

Jan. 25, 1966

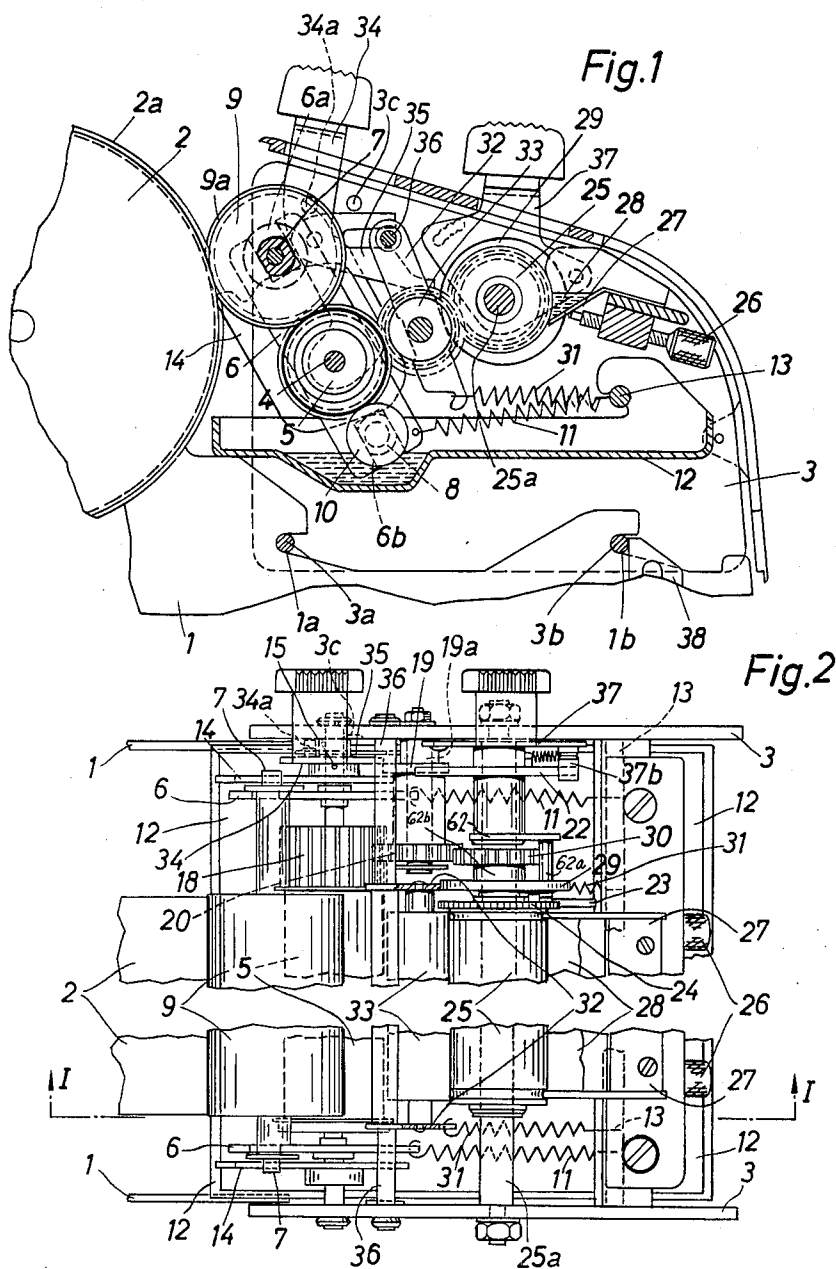
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3,230,877

INKING DEVICE FOR PRINTING MACHINES

Filed June 17, 1963

3 Sheets-Sheet 1



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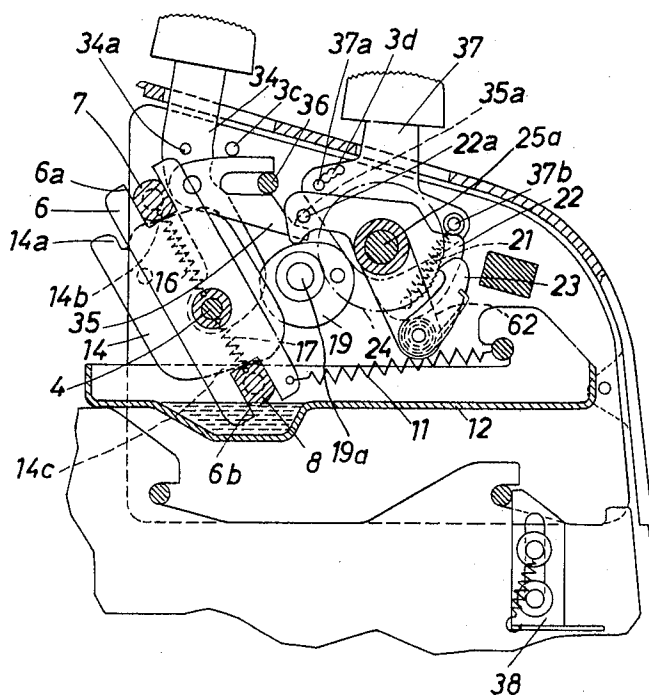
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Fig. 3



