Jan. 6, 1970 K. H. DIXON ET AL 3,488,119

PHOTOGRAPHIC PRINTER OPERATIONS RESPONSIVE TO A NEGATIVE MASK

Filed Oct. 30, 1967 4 Sheets-Sheet 1

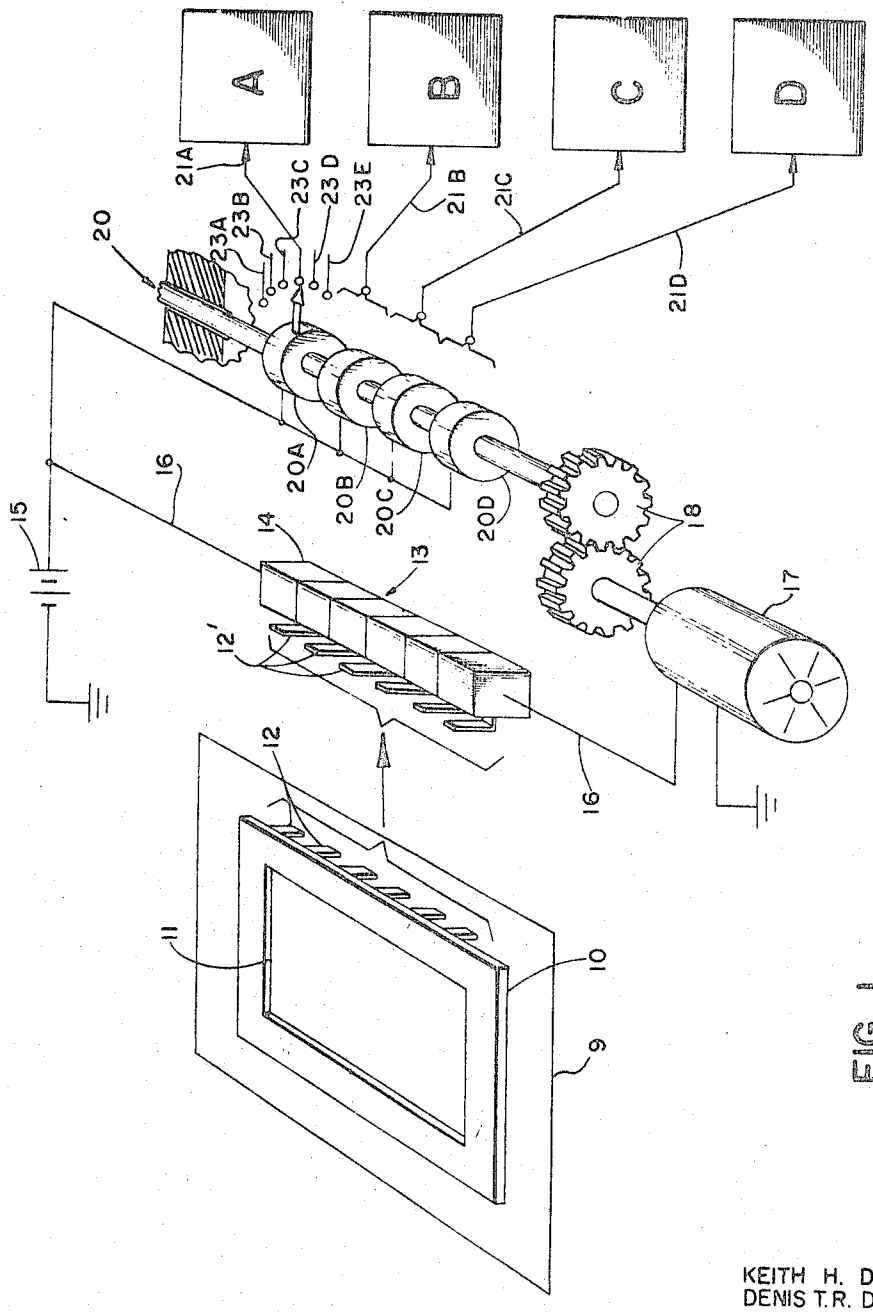


FIG. 1

