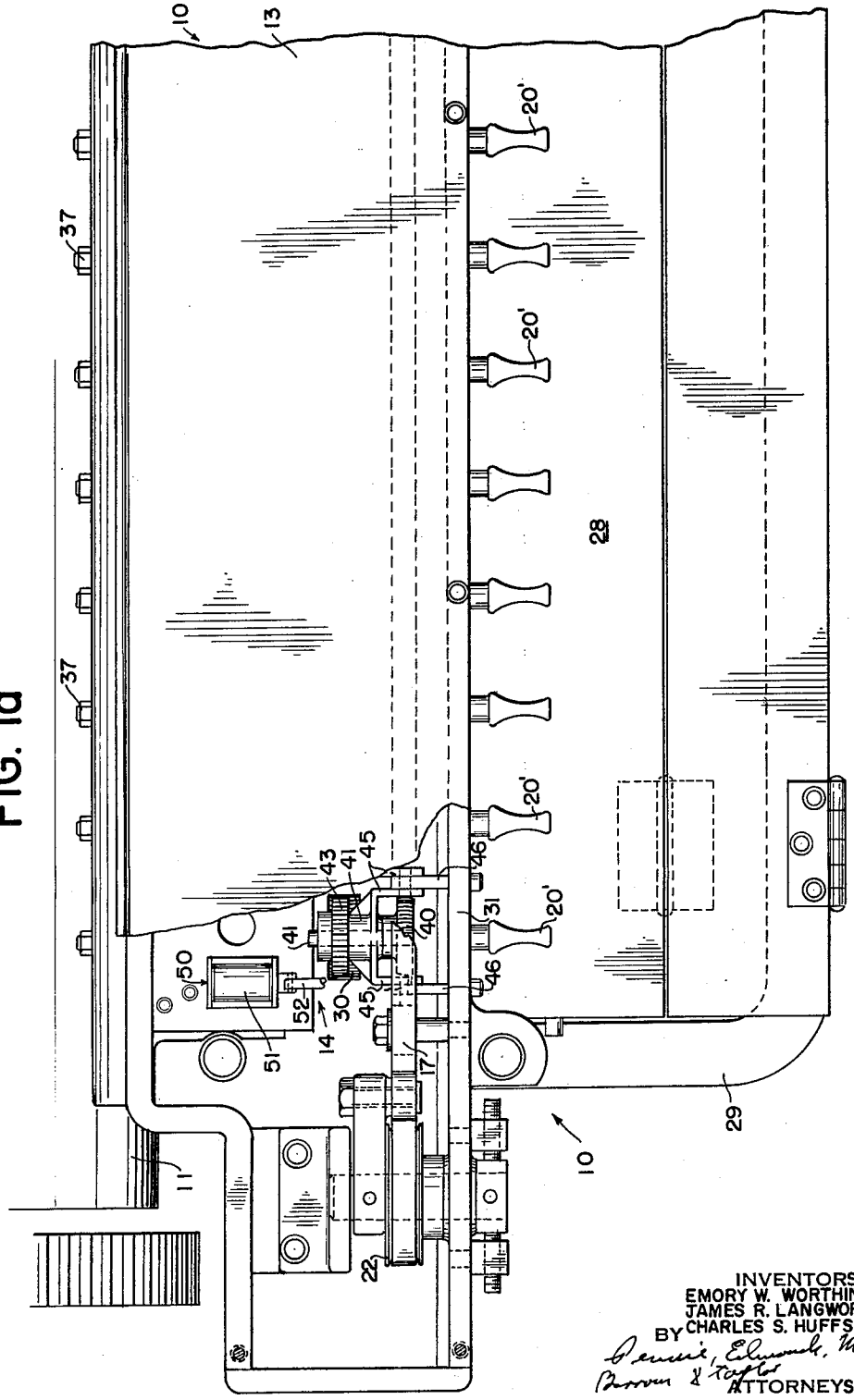
May 26, 1964 E. W. WORTHINGTON ETAL 3,134,325

