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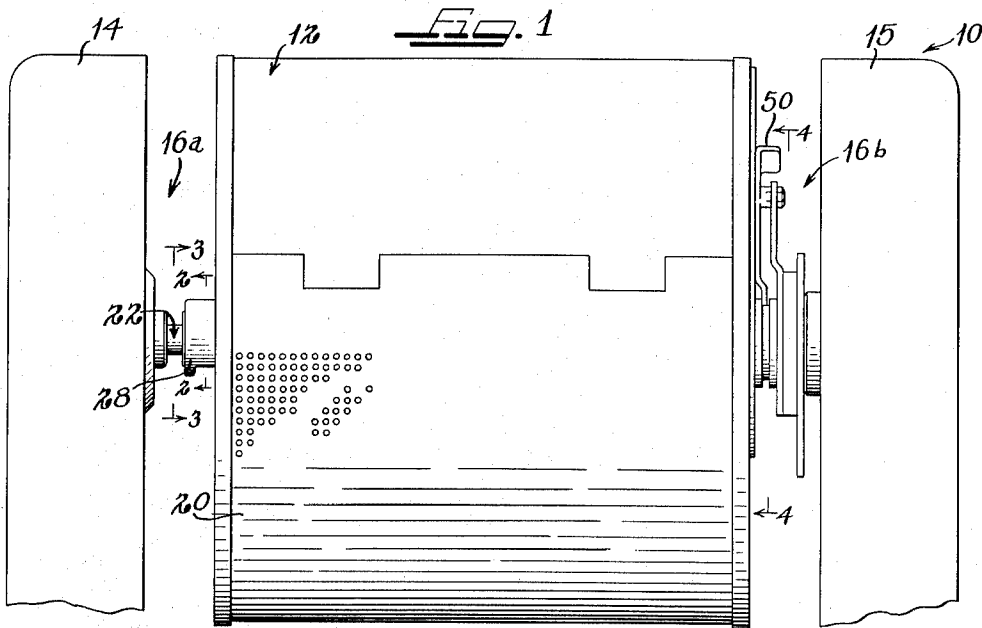
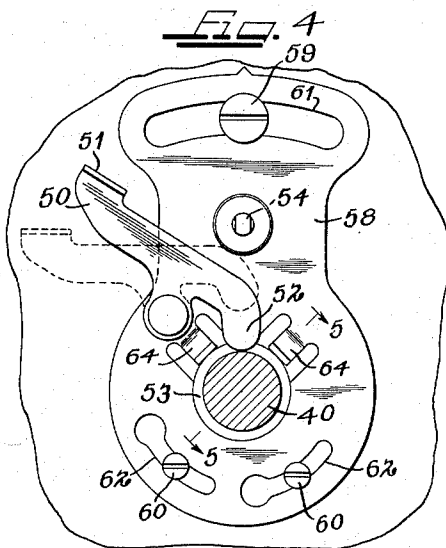
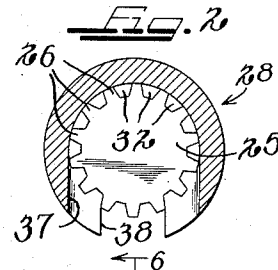
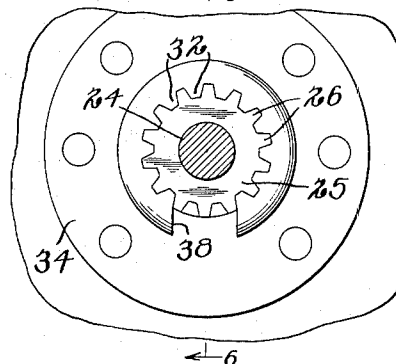
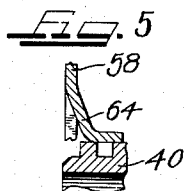
E. H. DU BOIS ET AL