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PHOTOGRAPHIC PRINTER OPERATIONS RESPONSIVE TO A NEGATIVE MASK

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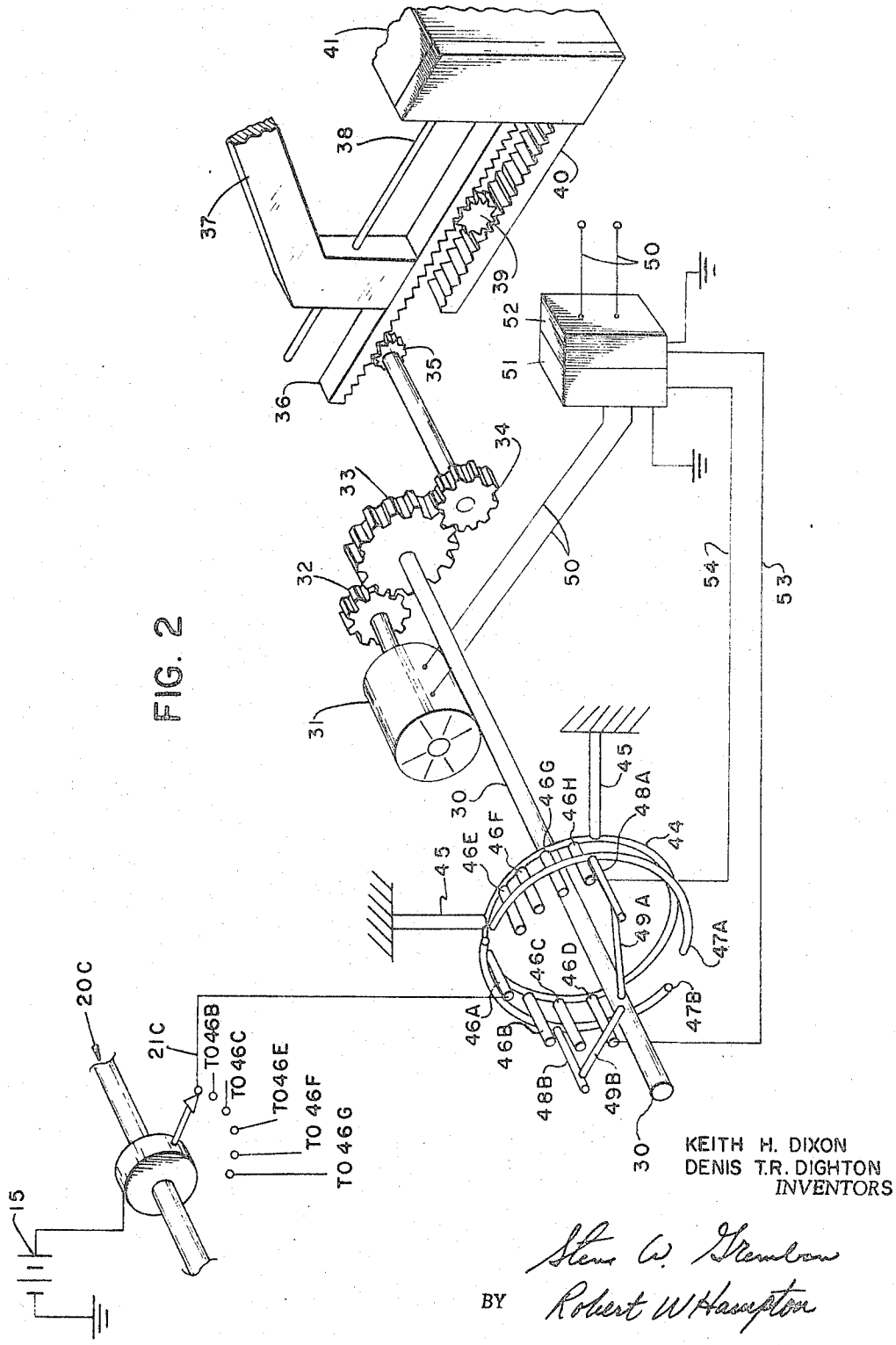