INK ADJUSTING MECHANISM

Filed Jan. 16, 1962 6 Sheets-Sheet 1

FIG. 1a



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INK ADJUSTING MECHANISM

Filed Jan. 16, 1962 6 Sheets-Sheet 2

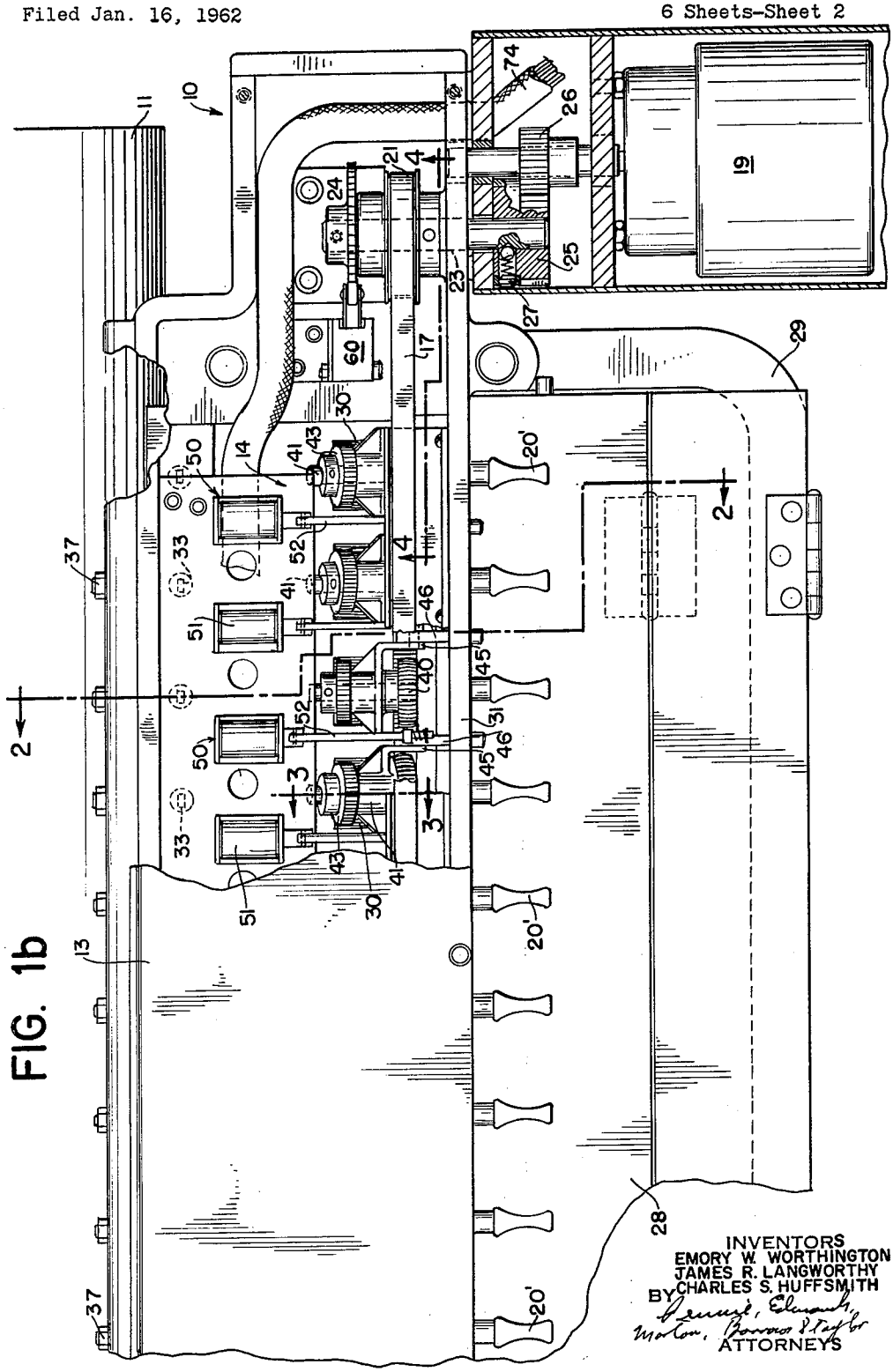

FIG. 1b

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INK ADJUSTING MECHANISM

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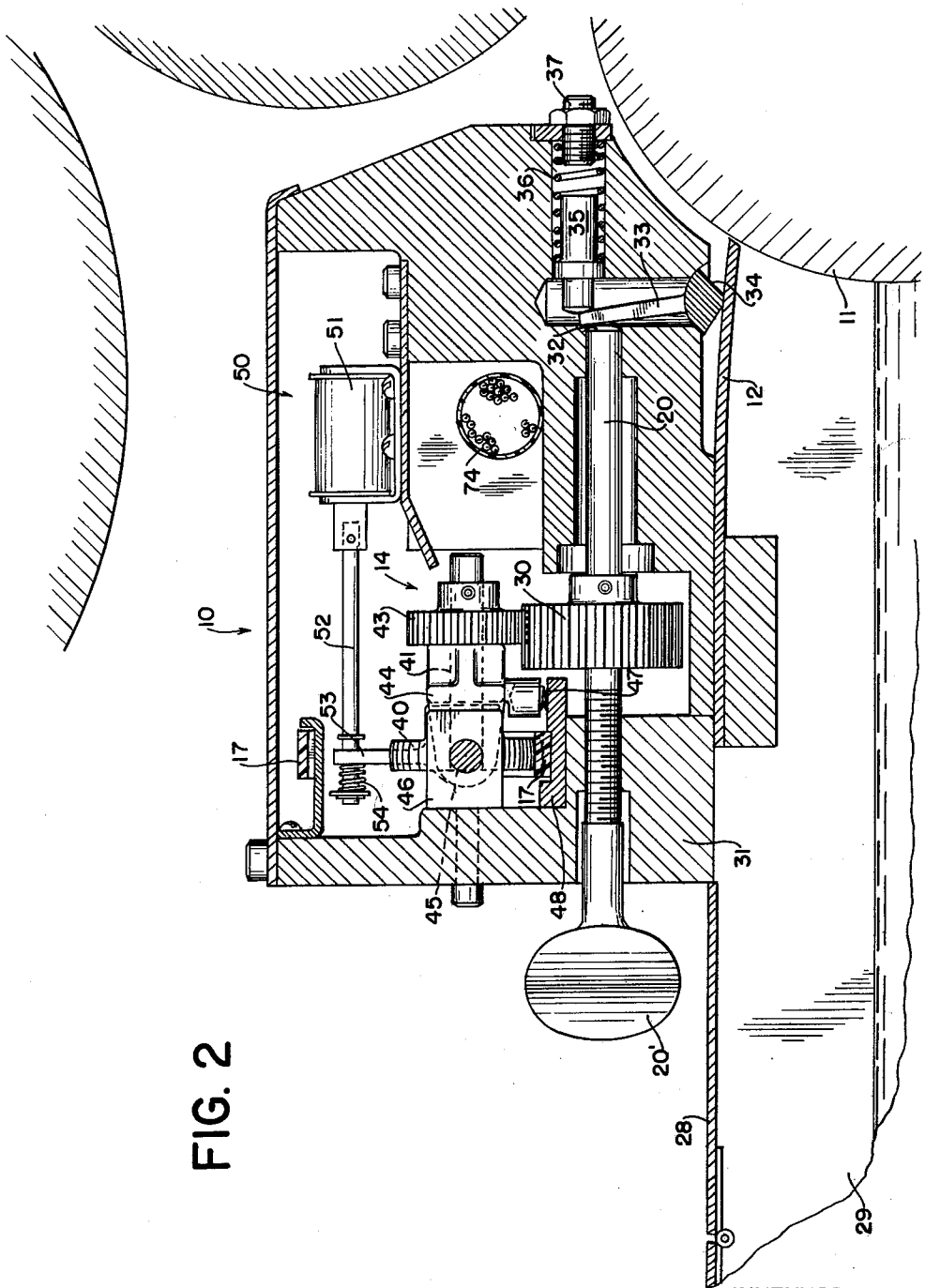