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INKING DEVICE FOR PRINTING MACHINES

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3 Sheets-Sheet 3

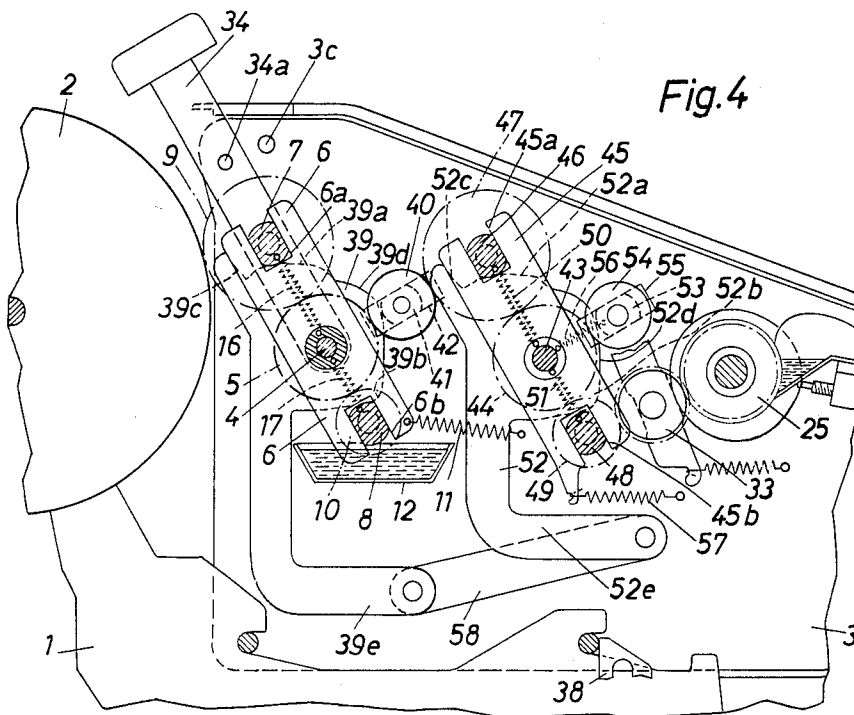


Fig. 4

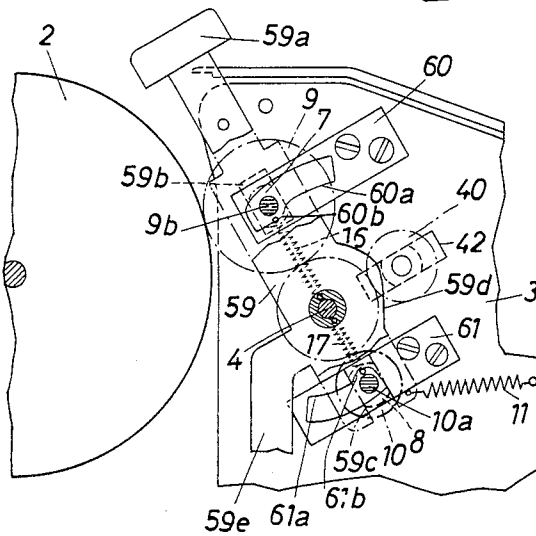


Fig. 5

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INKING DEVICE FOR PRINTING MACHINES

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Filed June 17, 1963, Ser. No. 288,193

Claims priority, application Germany, June 22, 1962,

A 40,502; June 29, 1962, A 40,562

19 Claims. (Cl. 101—351)

The present invention relates to an inking device for a printing machine, and more particularly to an inking device comprising a plurality of cooperating rollers which can be separated from each other when the printing machine is not operated.

It is known to separate the inking roller of an inking device from the printing cylinder to prevent an accumulation of ink on the same when the machine is not in use. However, since the inking roller, distributing roller, and transfer rollers remain in contact, deformations of the rubber surface of the rollers may take place when the same remain in contact along the same surface portion for an extended time.

It is one object of the present invention to provide an inking device for a printing machine in which the several rollers of the inking device can be separated from each other and from the printing cylinder when not in use.

Another object of the present invention is to accomplish this result by a very simple and compact apparatus.

Another object of the present invention is to separate the several rollers of an inking device by cam means.

Inking devices include doctor rollers which are stepwise turned and which cooperate with a transfer roller. It is necessary to stop the drive of the doctor roller when the printing machine is not in use, since otherwise an accumulation of ink forms between these rollers which are transferred to the printing cylinder when the next printing operation is started.

It is another object of the present invention to provide apparatus for automatically stopping the drive of the doctor roller when the inking roller of the inking device is separated from the printing cylinder.