FIG. 2

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PHOTOGRAPHIC PRINTER OPERATIONS RESPONSIVE TO A NEGATIVE MASK

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FIG. 3

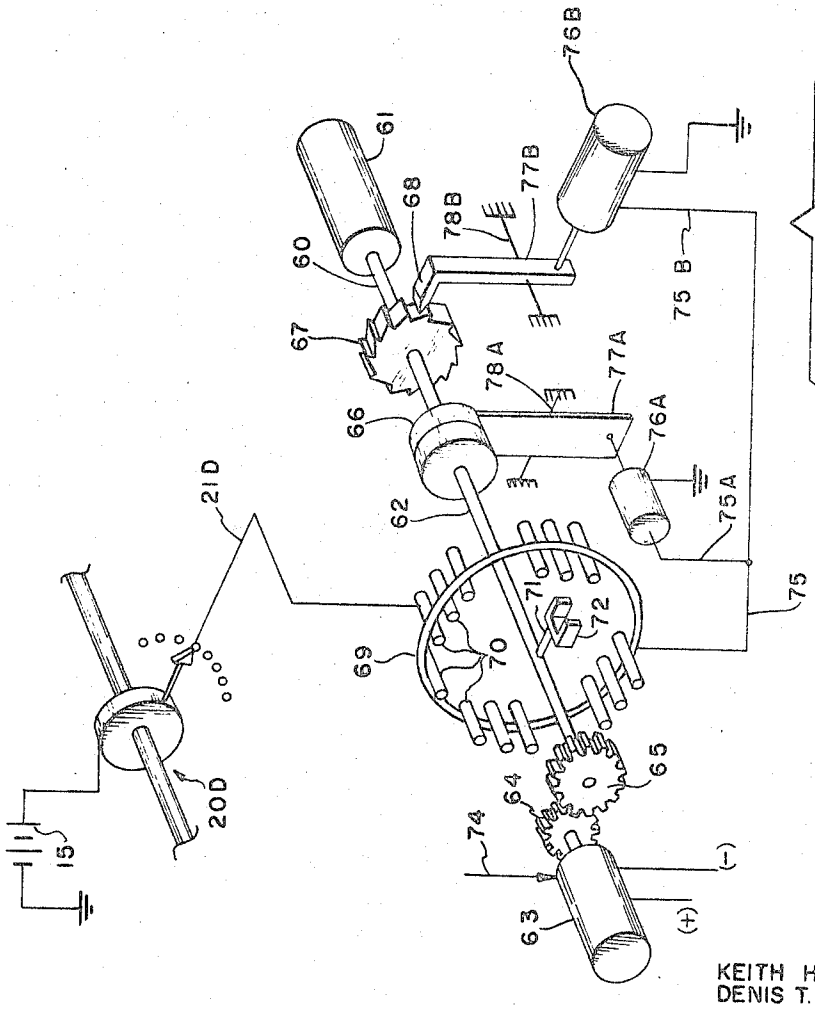
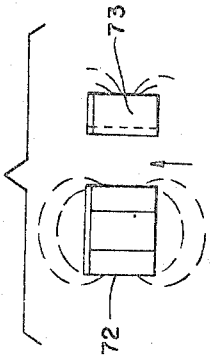