FIG. 2

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INK ADJUSTING MECHANISM

Filed Jan. 16, 1962 6 Sheets-Sheet 4

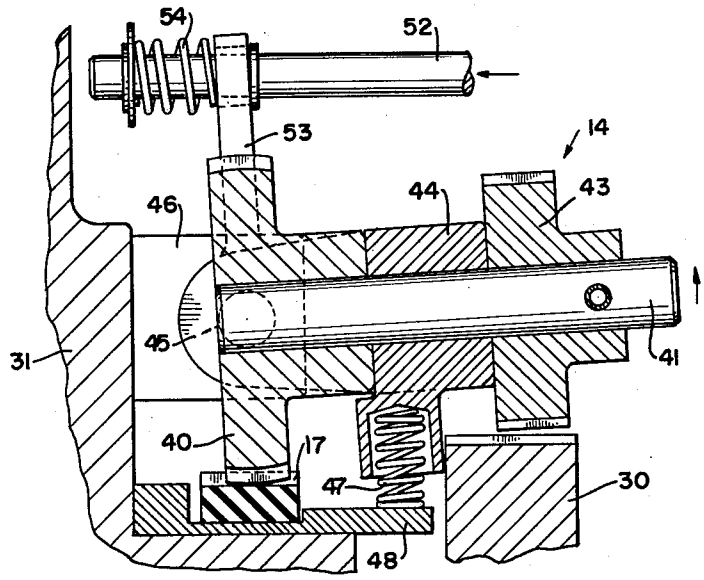
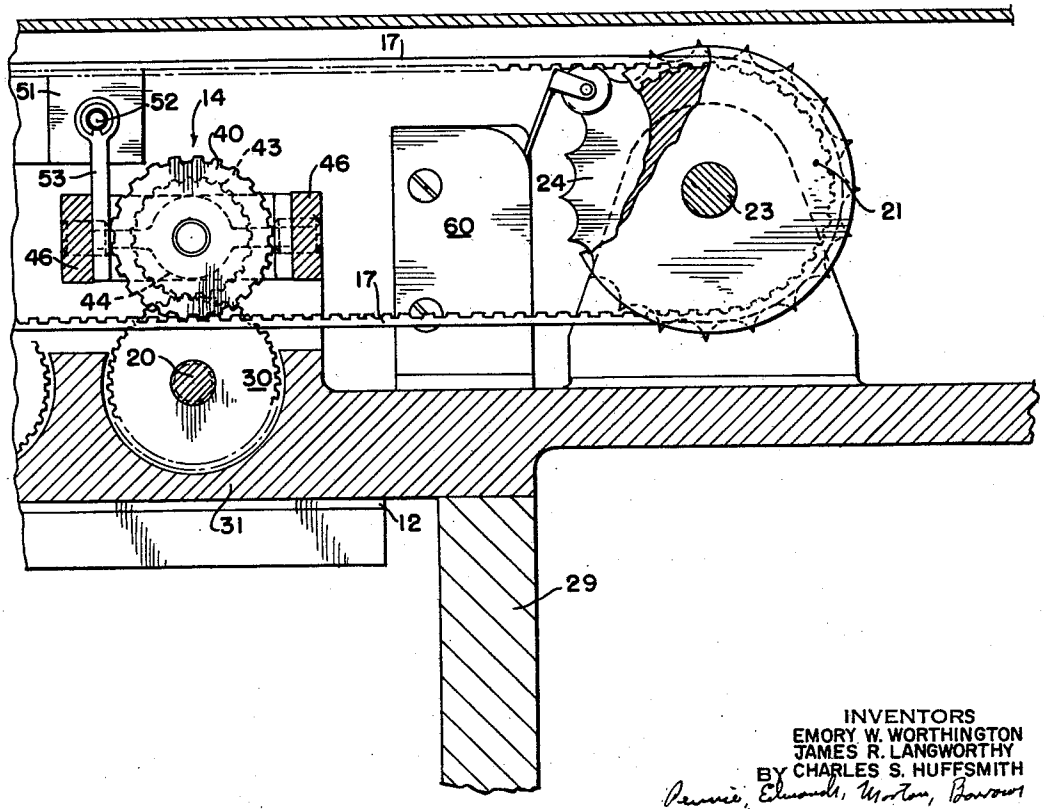