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CYLINDER DEMOUNTING MECHANISM FOR DUPLICATORS

Filed July 8, 1954

2 Sheets-Sheet 1



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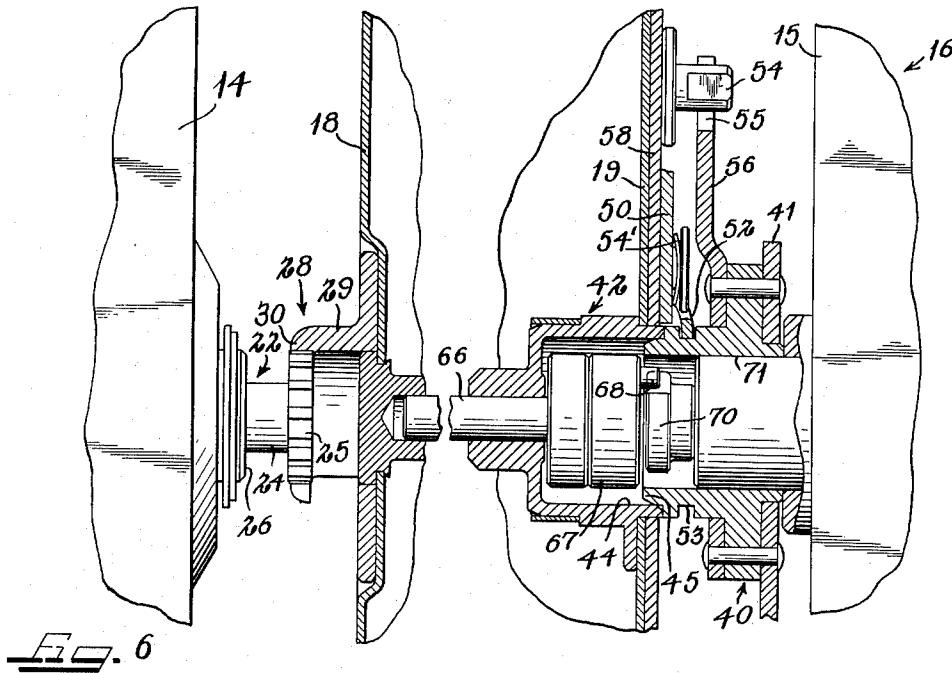
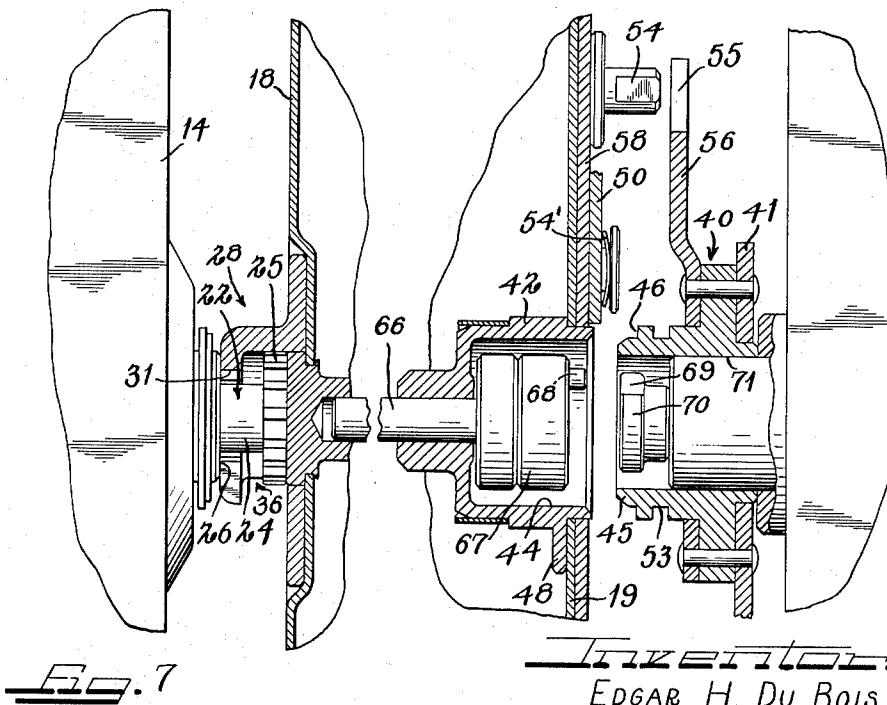
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CYLINDER DEMOUNTING MECHANISM FOR DUPLICATORS