FIG. 4



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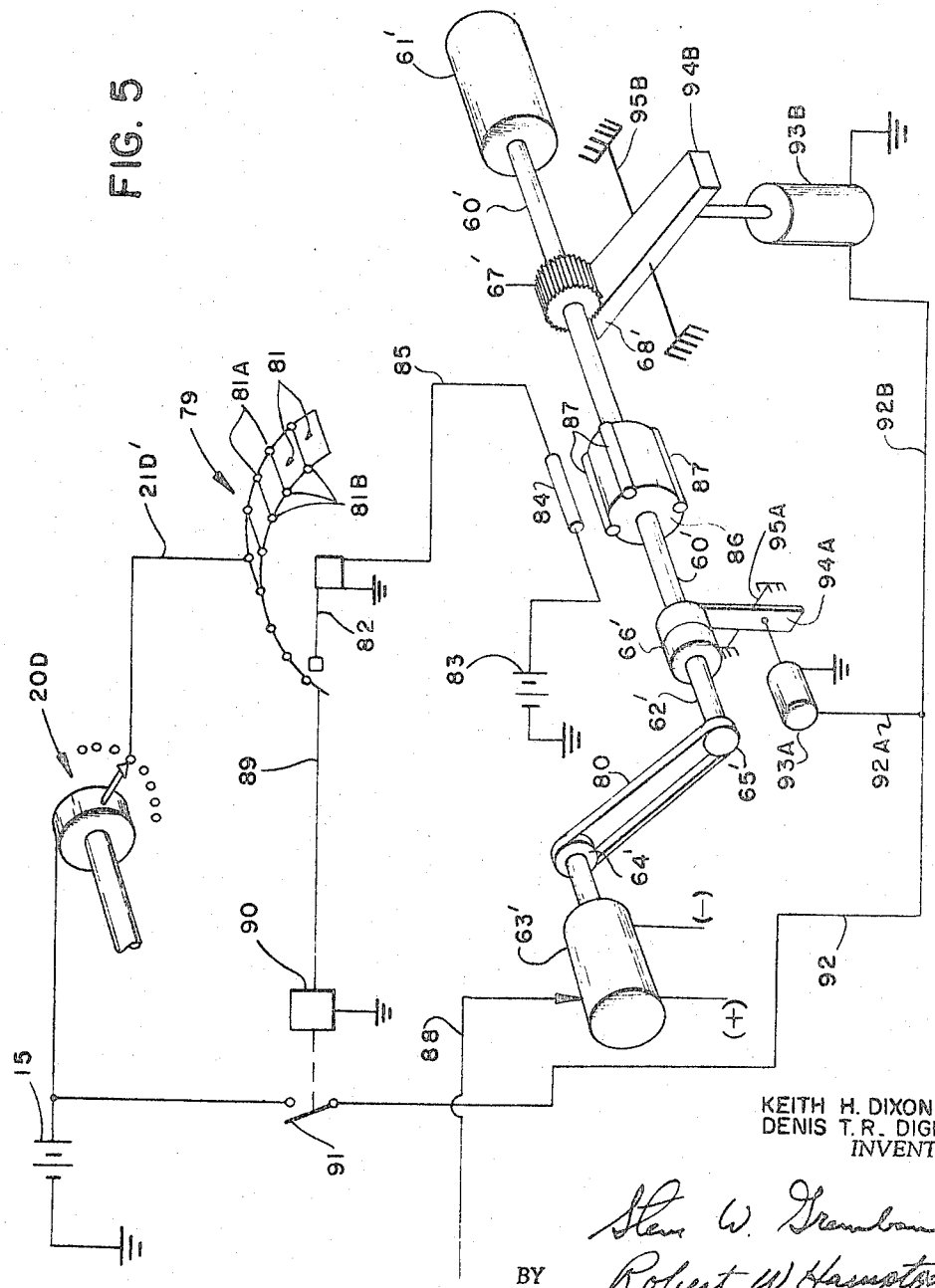
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PHOTOGRAPHIC PRINTER OPERATIONS RESPONSIVE TO A NEGATIVE MASK

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FIG. 5



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United States Patent Office

3,488,119

Patented Jan. 6, 1970

3,488,119

PHOTOGRAPHIC PRINTER OPERATIONS RESPONSIVE TO A NEGATIVE MASK

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Int. Cl. G03b 27/58, 27/62
U.S. Cl. 355—74 14 Claims

ABSTRACT OF THE DISCLOSURE

A photographic printing apparatus for interchangeably receiving negative masks having similar outer dimensions, but having negative areas of different sizes. A control mechanism is responsive to each mask as it is mounted in the apparatus for controlling different printing functions or operations such as (a) light level output, (b) negative size compensation, (c) size of opening of the printing paper mask and/or (d) metering of the printing paper to an exposure position.

BACKGROUND—FIELD OF THE INVENTION

This invention relates to photographic printers for exposing photosensitive materials to a light passing through a negative or positive area on a film. The invention is particularly applicable to photographic printers for accommodating negative masks having similar outer dimensions, but having negative areas of different sizes. The printers have control means responsive to the masks for controlling different printing operations or functions.