Another object of the present invention is to stop the drive of the doctor roller when the several rollers of the inking device are separated from each other.

Another object of the invention is to provide means for adjusting the drive of the doctor roller so that the same is turned through different angular distances during each step.

With these objects in view, the present invention relates to an inking device for a printing machine which comprises first roller means rotatable about a stationary axis, means for applying ink to the surface of the first roller means, second roller means mounted for movement toward and away from the first roller means between a spaced position and a transfer position; and cam means operatively connected with the second roller means. The second roller means and the cam means are movable relative to each other for moving the second roller means between the spaced position and the transfer position.

In one embodiment of the invention, spring means urge the second roller means toward the first roller means, and the cam means is turnable about the axis of the first roller means and causes movement of the second roller means away from the first roller means when being turned by the operator.

In another embodiment of the invention stationary cam means are provided, and the second roller means are moved relative to the stationary cam means to be urged away from the first roller means.

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In a preferred embodiment of the invention, supporting lever means are mounted on the shaft of the first roller means for turning movement about the axis of the same and are provided at the ends thereof with first and second radial guideways in which the bearing means of second and third roller means are mounted for radial movement. Springs urge the bearing means in inward radial direction so that the second and third roller means tend to abut on the first roller means. Operator controlled cam means are mounted for turning movement on the shaft of the first roller means and act on the bearing means for moving the second and third roller means to positions separated from the first roller means. Preferably, the cam means also effect turning of the supporting lever means to a position in which the second roller means is spaced from the printing cylinder.

In one embodiment of the invention, a transfer roller cooperates with the first roller means and is mounted in bearing means which are slidable in radial direction with respect to the axis of the first roller means. A cam means engage the bearing means of the transfer roller, and separate the same from the first roller means when the other rollers of the inking device are separated by the operator.

Preferably, the operating means are also connected to the drive of a doctor roller to disconnect the same when the other rollers are separated from each other.

In one embodiment of the invention, means are provided to adjust the angular steps of the drive of the doctor roller independently of the separation of the rollers of the inking device by the operator.

The present invention provides a complete inking and moistening device for a printing machine, in which all rollers including inking roller, transfer rollers, distributing rollers, moistening rollers and a doctor roller are simultaneously separated from each other while the inking roller is separated from the printing cylinder. The principle of the invention can be applied to any number of rollers of an inking device. It is particularly advantageous to combine several groups of rollers, wherein two rollers of two different groups cooperate with each other and wherein the distances through which the rollers are displaced to be separated are selected to cause separation of cooperating rollers which are displaced in the same direction.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a fragmentary cross sectional view taken on line I—I in FIG. 2 and illustrating one embodiment of the invention;

FIG. 2 is a fragmentary plan view of the embodiment of FIG. 1;

FIG. 3 is a fragmentary cross sectional view taken on line III—III in FIG. 2;

FIG. 4 is a fragmentary cross sectional view illustrating another embodiment of the invention; and

FIG. 5 is a fragmentary cross sectional view illustrating a third embodiment of the invention.

Referring now to the drawings, and more particularly to FIGS. 1 to 3, a machine frame 1 supports a printing cylinder 2 for rotation about an axis. Frame 1 has recesses 1a and 1b into which carrier rolls 3a and 3b of the support frame 3 of the inking device are inserted. A spring loaded slide or catch 38 locks the frame of the

inking device to the machine frame, permitting, however, the removal of the entire inking device.

Frame 3 supports a shaft 4 for turning movement, and a distributing roller 5 is mounted thereon for turning and axial movement. To achieve better distribution of ink on the distributing roller 5, the same is periodically reciprocated in axial direction by cam means, not shown. This arrangement is known, and not a object of the present invention.

Two supporting lever means 6 are mounted on shaft 4 for turning movement and have at the ends thereof guideways 6a and 6b for two pairs of bearings 7 and 8. Bearings 7 support an inking roller 9, and bearing means 8 support a moistening roller 10. A spring 11 is connected to one end of the supporting lever means 6 and to the frame, and urges supporting lever means 6 to turn in counterclockwise direction to a position in which the inking roller 9 cooperates with the surface of the printing cylinder 2. Moistening roller 10 is partly immersed into a liquid in a trough in a bottom plate 12 which is suspended on a shaft 13 at one end, and rests with its other end on the machine frame.

Cam means 14 are secured by pins 15 to shaft 4 and are provided with peripheral cam faces 14a, 14b and 14c. Springs 16 and 17 are secured to bearings 7 and 8 and to shaft 4 to urge bearings 7 and 8 to move inwardly in the radial guideways 6a and 6b. In the printing position illustrated in FIG. 1, bearings 7 and 8 are in the innermost position, and the surfaces of inking roller 9 and moistening roller 10 are in contact with the surface of distributing roller 5.

