 15 which are secured to the shaft by dog point screws 16. In each case the inner races of the ball bearings 17 and 18 are secured to the shaft by a nut 19 which is threadedly carried on the inner end of the sleeve 15. A spacer 20 is provided to separate the inner races of the ball bearings. The outer races fit in the bevel gear 13 or 14 and are separated by a spacer 21. A seal 22 is made in two halves and secured by bolts 23 to the bevel gear 14. A slight clearance is provided at 24 between the bevel gear 14 and the seal 22 so that a tight clamp can be obtained on the outer races of the ball bearings to hold the bevel gear 14 securely in place with respect to the sleeve 15. Of course, the bevel gear 13, with similar ball bearings 17 and 18, is mounted in an identical manner.

A pair of clutch hubs 25 and 26, in the form of sleeves, are securely mounted on the shaft 8 and held rigidly against motion with respect thereto by keys 27. These hubs or sleeves are provided each with eight longitudinal holes 28 and 29 respectively in which are mounted hardened bushings 30 and 31. Any desired number of longitudinal clutch pins 32 may be inserted in the bushings 30 and 31, as desired. These pins 32 cooperate with hardened bushings 33 and 34 mounted respectively in the bevel gears 13 and 14.

A ring 35 is mounted free to slide on the sleeves or hubs 25 and 26 and is provided with semi-circular holes for accommodating the pins 32. In order to hold these pins in place blocks 36 and 37 are provided. These blocks are built in 90° sections, split at points 38 and 39, etc. and held in by screws 40.

By referring to Fig. 3 it will be seen that the section of the block 37 is holding in two pins 32. In a similar manner six other pins are being held in by similar block sections. In a similar manner eight pins are held in by sections which constitute the block 36.

A wire 41 may be passed around a groove 53 supplied in the sections 37 to prevent the screws 40 from working out. The sections 36

may be supplied with a similar groove and wire.

As shown in Figs. 2 and 4 sixteen longitudinal holes 60 are located in each of the gears 13 and 14 and eight more holes 61 in each of the clutch hubs 25 and 26. Thus there are eight holes shown on each clutch hub 25 and 26 and sixteen shown in the gears 13 and 14. As many or as few pins 32 may be used as is considered desirable. It is possible to clutch a gear at sixteen different points in relation to its driving hub. This method of constructing the pin clutch not only insures easy assembly or disassembly but provides small increments of angular displacement between clutching points and furthermore provides a connection which avoids any lack of rigidity in the clutch.

The ring 35 has a groove 42 which accommodates a radial shaft roll 43 carried on a stud 44 of a crank shaft 45. The crank shaft is rotatably mounted in a guard 46. The right hand end of the crank shaft 45, as shown in Fig. 2, has secured thereto an arm 47 provided with a retractible dowel pin 48 held to the left by a spring 49 and cooperating with a hole 50 in the guard 46. It is evident that by withdrawing the pin 48 and turning the handle 47 the pin 48 may be made to cooperate with the hole 51 in the guard 46 moving the pin clutch to neutral position or by cooperating with a hole 52 in the pin clutch will be moved to the opposite position, clutching hub 25 with the gear 13, thereby reversing the direction of rotation of the bevel gear 10 with respect to the shaft 8.

The two clutch sections 25 and 26 are both keyed to the driving shaft 8 and consequently rotate with it. Each one of these driving sections has in the present instance eight longitudinal perforations 28 and 29 in which are bushings of hardened metal 30 and 31 respectively. On the cylindrical portion of the clutch hubs 25 and 26 slides longitudinally the ring 35 operated by the handle 47 for the purpose of carrying the pins 32, either to the right or the left. It will be noticed that these pins are solidly but slidingly mounted in the bushings 30 and 31 so that the pins cannot chatter or otherwise impart a vibratory motion. The sliding of the ring 35 projects the ends of these pins into the holes 60 through bushings 33 or 34 which also are hardened and fit the pins accurately. This fitting of the pins in the bushings 33 and 34, which are carried by the gears 13 and 14 respectively, also prevents chattering. Sixteen holes and bushings have been described in each of the gears so that small increments of angular displacement are provided. The space is such that the ring can be placed at the center and the pins will project into neither one of the bushings 33 or 34, leaving the clutch in neutral position. The blocks 36 are provided in the ring 35 in sections to hold the heads of the pins and constitute an easy method of assembly in the first place in setting up the machine and also an equally easy method of disassembly.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a reversing clutch, the combination with a power transmitting shaft, of a gear rotatably mounted thereon, having, on its inner face, a circular series of holes provided with a hard interior surface, a clutch hub fixed to the shaft, a ring slidably mounted on exterior surface of the clutch hub and movable to different positions longitudinally of the shaft, said clutch hub having at opposite ends a circular series of holes having hardened surfaces, a circular series of pins carried by the ring and projecting oppositely from opposite ends, said pins fitting the holes in the gear and clutch hub accurately to avoid play between the pins and holes, and a series of separable blocks carried by the ring and detachably mounted, said blocks having means for holding said pins with respect to the ring, whereby either said gear can be clutched to the shaft accurately.

2. In a reversing clutch, the combination with a power shaft and a gear freely rotatable thereon, of a clutch hub keyed to the shaft and having a series of longitudinal holes, concentrically arranged around the axis of the shaft, each of said holes being provided with a hardened bushing having a cylindrical hole therethrough, accurately finished, a ring slidably mounted on the clutch hub having a series of pins projecting in opposite directions from said ring, detachable means on the ring for holding the pins, said gear having a corresponding series of holes at the same distance from the center of the shaft as the first mentioned holes, and bushings in each of the holes in the gears, the last named bushings being hardened and each having a cylindrical hole therein having a machined inner surface for receiving the pins from the bushings on the clutch hub, whereby, when the pins are projected through from the clutch hub into the bushings on the gear, the pins will be held in both rigidly so as to prevent play, the number of holes and bushings in the gear being twice as great as that of the holes and bushings in the clutch hub to provide small increments of angular displacement between the clutching points.

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