BACKGROUND—DESCRIPTION OF THE PRIOR ART

Although large scale photofinishers may be able to retain a printer for handling a predetermined negative image size, the printers are normally made with interchangeable negative masks to accommodate negatives of various sizes so that different sized prints can be made on one machine. The various sized negatives may be printed at different magnifications and, in view of their sizes, at different integrated light flux passing through the negatives. Additionally, a paper mask and a paper metering mechanism of an automated printer may be adjusted in accordance with the size of print to be produced. In conventional printers, the print size is fixed relative to the size of the associated negative to be printed.

In British Patent No. 1,038,787, issued Aug. 10, 1966, a printing apparatus is disclosed in which the exposure light level and the electronic negative size compensations are selected automatically in response to the mounting of a negative mask on the apparatus.

SUMMARY OF THE INVENTION

This invention includes within its scope a new, improved photographic printing apparatus including control means responsive to the size of the negative areas of a negative mask mounted on the apparatus for automatically controlling various printing functions or operations of the apparatus, such as the size of the printing paper mask opening and movement of the printing paper metering roller in response to signals.

Accordingly, one of the objects of the present invention is to provide a photographic printing apparatus for accommodating a plurality of interchangeable negative masks having similar outer dimensions, each mask bearing a physical indication of the size of the negative area of the

negative carried thereby, and control means in the printing apparatus including sensing means to sense the physical indication and to adjust various printing functions or operations of the apparatus such as metering of the photosensitive material and adjusting of the printing paper mask size.

Conveniently, each negative mask may have a combination of pins indicative of one or more of the above functions, and preferably in combination with at least two guide pins. The control means may include, for actuation by the pins, a plurality of micro-switches for controlling appropriate mechanisms of the printer. In a preferred arrangement of the invention, the micro-switches will cause movement of a rotary switch to a position dependent upon the particular combination of micro-switches actuated. If desired, the position to which the rotary switch is moved may be held, on withdrawing of the negative mask, by a further micro-switch to prevent cycling of the rotary switch. It has been found that this arrangement may increase the life of the rotary switch by as much as 100%.

The exposure light level may be selected by the rotary switch by energizing one or more lamps and by the interposition in or removal from the light beam of one or more neutral density filters.

Electronic negative size compensation may be effected by selection of an appropriate one of several preset resistors, not shown, by the rotary switch.

Adjustment of the printing paper mask size may be selected by the rotary switch in accordance with its position by driving printing paper masking blades to the required position. The paper mask blades may be driven by a reversible motor controlled by a bi-directional switching apparatus which is operative in response to the position of the rotary switch.

Automatic metering of photosensitive printing paper may be effected by a power means normally connected to a metering roller wherein the timing of the disengagement of the power means from the roller is dependent upon the particular position of the rotary switch.

In one arrangement for automatically metering photosensitive printing paper, a magnet rotates with a shaft connecting the power means to a metering roller, and upon rotation of the magnet by the power means sequentially closes a plurality of fixed magnetically operable reed switches encircling the shaft until the reed switch selected by the rotary switch is closed to cause disengagement of the metering roller from the power means. Conveniently, the magnet may be a horseshoe magnet and is preferably fitted with a soft steel shield deflector. This effectively gives the field of the magnet a limited arc with sharp edges. The rotating magnet may be arranged to complete a 360° rotation so as to have a fixed starting position.

In an alternative embodiment for metering photosensitive printing paper, a plurality of magnets are circumferentially spaced about a shaft and rotated therewith for continuously feeding photosensitive printing paper until the metering roller is disengaged from the drive means. A single magnetically operable reed switch is stationarily mounted adjacent the rotating magnets so that the reed switch is closed each time a magnet passes thereby. Closing of the reed switch closes an electrical circuit to a uniselector device to move a contact member therein one step. Meanwhile, a given contact on the uniselector device has been selected by the rotary switch. When the reed switch closes the number of times required to step the contact member into engagement with the contact selected by the rotary switch, another electrical circuit is completed in a manner similar to that of the first embodiment of the automatic paper metering apparatus disengaging the power means and metering roller.