When cam means 14 is turned in clockwise direction, cam faces 14b and 14c move bearing means 7 and 8 against the action of springs 16 and 17 in outward direction so that the inking roller 9 and moistening roller 10 are separated from the distributing roller 5.

Cam means 14 is turned by operation of an operating lever 34 which is secured to shaft 4. Operating lever 34 is resilient and carries a catch pin 34a which slides on the surface of one wall of frame 3 until falling into the bore 3c under the action of the resilient operating lever 34. When operating lever means 34 is turned in clockwise direction, shaft 4 with cam means 14 turn, so that first cam faces 14b and 14c cause separation of the inking and moistening rollers from the distributing roller 5, whereupon the cam face 14a abuts bearing means 7 whereupon further turning of operating lever means 34 causes turning of support lever means 6 about shaft 4 against the action of spring 11 so that inking roller 9 is separated from the surface of printing cylinder 2.

Printing cylinder 2 has a gear ring 2a meshing with a corresponding gear ring 9a of inking roller 9. Gear ring 9a meshes with a gear 18 which is fixedly secured to distributing roller 5, meshing with another gear 20 which is fixed to a cam 19 for turning movement therewith. Cam 19 and gear 20 are mounted on a shaft 19a supported on frame 3. A cam follower lever 22 is biased by a spring 21 which is attached to a pin 37b of a manually operated control member 37. Control member 37 is laterally resilient and has a catch pin 37a which successively snaps into a series of bores 37a in a wall of frame 3 to arrest control member 37 in several adjusted control positions. Pin 37b also constitutes a stop which limits the turning movement of cam follower lever 22.

During rotation of the printing cylinder 2, cam 19 rotates continuously, and causes an angular reciprocation of cam follower lever 22.

A shaft 36 is mounted on frame 3 and supports lever means 32 on which a transfer roller 33 is mounted. Transfer roller 33 cooperates with distributing roller 5 and a doctor roller 25 which is mounted for turning movement on a shaft 25a. Doctor roller 25 is supplied with ink by an ink fountain 28 on a support 27 whose position can be adjusted by an adjusting screw 26.

A ratchet wheel 24 is secured to doctor roller 25 and cooperates with a stepping pawl 23 which is pivotally mounted on an axially projecting stud 62a which is secured to a lever 62 connected by a hub 62b to cam follower lever 22 for angular movement therewith. When levers 22, 62 oscillate under the control of cam 19, stepping pawl 23 causes stepwise turning movement of doctor roller 25.

When control member 37 is turned in clockwise direction between several control positions defined by bores 3d, stop 37b assumes different positions relative to cam follower lever 22, and limits the movement of the same in inward radial direction so that the lowest portions of the cam 19 cannot be engaged by the cam follower lever 22. As a result, the turning angle of cam follower 22 is reduced, and stepping pawl 23 performs shorter movements along the periphery of ratchet wheel 24, so that ratchet wheel 24, and thereby doctor roller 25, are turned through smaller angular distances. When cam follower lever 22 is prevented by stop 37b to reach the surface of cam 19 at all, the doctor roller 25 stops.

A control member 35 is pivotally mounted on operating lever 34 and has a recess which receives shaft 36 so that control member 35 is guided along a path. Control member 35 has a cam face 35a cooperating with a pin 22a fixed on cam follower lever 22. When operating lever means 34 is turned in clockwise direction to separate rollers 9 and 10 from distributing roller 5, cam face 35a engages pin 22a and raises cam follower lever 22 to a position in which it cannot engage cam 19, so that the drive 22, 62, 23, 24 of the doctor roller 25 is disconnected and rendered inoperative.

If the drive of the doctor roller is stopped by operation of operating lever means 34, control member 37 need not be displaced, and the drive of the doctor roller remains in the adjusted position so that when the machine is started again, and the inking device is rendered operative by turning of operating lever 34 in counterclockwise direction, the doctor roller starts its operation at the speed previously adjusted by operation of control member 37.

Gear 20 meshes with another gear 30 which is fixedly connected to, and drives a cam 29 cooperating with lever means 32 carrying transfer roller 33. Transfer roller 33 cooperates with doctor roller 25 and with distributing roller 5. Cam 29 causes periodic movement of transfer roller 33 toward and away from distributing roller 5.