FIG. 3

FIG. 4



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INK ADJUSTING MECHANISM

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FIG. 5

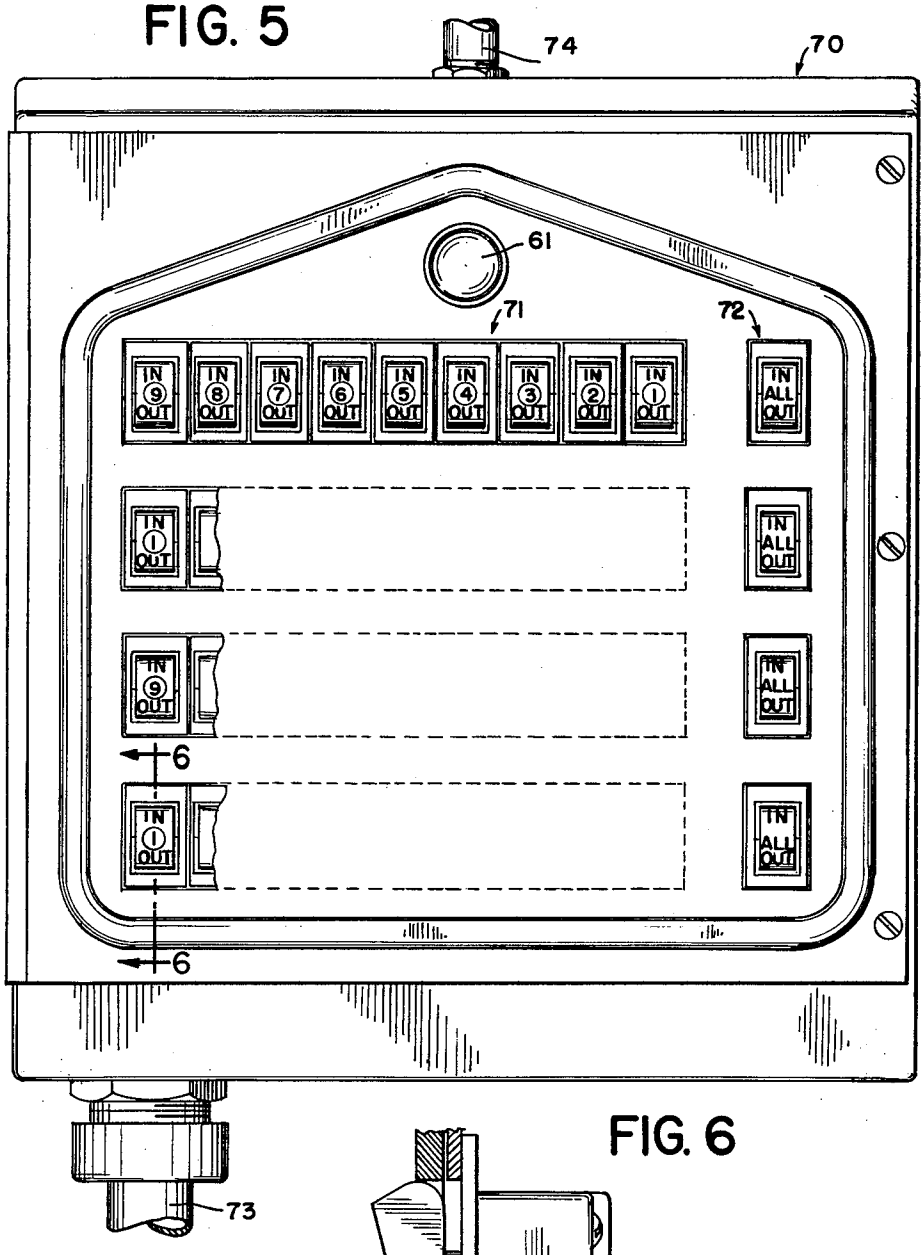
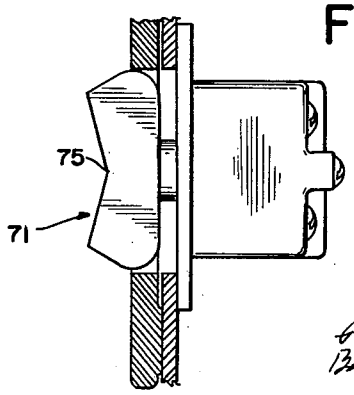