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8 Claims. (Cl. 101—216)

This invention relates to duplicating machines or the like and pertains particularly to a mechanism whereby the printing cylinder of the duplicating machine may be demounted or detached from the machine.

Accordingly, one principal object of the invention is to provide an improved cylinder demounting mechanism for duplicating machines.

A further object is to provide a mechanism which will support the printing cylinder of a duplicator in such a manner that the cylinder may be quickly and easily demounted from the machine.

Another object is to provide a mechanism permitting easy demounting of the printing cylinder while normally holding the cylinder in accurately centered relation to its axis of rotation.

Still another object is to provide a cylinder demounting mechanism which normally supports the cylinder for accurately centered rotation and provides a detachable driving connection to the cylinder, such driving connection being positive and free from objectionable play.

Further objects and advantages of the invention will appear from the following description, taken with the accompanying drawing, in which:

Figure 1 is a somewhat diagrammatic fragmentary elevational view of a duplicating machine embodying a cylinder demounting mechanism constructed in accordance with the invention;

Figs. 2 and 3 are fragmentary sectional views, taken generally along lines 2—2 and 3—3 in Fig. 1, to show the detachable mounting arrangement for one end of the printing cylinder shown in Fig. 1;

Fig. 4 is a fragmentary enlarged sectional view taken generally along a line 4—4 in Fig. 1 to show the detachable mounting arrangement for the opposite end of the cylinder;

Fig. 5 is a fragmentary sectional view taken generally along a line 5—5 in Fig. 4;

Fig. 6 is a fragmentary longitudinal sectional view through the cylinder of Fig. 1, taken generally along a line 6—6 in Fig. 3; and

Fig. 7 is a view similar to Fig. 6 but with the cylinder in a changed position to illustrate the first stage in the procedure for demounting the cylinder from the machine.

Considered in greater detail, Fig. 1 of the drawings illustrates a purely illustrative duplicating machine 10 which is shown as a stencil duplicator but may be of any other type. The illustrated machine comprises a printing or stencil supporting cylinder 12 mounted between left- and right-hand housings 14 and 15. A cylinder demounting mechanism 16 is provided having portions or submechanisms 16a and 16b for supporting the left- and right-hand ends of the cylinder 12. In this instance, the cylinder 12 is provided with left- and right-hand end walls 18 and 19, together with a cylindrically curved stencil supporting element in the form of a perforated plate or diaphragm 20.

At the left-hand end of the cylinder 12, the cylinder demounting mechanism 16a comprises a rotatable trun-

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nion 22 journaled in the left-hand end housing 14 and in this instance adapted to be geared or otherwise connected to a drive motor (not shown) for rotating the cylinder 12. The trunnion 22 projects outwardly from the housing 14 and is formed with a reduced stem or neck 24 terminating in an enlarged head 25. An outwardly facing shoulder 26 is formed on the trunnion at the left-hand end of the neck 24. In order that the head 25 of the trunnion may serve as a driving element for the cylinder 12, it is of noncircular shape and preferably is made with a plurality of evenly spaced splines or gear teeth 26, as shown.