The embodiment of FIG. 4 corresponds partly to the embodiment of FIG. 1, and corresponding parts are indicated by the same reference numerals. Operating lever 34 is connected to shaft 4 and to a cam 39 which has cam faces 39a and 39b for outwardly shifting bearing means 7 and 8 in which distributing roller 9 and moistening roller 10 are mounted. Springs 16 and 17 bias the bearing means and the rollers 9 and 10 to move inwardly to a position abutting the cam faces. When rollers 9 and 10 have been outwardly moved by cam faces 39a and 39b, cam face 39c is effective to turn supporting lever means 6 in clockwise direction by engaging bearing means 7 so that inking roller 9 is separated from the printing cylinder 2, as described with reference to FIGS. 1 and 3. Cam 39 has an additional cam face 39d cooperating with bearings means 41 mounted in slots or guideways 42 in walls of frame 3. Guideways 42 extend in radial direction with respect to the axis of shaft 4, so that turning movement of cam 39 causes movement of bearing means 41 away from shaft 4 and from the distributing roller 5. A transfer roller 40 is mounted in bearing means 41, and normally engages the surface of distributing roller 5, but when operating lever means 34 is turned in clockwise direction, transfer roller 40 and bearing means 41 are displaced by cam face 39d to a position in which the surfaces of transfer roller 41 and distributing roller 5 are spaced.

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A shaft 43 is mounted on frame 3 and turnably supports another distributing roller 44 which may be axially reciprocated in a conventional manner by cam means, not shown. Supporting lever means 45 are mounted on shaft 4, and have at the ends thereof radial guideways 45a and 45b in which bearings 46 and 48 are mounted for radial movement. Springs 50 and 51, secured to shaft 43 and to bearing means 46, 48, urge the latter inwardly to a position in which a transfer roller 47 mounted in bearing means 46, and another transfer roller 49 mounted in bearing means 48, are in contact with the surface of distributing roller 44. A spring 57 secured to the frame 3 and to one end of supporting lever means 45, urges the same to turn in counterclockwise direction so that transfer roller 47 abuts transfer roller 40 and urges the same to move toward distributing roller 5.

Bearing means 46 and 48 are engaged by cam faces 52a and 52b of a cam means 52 which also has a cam face 52c cooperating with bearing means 46. A further cam face 52d of cam 52 engages bearing means 53 of a transfer roller 54 and is adapted to urge transfer roller 54 away from distributing roller 44 against the action of spring means 56 which connect bearing means 53 with shaft 43.

Transfer roller 49 cooperates with a periodically oscillating transfer roller 33 supported on a lever 32, as described with reference to FIGS. 1 to 3. Doctor roller 25 cooperates with transfer roller 33 and rotates in synchronism with cam 29 by which lever means 32 is oscillated.

In the position of supporting lever means 45 in which rollers 47, 40 and 5 are in contact to transfer ink, transfer roller 49 is in the proper position to receive ink from the oscillating transfer roller 33.

Cam 39 has an integral arm 39e which is articulated to a link 58, and cam 52 has an angular arm 52e which is pivotally connected with link 58. When operating lever 34 is turned, not only cam 39, but also cam 52 is turned. The ratio of the transmission means 39e, 58, 52e is chosen in such a manner and the position of cam face 52c is so selected that transfer roller 47 is moved a greater distance away from transfer roller 40 under the control of operating lever 34, then transfer roller 40 is moved away from distributing roller 5 by the cam face 39d. Consequently, roller 47 is separated from roller 40, although the same is moved by cam 39 in a direction toward roller 47.

As cam face 52c displaces supporting lever means 45 in clockwise direction against the action of spring 57, transfer roller 49 moves away from transfer roller 33, and when operating lever means 34 is in the position in which catch 34a engages bore 3c, transfer roller 33 cannot reach the surface of transfer roller 49 when oscillated by cam 29 so that rollers 49 and 33 are separated from each other, as are all other rollers of the inking device.

In the modified embodiment of FIG. 5, supporting lever means 59 are secured to shaft 4 which is mounted for turning movement in frame 3. Supporting lever means 59 are fixedly connected to an operating arm 59a which is controlled by the operator of the machine. Supporting lever means 59 have guideways 59b and 59c extending in radial direction with respect to the axis of shaft 4, and respectively supporting bearing means 7 and 8 in which the shafts 9b and 10a of an inking roller 9 and of a moistening roller 10 are mounted. Springs 16 and 17 are connected to the bearing means 7 and 8 to urge the same inwardly until they abut the innermost faces of the guideways. Stationary cam means 60 and 61 are secured to the frame 3 and have cam slots 60a and 61a in which shafts 9b and 10a are located. The shape of the cam slots is designed so that in the position illustrated in FIG. 5, shafts 9b and 10a can move to a position in which rollers 9 and 10 engage a surface of distributing roller 5. When supporting lever means 59 are turned in clockwise direction by the operator, shafts 9b and 10a

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engage radially higher portions of the cam tracks of the cam slots whereby bearing means 7 and 8, and rollers 9 and 10 are outwardly urged until separated from the surface of distributing roller 5.

Supporting lever means 59 are provided with cam faces 59d acting on bearing means 41 which are guided in guideways 42 in walls of frame 3, and support a transfer roller 40 cooperating with distributing roller 5, as explained with reference to FIG. 4. Consequently, turning movement of supporting lever means 59 not only cause separation of rollers 9 and 10 from roller 5 due to the action of cams 60, 61, but also separation of roller 40 from distributing roller 5 by the action of cam face 59d which has the effect of the cam face 39d described with reference to FIG. 4.