Other objects and the attendant advantages of the

present invention will become apparent from the detailed description to follow together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIGURE 1 is an exploded diagrammatic perspective view of a negative mask and portion of a control system of a printing apparatus according to the present invention;

FIGURE 2 is an exploded diagrammatic perspective view of a printing paper mask and control therefor;

FIGURE 3 is an exploded diagrammatic perspective view showing one embodiment of a printing paper metering mechanism;

FIGURE 4 is a front elevational view of a magnet and its field deflector of the metering mechanism of FIGURE 3; and

FIGURE 5 is an exploded diagrammatic view showing an alternative embodiment of a printing paper metering mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIGURE 1, there is shown schematically a mask carrier **9** having mounted thereon a negative mask **10** for holding a negative of a predetermined size. The mask **10** has a window **11** in accordance with the predetermined size of the negative area, and has overall dimensions such as to be interchangeable in the mask carrier **9** with a plurality of other masks having different sized windows **11** for accommodating negatives having different sized negative areas.

The mask **10** includes a set of dependent pins **12** in a combination unique to, and thus representative of the size of the negative area. The pins **12** include two guide pins (one of which is arranged to cooperate with a micro-switch) and the other pins **12** are arranged to operate an appropriate combination of micro-switches **14** in a bank **13** of switches for selecting an appropriate electrical circuit and controlling the flow of electrical current therethrough. The mask carrier **9** is mounted closely adjacent the bank of micro-switches **13** so that pins **12** interact with cooperating pins **12'** on micro-switches **14**.

A particular set of pins **12**, and thus a particular manner of actuation of the micro-switches **14** energizes motive means to cause movement of a rotary switch **20** mounted on a shaft **19** to a particular position corresponding to the size of the negative to be printed. The interaction between micro-switches **14** and switch **20** may be provided in any convenient manner. One such arrangement is shown in FIGURE 1 wherein current from a source **15** passes through the set of micro-switches **14** to energize a suitable power means such as a motor **17** which, through gears **18**, rotates shaft **19** and rotary switch **20** to a selected position.

The switch **20** may include separate banks **20A**, **20B**, **20C** and **20D**, each adapted to connect power source **15** to a different printing operation or function of the printing apparatus. For example, **20A** controls function A, **20B** controls function B, **20C** controls function C and **20D** controls function D. Each bank **20A**, **20B**, **20C** and **20D** has one input from source **15**, and a plurality of outputs, the selected one of which depends upon the rotary position of a contact **22A** rotatably mounted on shaft **19**. Each bank is further driven through any suitable clutch means, not shown, to permit the positioning of each bank in different preselected positions determined by the actuation of switches **14** by pins **12**. For example, in FIGURE 1 switch **20** has been rotated to a position in which contact **22A** of bank **20A** selects electrical output line **21A**. Any suitable latching means, not shown, controlled by a switch **14** may be provided to stop the movable bank **20A** in a selected position determined by switch **14**. At other positions, bank **20A** may select one of the other electrical output lines **23A**, **23B**, **23C**, **23D**, **23E**, etc. each controlling the operation or function A in a different manner. In a similar manner, banks **20B**, **20C** and **20D** control operations or functions B, C and D through lines **21B**, **21C** and **21D**, respectively. Other output contacts of banks **20B**, **20C** and **20D** are represented schematically by a bracket.

The arrangement shown in FIGURE 1 may operate to control any number of operations or functions of the printing apparatus. For example, function A may control the light level output, function B the negative size compensation, function C the printing paper masking mechanism control, and function D the printing paper metering mechanism control.

In a light level output control, not shown, the current through rotary switch **20** and line **21A** may control the energization of one or more lamps for transilluminating the negative; for interposition in the light beam, if necessary, of appropriate neutral density filters; and, if desired, the interchange or adjusting of a condenser system in the optical path of the printer.

Current passing along line **21B** through bank **20B** may control the negative size compensation in a manner, not shown, by providing for the insertion in a photoelectric control circuit of a combination of one or more preset resistors so as to provide for termination of the exposure of the paper after a predetermined period of time has elasped.

FIGURES 2–5 illustrate new and unobvious arrangements for controlling mechanisms to mask and meter photo-sensitive printing paper in response to signals received through switch **20**.