To establish a connection with the trunnion 22, a hollow coupling or mounting member 28 is secured to the left-hand end wall 18 on the cylinder 12. As shown, the coupling member 28 is preferably formed with a generally cylindrical side wall 29 terminating in an inwardly projecting flange or end wall 30 formed with an opening 31, of a shape corresponding to that of the head 25. Accordingly, the opening 31 in this instance is formed with internal splines or gear teeth 32 adapted to mesh with the external teeth 26 on the head 25. The coupling member 28 has an outwardly projecting flange 34 which is secured to the left-hand end wall 18 of the cylinder.

To provide for disconnection of the cylinder 12 from the trunnion 22, the coupling member 28 is formed with a longitudinal slot 36 having a relatively wide portion 37 extending through the cylindrical wall 29, for admitting the head 25 to the inside of the member 28, together with a relatively narrow portion 38 extending through the end wall 30, for admitting the neck 24 of the trunnion while retaining the head 25 in centered supporting and driving relation to the member 28.

When the cylinder 12 is in its operative position on the machine 10, the head 25 of the trunnion 22 is positioned in the opening 31 and the splines or teeth 26 are in mesh with the internal teeth 32, as shown in Fig. 6. The size of the slot 38 is substantially smaller than that of the head 25, with the result that the head is held snugly within the opening 31, and the cylinder is maintained in accurately centered relation to the trunnion 22.

The cylinder 12 may be detached from the trunnion 22 by sliding the cylinder axially to the left so as to disengage the splined end flange 30 from the head 25 and position the latter within the coupling member 28. The cylinder 12 may then be withdrawn laterally in such a direction that the head 25 and the neck 24 will pass through the large and small slots 37 and 38.

At the right-hand end of the cylinder, the demounting mechanism 16b comprises a second or right-hand trunnion 40 which in this instance is journaled in the right-hand housing 15 and is adapted to drive various operating components of the machine such as a cam 41, mounted directly on the trunnion in this case. The cylinder is provided with a coupling element 42 adapted to engage the trunnion 40 so that the latter will support the cylinder in accurately centered relation to the axis of rotation of the trunnion. As shown, the coupling element 42 is cup-shaped to provide a cylindrical recess or opening 44 for receiving a cylindrical end portion 45 formed on the trunnion 40. A shoulder 46 is formed on the trunnion to limit the extent to which the trunnion may be inserted into the cup-shaped element 42. An outwardly projecting flange 48, formed on the coupling element 42, is secured to the end wall 19 of the cylinder 12.

Provision is made for locking the cylinder 12 to one of the trunnions against endwise movement, so as to maintain the cylinder in its operative position. For this purpose, a locking lever 50 is pivotally connected to the right-hand end wall 19 of the cylinder. At one end, the lever 50 is formed with an ear 51 which serves as a hand grip. The other end of the lever 50 is provided with a

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nose portion 52 adapted to be received in a peripheral groove 53 or other locking element formed in the right-hand trunnion 40. A spring washer 54' maintains the adjustment of the lever whether it is engaged with the groove 53, as shown in full lines in Fig. 5, or disengaged from the groove as shown in dotted lines.

In order to form a disengageable driving connection between the cylinder 12 and the right-hand trunnion 40, a longitudinal projecting drive pin 54 is connected to the right-hand cylinder end wall 19 for engagement with a notch 55 formed in a radial arm 56 which is secured to the trunnion.

Rather than being mounted directly on the end wall 19, the locking lever 50 and the drive pin 54 are mounted on an adjustable plate 58 adapted to be clamped in an adjusted position on the end wall 19 by means of screws 59 and 60 extending through arcuate slots 61 and 62 formed in the plate 58. Adjusting the angular position of the plate 58 will vary the timing of the machine components operated by the trunnion 40.

It will be evident that the cylinder 12 may be detached from the right-hand trunnion 40 by sliding the cylinder to the left and thereby disengaging the cup-shaped mounting element 42 from the trunnion. To support the right-hand end of the cylinder until it can be lifted free of the trunnions 22 and 40, a pair of outwardly projecting fingers 64 are formed on the plate 58 for engagement with the outer periphery of the trunnion 40. The fingers 64 also serve to guide the cylinder when it is remounted on the trunnion 40.