Supporting lever means 59 have arm means 59e which may be connected to a link 58, and to the group of rollers illustrated in FIG. 4 including a doctor roller, and a transfer roller 47 cooperating with roller 40.

For the above description it will become apparent that in accordance with the present invention a plurality of rollers of an inking device can be separated from each other and from the printing cylinder by a very simple mechanism which does not require a precise adjustment. In fact, due to the mounting of bearing means in guideways, the respective rollers are automatically adjusted to engage each other along the entire length thereof under the action of the action of the respective springs whereby even rollers whose axes are not exactly parallel cooperate in a satisfactory manner.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of inking devices for printing machines differing from the types described above.

While the invention has been illustrated and described as embodied in an inking device including a plurality of rollers, all of which are separated from each other when the inking roller is separated from the printing cylinder, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

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

1. In an inking device for a printing machine, in combination, first roller means rotatable about a stationary axis; means for applying ink to the surface of said first roller means; second roller means mounted for movement toward and away from said first roller means between a transfer position in contact with said surface, and a spaced position, said second roller means being also mounted for movement about said axis; spring means for urging said second roller means into said transfer position; and stationary cam means engaging said second roller means in a first position angularly displaced about said axis for holding said second roller means in said spaced position, and permitting said second roller means in a section position to be moved to said transfer position by said spring means.

2. In an inking device for a printing machine, in combination, first roller means rotatable about a stationary axis; means for applying ink to the surface of said first roller means; supporting means mounted for turning movement about said axis and having a guideway; bearing means mounted in said guideway; second roller means

supported in said bearing means for turning movement and being movable with the same along said guideways toward and away from said first roller means between a spaced position, and a transfer position in contact with said surface of said first roller means; spring means connected to said supporting and to said bearing means for urging the latter with said second roller means to said transfer position; and cam means mounted for turning movement about said axis and operatively connected with said bearing means for moving said second roller means to said spaced position.

3. In an inking device for a printing machine, in combination, first roller means rotatable about a stationary axis; means for applying ink to the surface of said first roller means; supporting means mounted for turning movement about said axis between inoperative and operative positions and having a guideway; bearing means mounted in said guideway; a printing cylinder located in the proximity of said supporting means; second roller means supported in said bearing means for turning movement and being movable with the same along said guideway toward and away from said first roller means between a spaced position, and a transfer position in contact with said surface of said first roller means, said second roller means contacting the surface of said printing cylinder in said operative position, and being spaced from said printing cylinder in said inoperative position of said supporting means; resilient means for urging said supporting lever means to said operative position; spring means connected to said supporting means and to said bearing means for urging the latter with said second roller means to said transfer position; cam means mounted for turning movement about said axis and operatively connected with said bearing means for moving said second roller means to said spaced position, and operatively connected with said supporting means for turning the same to said inoperative position; and operating means for turning said cam means so that said second roller means can be moved to a position spaced from said printing cylinder and from said first roller means.

4. In an inking device for a printing machine, in combination, first roller means rotatable about a stationary axis; means for applying ink to the surface of said first roller means; supporting lever means mounted intermediate the ends thereof for turning movement about said axis and having at each end thereof a guideway; bearing means mounted in said guideway; two second roller means supported in said bearing means for turning movement and being movable with the same along said guideways toward and away from said first roller means between a spaced position and a transfer position in contact with said surface of said first roller means; means for applying moisture to one of said second roller means; a printing cylinder cooperating with the other of said second roller means; spring means connected to said supporting lever means and to said bearing means for urging the latter with said second roller means to said transfer position; and cam means mounted for turning movement about said axis and operatively connected with said bearing means for moving said second roller means to said spaced position.

5. In an inking device for a printing machine, in combination, first roller means including a shaft rotatable about a stationary axis; means for applying ink to said first roller means; supporting lever means mounted on said shaft intermediate the ends thereof for turning movement about said axis between inoperative and operative positions and having at the ends thereof first and second guideways; bearing means mounted in said guideways; a printing cylinder located in the proximity of one of said bearing means; second roller means supported in said one bearing means for turning movement, third roller means supported in the other bearing means for turning movement, said second and third roller means being movable with said bearing means along said guideways toward and

away from said first roller means between a spaced position and a transfer position in contact with said surface of said first roller means, said second roller means contacting the surface of said printing cylinder in said operative position and being spaced from the same in said inoperative position of said supporting lever means; means for applying moisture to said third roller means; first spring means for urging said supporting lever means to said operative position; second spring means connected to both said bearing means for urging the same with said second and third roller means to said transfer position; cam means mounted for turning movement about said axis and operatively connected with said bearing means for holding said second and third roller means in said spaced position, and operatively connected with said supporting means for turning the same to said inoperative position; and operating means for turning said cam means to a position in which said second and third roller means are in said spaced position, and said second roller means is in a position spaced from said printing cylinder.