FIG. 6



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INK ADJUSTING MECHANISM

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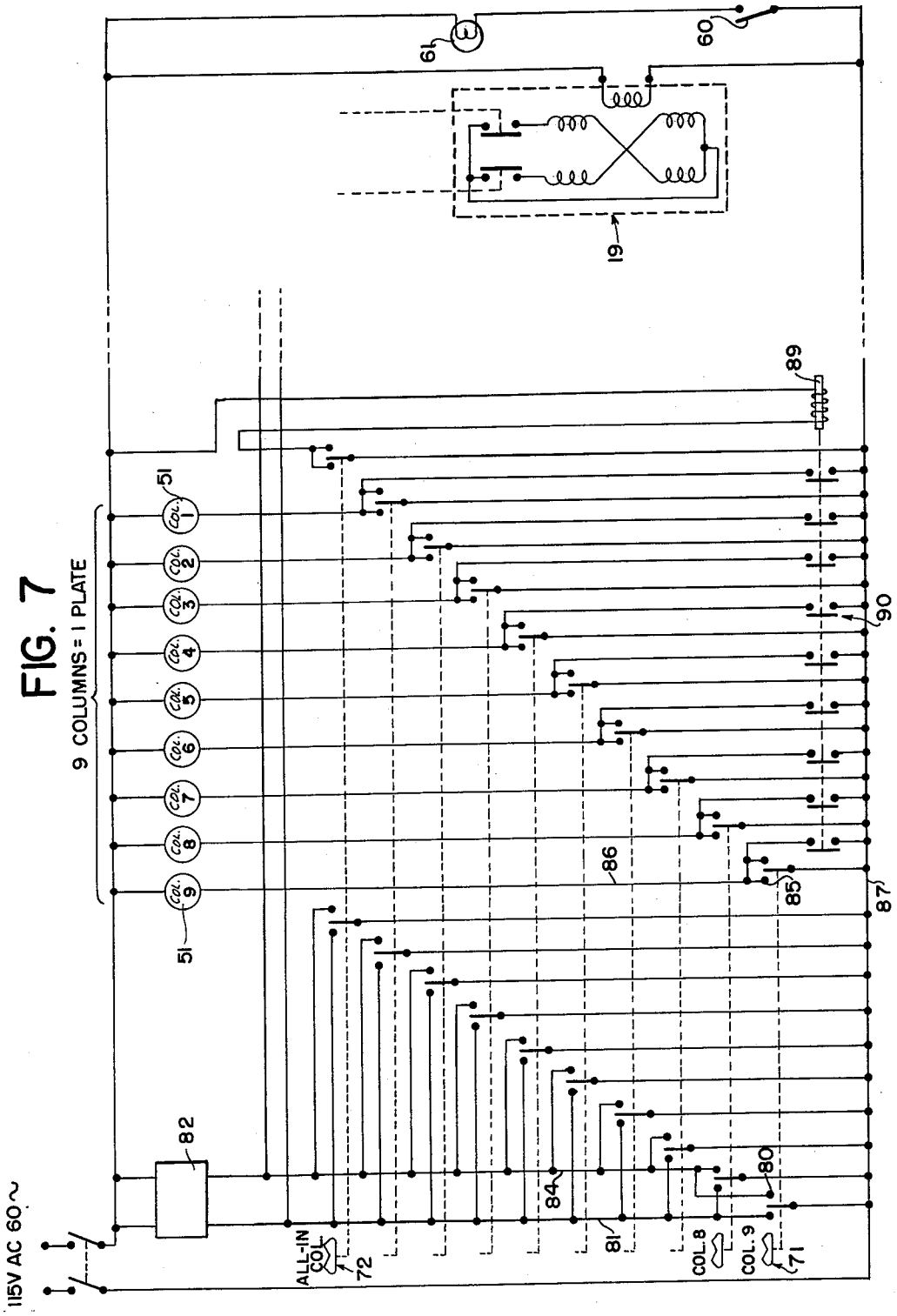
FIG. 7



United States Patent Office 3,134,325 Patented May 26, 1964

3,134,325

INK ADJUSTING MECHANISM

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8 Claims. (Cl. 101—365)

This invention relates generally to adjustment mechanisms for printing press ink fountains and more specifically to a novel construction and arrangement of parts used in the adjustment mechanism.

There has been a need in the printing press industry for an ink control adjustment that can quickly, efficiently, and accurately increase and decrease the ink supply to both a columnar and a page-wide portion of a fountain roll. Many conventional ink control devices utilize a flexible blade to vary the amount of ink on a fountain roll. Often the controls used to flex the blades associated with these mechanisms are located adjacent the blade and fountain roll, both of which are usually situated near the bottom of the press making accessibility to the controls difficult.

A difficulty inherent in many ink control mechanisms that are operated from remote control positions is that there is no means associated with the control mechanism that will give an accurate representation of the amount that a blade has been flexed which in turn controls the amount of ink on the fountain roll. This lack of means indicating flexure of a blade requires test runs of the press to insure that the ink on the fountain roll is in the desired amount and at the desired position on the roll, all of which takes time.

Still a further difficulty with conventional inking mechanisms is that the flexible blade may be brought into forceable contact with the fountain roll resulting in damage to the roll. This is particularly true where the blade is flexed by mechanical means incorporating power devices and where the adjustment and flexure is made for a number of columns at the same time.

It is an object of our invention to provide for an ink control mechanism which is remote controlled and which may selectively increase and decrease ink applied to either columnar or page-wide portions of a fountain roll while, at the same time, provide a visual indication of the amount of flexure of the blade controlling the amount of ink on the fountain roll. It is a further object of our invention to provide a means for preventing over-flexure of the blade, thus preventing resultant damage to the fountain roll.

According to our invention, we provide for an ink adjusting mechanism for a press unit which has a flexible blade extending the length of a fountain roll. The ink adjusting mechanism flexes the blade to control the amount of ink along selective portions of the fountain roll. The ink control mechanism broadly comprises a reversible drive means, a plurality of rotatable screws positioned along the length of the blade with each screw being intermittently operatively associated with the blade to flex the blade, and selectively controlled clutch means for operatively connecting the drive and screw means. The clutch means in turn comprises a second gear continually contacting the drive means, a third gear, and a pivotable shaft connecting the second and third gears. A first gear is mounted on the screw means and is adapted to be intermittently engaged by the third gear contained on the clutch means when a remote control means is actuated to pivot the shaft and cause the third gear to mesh with the first gear.