In this instance, the cylinder 12 is provided with a rotatable, axially extending shaft 66 for operating an inking mechanism (not shown) mounted within the cylinder. At its right-hand end the shaft 66 is fitted with an enlarged head 67 carrying a drive pin 68 which is adapted to be engaged with a notch 69 formed in the left-hand end of a shaft 70 extending through a bore 71 in the trunnion 40. A knob or lever (not shown) may be provided for turning the shaft 70 and thereby controlling the inking mechanism in the cylinder.

When the cylinder 12 is in its normal operating position, as shown in Fig. 6, the toothed end flange 30 is aligned and engaged with the splined head 25 on the left-hand trunnion. The head 25 of the trunnion is held captive in the opening 31 with a minimum of play, with the result that the cylinder 12 is maintained accurately centered with respect to the trunnion 22. The right-hand trunnion 40 is received within the cup-shaped mounting element 42 and the drive pin 54 is engaged with the drive arm 56. To hold the cylinder against endwise movement, the lever 50 is engaged with the groove 53 in the trunnion 40.

When it is desired to demount the cylinder 12, the cylinder is brought to rest with the drive arm 56 extending upwardly. To unlock the cylinder 12, the lever 50 is moved to the dotted line position shown in Fig. 5 so as to disengage the lever from the groove 53 in the trunnion 40. The cylinder is then moved endwise toward the left-hand housing 14 until the mounting member 28 engages the shoulder 26, as shown in Fig. 7. This operation disengages the cup-shaped element 42 from the trunnion 40 and withdraws the drive pin 54 from the notch 55 in the arm 56. Likewise, the drive pin 68 for the inking mechanism is withdrawn from the notch 69 in the shaft 70. At the left-hand end of the cylinder, the toothed end flange 30 on the coupling member 28 is disengaged from the splined head 25. The leftward movement of the cylinder 12 shifts the mounting member 28 to a position in which the head 25 is disposed within the coupling member 28. The cylinder 12 may then be lifted off the trunnions 22 and 40, whereupon the head 25 and the neck 24 will pass through the slots 37 and 38. The cylinder may be remounted on the machine by a reversal of these operations.

Various modifications, alternative constructions and

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equivalents may be employed without departing from the true spirit and scope of the invention as exemplified in the foregoing description and defined in the following claims.

We claim:

1. In a duplicating machine or the like, the combination comprising a cylinder, a drive trunnion for rotatably supporting one end of said cylinder means rotatably supporting said trunnion, said trunnion having a stem thereon terminating in a noncircular head rigid with said trunnion and of enlarged cross section relative to said stem, a hollow coupling member rigidly mounted on said cylinder, said coupling member having side wall means extending longitudinally from said cylinder and end wall means spaced from the end of said cylinder, said end wall means having a noncircular opening therein of a shape corresponding to that of said head for closely receiving said head to establish a driving relation between said head and said coupling member, said coupling member having a generally longitudinal slot therein for receiving said trunnion, said slot having a relatively wide portion extending through said side wall means for receiving said head and a relatively narrow portion extending through said end wall means for receiving said stem while retaining said head in said opening, said cylinder being detachable from said trunnion by moving said cylinder axially toward said trunnion to position said head in said hollow coupling member and moving said cylinder laterally to withdraw said coupling member from said trunnion.