6. An inking device as set forth in claim 5 wherein said second roller means is an inking roller; wherein said third roller means is a moistening roller means; and including a fourth roller means mounted on said frame for angular reciprocating movement; and other cam means for reciprocating said fourth roller means toward and away from said first roller means.

7. In an inking device for a printing machine, in combination, first roller means including a shaft rotatable about a stationary axis; means for applying ink to said first roller means; supporting lever means mounted on said shaft intermediate the ends thereof for turning movement about said axis between inoperative and operative positions and having at the ends thereof first and second guideways; bearing means mounted in said guideways; a printing cylinder located in the proximity of one of said bearing means; second roller means supported in said one bearing means for turning movement, third roller means supported in the other bearing means for turning movement, said second and third roller means being movable with said bearing means along said guideways toward and away from said first roller means between a spaced position and a transfer position in contact with said surface of said first roller means, said second roller means contacting the surface of said printing cylinder in said operative position and being spaced from the same in said inoperative position of said supporting lever means; means for applying moisture to said third roller means; first spring means for urging said supporting lever means to said operative position; second spring means connected to both said bearing means for urging the same with said second and third roller means to said transfer position; stationary cam means operatively connected with said bearing means for holding said second and third roller means in said spaced position when said supporting lever means is in said inoperative position; and operating means for turning said supporting lever means.

8. In an inking device for a printing machine, in combination, a frame; first roller means rotatable about an axis; supporting means mounted for turning movement about said axis; second and third roller means supported on said supporting means for movement toward and away from said first roller means in opposite directions; fourth roller means mounted on said frame for movement toward and away from said first roller means in a transverse direction; and operating means including cam means operatively connected with said second, third and fourth roller means for moving the same between an operative position engaging said first roller means and an inoperative position spaced from the same.

9. An inking device as set forth in claim 8 wherein said cam means is turnable about said axis, and wherein said second and third roller means are guided in radial guideways formed in said supporting means, wherein said

fourth roller means is guided in radial guideways formed in said frame.

10. An inking device as set forth in claim 8 wherein said cam means includes stationary cams mounted on said frame, and a cam portion of said supporting means, wherein said operating means are connected with said supporting means and turn the same relative to said stationary cams, and wherein said second and third roller means are outwardly moved by said stationary cams, and said fourth roller means is outwardly moved by said cam portion of said supporting means.

11. An inking device as set forth in claim 8 and including other supporting means, and other first, second and third roller means, said other first roller means cooperating with said fourth roller means; and said operating means including other cam means operatively connected with said other second, third and fourth roller means for moving the same between an operative position engaging said other first roller and an inoperative position spaced from the same whereby by operation of said operating means all roller means can be separated from each other.

12. An inking device as set forth in claim 11 including a printing cylinder cooperating with said second roller means, wherein said cam means turns said supporting means to a position in which said second roller means is spaced from said printing cylinder when said other cam means turns said other second roller means to a position spaced from said first roller means; and wherein said cam means and other cam means are connected in such a manner that said other second roller means moves a greater distance away from said first roller means than said fourth roller means moves away from said first roller means so that said first roller means, fourth roller means, and other second roller means are separated from each other when said second roller means is separated from said printing cylinder and from said first roller means.

13. An inking device as set forth in claim 12 wherein said cam means is mounted for turning movement about said axis, and said other cam means is mounted for turning movement about the axis of said other first roller means; and wherein said cam means have arms; and link means connecting said arms; and wherein said operating means includes a manually operated member connected to said cam means for turning movement whereby said cam means and other cam means can be simultaneously operated.

14. An inking device for a printing machine including a printing cylinder; an inking roller cooperating with the printing cylinder; doctor roller means; a plurality of transfer roller means connecting said doctor roller means with said inking roller means; drive means for stepwise rotating said doctor roller means, said drive means including a rotary cam, a cam follower reciprocated by said cam, a pawl mounted on said cam follower, and a ratchet wheel connected to said doctor roller means for rotation therewith and being stepwise moved by said pawl; adjusting means connected to said drive means for adjusting the speed of rotation of said doctor roller means and adapted to be manually operated, said adjusting means including operator controlled means having a movable stop for limiting the stroke of said cam follower toward said cam whereby the angular displacement of said ratchet wheel by said pawl during each stepwise movement thereof and thereby the speed of rotation of said doctor roller is adjusted; operating means for moving said inking roller independently of the operation of said adjusting means between an operative position and an inoperative position spaced from said printing cylinder; and connecting means connecting said operating means with said drive means for rendering said drive means inoperative independently of the operation of said adjusting means when said inking roller is in said spaced inoperative position, said connecting means including a movable cam member for moving said cam follower to a position spaced from said rotary cam so that said drive means is not operated.