In addition visual means are provided to indicate the amount of movement of the drive means, and stop means

are provided to limit movement of the screw means and to cause automatic disengagement of the clutch means connecting the drive means with the screw means.

An ink control device constructed according to our invention allows an operator to vary the flexure of a blade from a remote control station by operating a series of switches to cause the reversible drive means to move in a desired direction and, at the same time, to cause selected clutch means to engage or disengage the screw means to vary the flexure of the blade at particular positions along the length of the blade. Visual indicator means indicate the amount of movement of the drive means and thus the amount of flexure of the blade.

Further objects and advantages of the invention will become apparent as the following description proceeds, taken in connection with the accompanying drawings, in which:

FIGS. 1*a* and 1*b* are plan views of the ink control mechanism with parts broken away;

FIG. 2 is an enlarged sectional view taken along line 2—2 of FIG. 1*b* showing details of the ink control mechanism;

FIG. 3 is an enlarged sectional view taken along line 3—3 of FIG. 1*b* showing construction details of the clutch;

FIG. 4 is an enlarged sectional view taken along line 4—4 of FIG. 1*b*;

FIG. 5 is a front view showing the layout of the switches on the remote control panel board;

FIG. 6 is a view taken along line 6—6 of FIG. 5; and

FIG. 7 is a schematic wiring diagram of the electrical connections between the remote control panel and the ink adjusting mechanism.

Referring to FIGS. 1*a* and 1*b*, **10** denotes generally the structure which houses the ink adjusting mechanism used to control the thickness of the ink on a fountain roll **11** by flexure of a blade **12**. A cover portion **13** is partially broken away to show the layout of individual clutch units generally designated by **14** used in flexing portions of the blade and which are spaced at designated intervals along the length of the blade **12** so that there is one clutch unit for each column. Each of these clutch units **14** operatively connect a driving means comprising a drive belt **17** and a reversible drive motor **19** with a screw means **20** more fully explained hereafter to flex portions of the blade.

The cogged, endless reversible belt **17** extends substantially the length of the fountain roll and is operatively associated with each of the clutch units **14** spaced along the blade. The endless belt **17** is carried by pulleys **21** and **22** supported by the press housing structure at either end of the fountain roll **11**. The pulley **21** is connected to a shaft **23** which has a grooved disc **24** attached to one end. A spur gear **25** is attached to the other end of the shaft which gear in turn meshes with a spur gear **26** driven by the reversible drive **19**. A spring and ball mechanism **27** contained in gear **25** fits into a detent in the shaft **23** to provide a convenient and efficient overload protection which causes the gear **25** to slip on shaft **23** when the motor **19** is overloaded. A hinged cover **28** provides access to an ink well **29** into which the fountain roll **11** extends. While a cogged belt is illustrated, it is apparent that it could be substituted by a roller chain.

FIG. 2 illustrates in greater detail the construction of the ink adjusting mechanism associated with each column width of the blade **12**, the clutch means **14** and the manner in which screw means **20** deflects the blade **12**. Each of the screws **20** has a first gear **30** thereon and is threaded into a carrying plate **31** extending the length of blade **12** so as to move axially when rotated. An end **32** of the screw engages a lever **33** which has a cam surface **34** on one end engaging the flexible blade **12**. A handle **20'** is also included on the screw for manual adjustment.

The lever 33 is urged into contact with end 32 by the force of the flexed blade acting on the cam surface 34 and also by means of a plunger 35 urged by a spring 36. An adjustable stop 37 limits movement in one direction of the plunger and thus the lever 33 so that the blade 12 will not come into contact with the roll 11 and so damage it. It is seen that a relatively large axial movement of screw 20 will produce a much smaller corresponding movement of the cam surface 34 which helps to insure accurate flexing of the blade and thus accurate and precise control of ink on the roll 11.

Each of the clutch units selectively operatively connecting the belt to a screw means comprises generally a second gear 40 in continuous meshing engagement with the cogged belt 17. Gear 40 in turn is joined by a pivotable shaft 41 to a third gear 43 adapted to intermittently mesh with the first gear 30 contained on screw 20. The shaft 41 is covered by a bushing 44 with arms 45 mounted in a bracket 46 mounted on the carrying plate 31 as shown in FIGS. 2, 3 and 4. The bushing 44, shaft 41 and third gear 43 are urged to pivot about the arms 45 by a compression spring 47 positioned between the bushing 44 and a belt supporting member 48 so that gear 43 is normally out of meshing engagement with gear 30.

The clutch unit 14 selectively operatively connects the belt 17 with one of the screw means 20 by means of a clutch control means denoted generally by 50. The clutch control means comprises generally a solenoid 51, a linearly movable bar 52, and an arm 53 connecting the bar 52 which is joined to bushing 44. Energization of solenoid 51 will cause movement of the bar 52 towards the right as shown in FIG. 2, which causes the bushing 44 and shaft 41 to pivot about arm 45 against the force of compression spring 47 and bring gear 43 into meshing engagement with gear 30. A return spring 54 serves to provide a flexible joint between arm 53 and bar 52. In addition, spring 54 insures that the armature of the solenoid 51 will be in the full in or bottomed position when the solenoid is energized in order to prevent overheating. Also spring 54 assists meshing engagement of gears 43 and 30 by urging them together when the belt 17 is moved in the event that the teeth of the gears are not in meshing engagement after the solenoid is energized because of tooth interference.