2. In a duplicating machine or the like, the combination comprising a cylinder, first and second trunnions for rotatably supporting said cylinder at opposite ends thereof, means mounted on one end of said cylinder for engaging said second trunnion and maintaining said cylinder in axially aligned relation thereto, said means being disengageable from said second trunnion by axially moving said cylinder in one direction away from said second trunnion, said first trunnion having a stem thereon terminating in a noncircular head of enlarged cross section relative to said stem, a hollow coupling member mounted on the opposite end of said cylinder, said coupling member having side wall means extending longitudinally from said cylinder and end wall means spaced from the end of said cylinder, said end wall means having a non-circular opening therein for closely receiving said head, said coupling member having a generally longitudinal slot therein for receiving said first trunnion, said slot having a relatively wide portion extending through said side wall means for receiving said head and a relatively narrow portion extending through said end wall means for receiving said stem while retaining said head in said opening, and means for disengageably locking said cylinder to one of said trunnions against axial movement, said cylinder being detachable from said trunnions by disengaging said locking means, moving said cylinder axially in said one direction to disengage said cylinder from said second trunnion and position said head in said hollow coupling member, and moving said cylinder laterally to withdraw said coupling member from said first trunnion.

3. In a duplicating machine, the combination comprising a printing cylinder, a trunnion for rotatably supporting one end of said cylinder, said cylinder having an end wall thereon at said end thereof, said first trunnion having a generally cylindrical stem thereon terminating in a head of enlarged diameter relative to said stem, said head having a plurality of evenly spaced external splines formed thereon, a hollow generally cylindrical coupling member mounted on said end wall of said cylinder in centered relation thereto, said coupling member having a generally cylindrical wall provided with an inwardly directed end flange spaced from said end wall and formed with internal splines for meshing with said external splines on said trunnion, said coupling member having a generally longitudinal slot formed therein for admitting said trunnion, said

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slot having a relatively wide portion extending through said cylindrical wall for receiving said head and a relatively narrow portion extending through said end flange for receiving said stem while excluding said head, said coupling member being detachable from said head by moving said cylinder endwise to position said head in said coupling member opposite said wide portion of said slot and then moving said cylinder laterally to withdraw said coupling member from said stem and said head.

4. In a duplicating machine, the combination comprising a printing cylinder having first and second opposite end walls, first and second trunnions for rotatably supporting said cylinder at opposite ends thereof, said first trunnion having a cylindrical neck thereon terminating in a head of enlarged diameter relative to said neck, said head having a plurality of evenly spaced external gear teeth formed thereon, a hollow generally cylindrical coupling member mounted on the first end wall of said cylinder in centered relation thereto, said coupling member having a generally cylindrical wall provided with an inwardly directed end flange spaced from said first end wall and formed with internal gear teeth for meshing with said external gear teeth on said first trunnion, said coupling member having a generally longitudinal slot formed therein for receiving said first trunnion, said slot having a relatively wide portion extending through said cylindrical wall for receiving said head and a relatively narrow portion extending through said end flange for receiving said neck while excluding said head, said coupling member being detachable from said head by moving said cylinder endwise to position said head in said coupling member and then moving said cylinder laterally to withdraw said coupling member from said neck and said head, said second end wall having means thereon forming a recess for receiving said second trunnion, a lever mounted on said second end wall for locking said cylinder to said second trunnion against relative axial movement therebetween, said second trunnion having a peripheral groove for receiving said lever, a drive pin mounted on said second end wall in radially spaced relation to the axis of said cylinder, and an arm mounted on said second trunnion and having a notch therein for disengageably receiving said drive pin to form a rotary driving connection between said cylinder and said second trunnion.

5. In a duplicating machine or the like, the combination comprising a cylinder, first and second trunnions for rotatably supporting said cylinder at opposite ends thereof, means mounted on one end of said cylinder for disengageable connection to said second trunnion, said first trunnion having an end portion formed with a noncircular head of enlarged cross section relative to said end portion, coupling means mounted on the opposite end of said cylinder, said coupling means having end wall means spaced from the end of said cylinder and supporting means for connecting said end wall means to said cylinder, said end wall means having a noncircular opening therein for closely receiving said head, said mounting member having a generally longitudinal opening therein for receiving said first trunnion, said opening having a relatively wide portion extending through said supporting means for receiving said head and a relatively narrow portion extending through said end wall means for receiving said stem while retaining said head in said opening, and means for disengageably locking said cylinder to one of said trunnions against axial movement, said cylinder being detachable from said trunnions by disengaging said locking means, moving said cylinder axially toward said first trunnion to disengage said head from said end wall means and moving said cylinder laterally to withdraw said coupling means from said first trunnion.