15. In an inking device for a printing machine, in combination, first roller means rotatable about a stationary axis; means for applying ink to the surface of said first roller means; supporting means mounted for turning movement about said axis and having a guideway; bearing means mounted in said guideway; second roller means supported in said bearing means for turning movement and being movable with the same along said guideways toward and away from said first roller means between a spaced position, and a transfer position in contact with said surface of said first roller means; a printing cylinder cooperating with said second roller means; spring means connected to said supporting means and to said bearing means for urging the latter with said second roller means to said transfer position; cam means mounted for turning movement about said axis and operatively connected with said bearing means for moving said second roller means to said spaced position; operating means connected to said cam means and to said supporting means for moving said second roller means to said spaced position and said supporting means to a position in which said second roller means is spaced from said printing cylinder; a doctor roller means; a plurality of transfer roller means connecting said doctor rollers means with said first roller means; drive means for stepwise rotating said doctor roller means; and connecting means connecting said operating means with said drive means for rendering said drive means inoperative when said second roller means is in said position spaced from said printing cylinder and from said first roller means.

16. In a printing machine, in combination, printing means having a surface; supporting means mounted for movement toward and away from said surface; first roller means mounted on said supporting means; means for applying a liquid to said first roller means; second roller means mounted on said supporting means for movement relative to the same between a transfer position in contact with said first roller means and a spaced position, and being movable with said supporting means toward and away from said surface; said supporting means being movable between a first position in which said second roller means in said transfer position contacts said surface whereby liquid is transferred to said surface, and a second position in which said second roller means in said spaced position is spaced from said surface; and cam means having a first cam portion for moving said second roller means between said transfer position and said spaced position, and a second cam portion for moving said supporting means between said first and second positions, said first and second cam portions being sequentially operative during movement of said cam means so that said second roller means is in said transfer position when said supporting means is in said first position and is in said spaced position when said supporting means is in said second position.

17. In a printing machine, in combination, printing means having a surface; supporting means mounted for turning movement about an axis toward and away from said surface; first roller means mounted for turning movement about said axis; means for applying a liquid to said first roller means; second roller means mounted on said supporting means for movement relative to the same between a transfer position in contact with said first roller means and a spaced position, and being movable with said supporting means toward and away from said surface; said supporting means being turnable between a first position in which said second roller means in said transfer position contacts said surface whereby liquid is transferred to said surface, and a second position in which said second roller means in said spaced position is spaced from said surface; and manually operable turnable cam means having a first cam portion for moving said second roller means between said transfer position and said spaced position, and a second cam portion for moving said supporting means between said first and second positions, said first and second cam portions being sequentially operative dur-

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ing movement of said cam means so that said second roller means is in said transfer position when said supporting means is in said first position and is in said spaced position when said supporting means is in said second position.

18. In a printing machine, in combination, printing means having a surface; supporting means mounted for turning movement about an axis toward and away from said surface; first roller means mounted for turning movement about said axis; second roller means mounted on said supporting means for movement relative to the same between a transfer position in contact with said first roller means and a spaced position, and being movable with said supporting means toward and away from said surface; third roller means mounted on said supporting means on the side of said first roller means remote from said second roller means, said third roller means being mounted on said supporting means for movement relative to the same between a transfer position in contact with said first roller means and a spaced position; trough means for holding a liquid and disposed so that said third roller means is in contact with said liquid; said supporting means being turnable between a first position in which said second roller means in said transfer position contacts said surface whereby liquid is transferred to said surface, and a second position in which said second roller means in said spaced position is spaced from said surface; and cam means having a first cam portion for moving said second roller means between said transfer position and said spaced position, a second cam portion for moving said supporting means between said first and second positions, and a third cam portion for moving said third roller means between said transfer position and said spaced position

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thereof, said first and third cam portions being simultaneously operative, and said second cam portion being operative sequentially with said first and third cam portions during movement of said cam means so that said first and second roller means are in said transfer positions when said supporting means is in said first position and are in said spaced positions when said supporting means is in said second position.

19. An apparatus as set forth in claim 18 and including spring means for urging said first and third roller means to said transfer positions, and spring means for urging said supporting means to said first position.

References Cited by the Examiner

UNITED STATES PATENTS

1,120,770	12/1914	Wagner et al.	101—144
1,306,726	6/1919	Smith	101—143
2,109,486	3/1938	Jirousek	101—351 X
2,545,836	3/1951	Albrecht	101—137
2,653,539	9/1953	Halley	101—352
2,722,176	11/1955	Rupp	101—352 X
2,737,886	3/1956	Ruppel	101—351
3,007,403	11/1961	Barnes	101—351 X
3,049,076	8/1962	Ritzerfeld et al.	101—137
3,120,803	2/1964	Greenwood	101—351

FOREIGN PATENTS

95,959 2/1924 Austria.

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