An important feature of the clutch construction described is that the clutch unit 14 will automatically disconnect the drive means from the screws when the blade has been flexed to a predetermined limit. This is an important feature particularly when the entire blade is moved at the same time towards the fountain roll with the drive means in operating engagement with all of the screw means and one portion of the blade is closer to the fountain roll than other portions of the blade. The automatic disconnections of a particular clutch unit insures that the portion of the blade nearest the roll will not contact the roll even though the driving means is operating.

In the construction shown, when the plunger 35 contacts the adjustable stop 37, axial movement of the screw 20 will stop. Reaction forces between the teeth of gears 43 and 30 in combination with the force of the compression spring 47 will overcome the force of return spring 54 to cause the shaft 41 to pivot and lift gear 43 out of meshing engagement with gear 30 even though solenoid 51 is energized.

Referring to FIG. 4, there is illustrated a limit switch 60 which is actuated by the grooves of disc 24 to actuate an indicator light 61 contained on a control panel 70 illustrated in FIG. 5. Actuation of the switch 60 is directly proportional to movement of the belt 17 and subsequent flexure of the blade 12.

FIG. 5 shows the layout of the control panel at a remote control station. The panel is designated generally by the number 70 and is comprised of a series of two-way control switches 71 arranged in four groups each having nine switches. This particular arrangement is meant for use with a press printing a web four pages wide with nine columns per page. A second series of group control switches designated as 72 are adjacent to each group of nine switches. The indicating light 61 is centrally located on the panel above the switches. The switches located in the group of nine are marked from one to nine and have markings indicating their two-way function as follows: IN and OUT. The individual switches located adjacent to the group switches are marked "ALL" in lieu of one to nine and are also marked with "IN" and "OUT." The numerals 73 and 74 designate the trunk means, also shown in FIG. 1, which lead the necessary wiring connecting the remote control panel with the limit switch, the drive motor, and the pivotable clutch control means.

FIG. 6 illustrates switch 71 and how it is pivoted at its center line at 75 to allow the two-way operation.

The operation of the ink adjustment mechanism can best be explained in conjunction with the schematic wiring diagram of FIG. 7. Succinctly stated the operator at the remote control station controls the amount of ink delivered to a selected portion of the fountain roll by pressing one of the switches located on the panel board 70. Each one of the switches denoted generally by 71 is electrically connected to an individual solenoid 51 which controls the individual clutch mechanisms spaced along the flexible blade 12. Additionally, the switches make contact with an electrical wire leading to either "IN" or "OUT" reversing relays which in turn are wired to operate the reversible driving motor 19. Still further when the switch is pressed either to the "IN" or "OUT" position electrical contact is made with the limit switch 60. If the operator wants the ink to the fountain roll to be decreased, he presses the switch to the "IN" position to move or flex the blade toward the roll 11. For example, if the operator wishes to decrease the ink supply to column 9 of page 1 on the press, he merely pushes the switch designated "9" in the first group of switches as shown in FIG. 5. With reference to the electrical diagram shown in FIG. 7, when the column 9 switch is pressed to the "IN" position, a contact marked 80 contacts a wire 81 leading to a motor reversing relay 82 which in turn is wired to the reversible drive motor 19 so that it can be driven in such a direction that the blade 12 will be flexed toward the fountain roll 11. The motor reversing relay is also adapted to drive the reversible motors in the opposite direction when the switch on column 9 is pressed to the "OUT" position. That is when the contact 80 makes contact with a line 84 as clearly shown in FIG. 7 which also leads to the motor reversing relay 82. Simultaneously with the contact of 80 and the wire 81, a contact 85 contacts a line 86 to energize the solenoid used in association with column 9. Connection of contact 80 with the relay through the wire 81 and contact 85 and wire 86 also completes the electrical circuit through a line 88 to the limit switch 60 allowing the indicator light 61 to flash intermittently. The operator is then able to control the ink supply at a selected portion of the blade 12 by merely pressing the switches generally marked 71 either to the "IN" or "OUT" position. These switches effectively control the ink supply to either a columnar or page-wide position of a newspaper.

The operator controls the ink supply to a page-wide portion of a press by merely pressing one of the switches generally marked 72. Pressing this switch to either the "IN" or "OUT" position actuates a relay 89 which closes a series of contacts generally marked 90 which in turn actuates the solenoids associated with all of the columns marked 1–9. In this particular embodiment nine columns comprise the width of a newspaper page so that pressing this "ALL" button either increases or decreases the ink across an entire page.

Once the switch is pressed, the operator can determine the amount by which the ink is controlled by counting the flashes that appear in the visual indicator marked 61.

These flashes indicate the amount of movement of the endless belt because as stated before the disc **24** is connected to the same shaft **23** that drives the endless belt **17**.

Once the solenoids are energized either individually or collectively, the third gear in an actuated clutch unit is brought into meshing contact with an associated first gear on an adjustable screw. The first gear in the clutch unit continually meshes with the endless belt so that the direction of rotation of the rotatable screw is determined by the direction in which the endless belt is moved to flex the blade as described previously.