6. In a duplicating machine or the like, the combination comprising a cylinder, a trunnion for rotatably supporting one end of said cylinder, means rotatably supporting said trunnion said trunnion having a body portion thereon terminating in a noncircular head of enlarged

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cross section relative to said body portion, a coupling element having a noncircular axial opening therein of a shape corresponding to that of said head for closely receiving said head to establish a driving relation between said head and said coupling element, supporting means for mounting said coupling element on said cylinder in spaced relation to one end thereof, said coupling element and said supporting means having respective aligned lateral openings therein for receiving said lateral trunnion, said opening in said supporting means being wide enough to admit said head, said lateral opening in said coupling element being wide enough to admit said body portion while narrow enough to retain said head in said axial opening, said cylinder being detachable from said trunnion by moving said cylinder axially toward said trunnion to position said head opposite said lateral opening in said supporting means and then moving said cylinder laterally, said head and said body portion thereby passing through said lateral openings.

7. In a duplicating machine, the combination comprising a printing cylinder having first and second opposite end walls, first and second trunnions for rotatably supporting said cylinder at opposite ends thereof, said first trunnion having a cylindrical stem thereon terminating in a head of enlarged diameter relative to said stem, said head having a plurality of evenly spaced external splines formed thereon, a hollow generally cylindrical coupling member mounted on the first end wall of said cylinder in centered relation thereto, said coupling member having a generally cylindrical wall provided with an inwardly directed end flange spaced from said first end wall and formed with internal splines for meshing with said external splines on said first trunnion, said coupling member having a generally longitudinal slot formed therein for admitting said first trunnion, said slot having a relatively wide portion extending through said cylindrical wall for admitting said head and a relatively narrow portion extending through said end flange for admitting said stem while excluding said head, said coupling member being detachable from said head by moving said cylinder endwise to position said head in said coupling member and then moving said cylinder laterally to withdraw said coupling member from said stem and said head, said second end wall having means thereon forming a recess for telescopically receiving said second trunnion, and means for locking said cylinder to said second trunnion against relative axial movement therebetween.

8. In a duplicating machine or the like, the combination comprising a cylinder, first journal means for supporting one end of said cylinder for rotation, second journal means mounted on said one end of said cylinder and separably engaging said first journal means, one of said journal means being telescopically received within the other of said journal means, said first and second journal means being separable by moving said cylinder axially away from said first journal means, a drive trunnion for supporting the opposite end of said cylinder for rotation, means rotatably supporting said trunnion, said trunnion having a stem portion thereon terminating in a noncircular head rigid with said trunnion and of enlarged cross section relative to said stem portion, a hollow coupling member rigidly mounted on said cylinder, said coupling member having side wall means extending longitudinally from said cylinder and end wall means spaced from the end of said cylinder, said end wall means having an axial non-circular opening therein of a shape corresponding to that of said head and disengageably receiving said head to establish a driving relation between said head and said coupling member, said coupling member having a generally longitudinal slot therein for admitting said trunnion thereto, said slot having a relatively wide portion extending through said side wall means for receiving said head and a relatively narrow portion extending through said end wall means and communicating with said non-

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circular opening for receiving said stem portion while retaining said head in said non-circular opening, and means for disengageably locking said cylinder against axial movement relative to said trunnion, said cylinder being detachable from said trunnion and said first journal means by disengaging said locking means, moving said cylinder axially toward said trunnion to disengage said first and second journal means while disengaging said non-circular opening from said head and positioning said head in said coupling member, and moving said cylinder laterally to withdraw said coupling member from said trunnion.

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