It is thus seen that an ink adjusting mechanism constructed according to our invention provides an accurate ink contact which may be located remote from the blade **12** at any convenient spot. It is further seen that the mechanism incorporates a feature to prevent damage to the fountain roll by over-flexure of the blade when the ink control mechanism is operated.

A further feature of our invention is that a single remote control panel may control the ink supplied to more than one press. Often when printing newspapers of large circulations, as many as six presses will be printing the same pages at the same time so making a common control desirable.

The description of our invention will suggest to those skilled in the art variations that are not without the purview of our inventive concept. Specifically, this embodiment shows a panel board that has been set up for ink adjustment of a press having four pages of nine columns each. We do not intend to be limited to an adjusting mechanism capable of handling this specific number of columns and pages and it is obvious the board set up could be varied to accommodate different page and columnar combinations and still come within the scope of our invention.

We claim:

1. In a press unit having a flexible blade extending along the length of a fountain roll for controlling the amount of ink on said roll, an ink adjusting mechanism for flexing the blade at specified portions comprising:

(*a*) reversible endless belt drive means,

(*b*) a plurality of rotatable screw means positioned along the length of said blade being operatively associated with portions of said blade to vary the flexure thereof,

(*c*) a plurality of selectively controlled clutch means with each such clutch means operatively connecting one of said screw means with said endless belt drive means, and each said clutch means having a drive portion in continuous contact with said drive means and a driven portion in intermittent contact with said screw means whereby said drive means may rotate one or more screw means at one time to selectively flex portions of said blade.

2. In a press unit according to claim 1 wherein said ink adjusting mechanism has in addition:

(*d*) stop means co-operating with each of said selectively controlled clutch means causing said clutch means to operatively disengage said screw means from said drive means when a selected portion of said blade is flexed to a predetermined limit.

3. In a press unit according to claim 2 wherein said ink adjusting mechanism has in addition:

(*e*) visual indicating means operated by said reversible endless belt drive means for indicating the amount of movement thereof.

4. An ink control mechanism for a press having a flexible blade extending along the length of a fountain roll for varying the amount of ink thereon comprising:

(*a*) reversible driving means,

(*b*) a plurality of rotatable screw means positioned along the length of said blade being operatively associated with portions of said blade to vary the flexure thereof,

(*c*) a first gear on each said screw means,

(*d*) a pivotable clutch means for each of said screw means for drivingly connecting said reversible drive means to said screw, having a second gear continually in contact with said drive means and a third gear for intermittently contacting said first gear, and a pivotable shaft connecting said second and third gears whereby said third gear may move into and out of meshing engagement with said first gear.

5. An ink control mechanism according to claim 4 wherein said ink control mechanism has in addition:

(*e*) remote controlled means associated with each of said pivotable clutch means for moving said third gear into meshing engagement with said first gear whereby said reversible drive means rotates said screw the number of turns of said screw determining the amount of flexure of said blade.

6. An ink control mechanism for a press having a flexible blade extending along the length of a fountain roll for varying the amount of ink thereon comprising:

(*a*) reversible driving means,

(*b*) a plurality of rotatable screw means positioned along the length of said blade being operatively associated with portions of said blade to vary the flexure thereof,

(*c*) a first gear on each of said screw means,

(*d*) a pivotable clutch means for each of said screw means for drivingly connecting said reversible drive means to said screw, having a second gear continually in contact with said drive means and a third gear for intermittently contacting said first screw, and a pivotable shaft connecting said second and third gears,

(*e*) stop means for co-operating with each of said pivotable clutch means for causing said clutch means to operatively disengage said screw means from said drive means when a selected portion of said blade is flexed to a predetermined position,

(*f*) visual indicating means operatively connected to said reversible drive means for indicating the movement thereof,

(*g*) and, remote controlled means associated with each of said pivotable clutch means for moving said third gear into meshing engagement with said first gear whereby said reversible drive means rotates said screw, the number of turns of said screw determining the amount of flexure of said blade.

7. An ink control mechanism for a press having a flexible blade extending along the length of a fountain roll for varying the amount of ink thereon comprising:

(*a*) a reversible motor,

(*b*) a cogged endless belt driven by said motor and extending along the length of said blade,

(*c*) a plurality of rotatable screws positioned along the length of said blade wherein each of said screws has a first gear thereon,

(*d*) a pivotable lever having a cam surface operatively associated with each of said screws, said cam surface engaging said blade,

(*e*) lever spring means urging said pivotable lever into engagement with said screw,

(*f*) a pivotable clutch means for each of said screw means for drivingly connecting said endless belt to a rotatable screw, having a second gear continually contacting the cogs of said belt, a third gear for intermittently meshing with said first gear on said screw, and a pivotable shaft connecting said second and third gears,

(*g*) a compression spring urging said third gear out of mesh with said first gear,

(*h*) and, a remote controlled electromagnetic means associated with each said clutch for moving said third gear into mesh with said first gear against the force of said compression spring whereby when said motor moves said belt, said screw is rotated to pivot said lever and cause a portion of said blade to flex.

8. An ink control mechanism according to claim 7 having in addition:

(*i*) a plurality of control switches for controlling said electromagnetic means with a single said control switch for each said electromagnetic means to selectively operate said electromagnetic means and said reversible motor,

(*j*) a group control switch for selectively operating a plurality of said electromagnetic means and said reversible motor,

(*k*) and, visual indicating means operated by said endless belt to indicate movement thereof.

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