FIGURE 2 illustrates an arrangement for controlling the printing paper mask in response to a signal received through switch **20C**. The arrangement includes a drive shaft **30** driven by a reversible electric motor **31** through gears **32** and **33**. Rotation of gear **33** also causes rotation of gears **34** and **35** which, in turn, move a rack **36** linearly to move a first printing paper mask blade **37** along support rod **38**. Through the action of pinion **39** and a rack **40**, a second printing paper mask blade **41** will move by an equal amount in the opposite direction.

The invention includes a unique arrangement for starting and stopping reversible motor **31** in order to provide the desired movement of mask blades **37** and **41**. A stationary ring **44** is supported by any suitable means such as rods **45** secured to a stationary surface. This stationary ring has a plurality of electrical contacts **46A** through **46H** which may be arranged in any suitable manner to control the direction and duration of the current to motor **31**. In the particular embodiment shown in FIGURE 2, there are provided two banks of contacts **46A** through **46D** and **46E** through **46H**. In the first bank, any one of contacts **46A**, **46B** or **46C** may be connected to switch **20C**, and contact **46D** may be connected through a line **53** to a first relay device **51**. In the second group, contacts **46E**, **46F** and **46G** may be connected to switch **20C** while contact **46H** may be connected through a line **54** to a second relay device **52**.

Surrounding the contacts, a rotating split ring is provided having portions **47A** and **47B** held by extensions **48A** and **48B** respectively. The ring is secured to shaft **30** for rotation therewith by connecting links **49A** and **49B**.

In the operation of the arrangement shown in FIGURE 2, upon selection of a contact by switch **20C**, a circuit is completed from the electrical energy source **15** through switch **20C**, line **21C**, contact **46A**, ring **47B**, contact **46D** and line **53** to relay **51** to control the flow of electrical current through lines **50** in a given direction. Energization of motor **31** drives gears **32**, **33**, **34** and **35** to move mask blades **37** and **41**. However, it will be noted that rotation of gear **33** also rotates split ring **47A** **47B**. In the present instance, this rotation would be counterclockwise (viewed from the left-hand end of the drawing) until split ring **47B** passed beyond the contacts **46A** thereby opening the electrical circuit to relay **51** and

thereby terminating operation of motor 31. Rotation of shaft 30 in the opposite direction is achieved by connecting switch 20C to one of the contacts 46E, 46F or 46G thereby closing a circuit from source 15 through switch 20C, line 21C, the selected contact 46E, 46F or 46G, contact 46H, and line 54 to relay 53.

Of course, suitable means, not shown, may be provided to assure that the circuit remains open while rings 47A and 47B return to their normal starting position.

FIGURE 3 illustrates a mechanism for controlling metering of the photosensitive printing paper. A main shaft 60 is operatively connected to a printing paper metering roller 61 and is driven by suitable power means such as an electric motor 63 through a drive shaft 62. Motor 63 may be connected to shaft 62 by suitable means such as gears 64 and 65. The two shafts 60 and 62 are selectively engaged through a normally engaged clutch means shown schematically at 66. A ratchet wheel 67 is fixed on shaft 60 and may be engaged by a pawl 68 to prevent movement of ratchet wheel 67, shaft 60 and roller 61. Pawl 68 is normally in a disengaged position, and is movable to an engaged position by a solenoid 76A.

A stationary electrically conductive ring 69 encircles shaft 62, and has mounted thereon a plurality of magnetically closable reed switches 70. Each reed switch has one end connected to ring 69 and its other end connected to a contact at switch 20D. A magnet 72 connected to arm 71 is mounted on shaft 62 for rotational movement therewith. As illustrated in FIGURE 4, magnet 72 may be provided with a ferromagnetic field deflector 73 which provides sharp edges to the magnetic field of magnet 72.

The output current from ring 69 passes along line 75 to a line 75A to control movement of solenoid 76A and movement of a lever 77A about pivot axis 78A to disengage clutch 66. A parallel line 75E operates a solenoid 76B to control movement of a lever 77B about pivot axis 78B to move pawl 68 into engagement with ratchet wheel 67.

The embodiment of FIGURE 3 operates as follows. Initially, arm 71 holds magnet 72 at a given starting position and power means 63 is idle. The motor 63 may be a one revolution motor. Alternatively, means may be provided after completion of the operation to return motor 53 and thus arm 71 and magnet 72 to its starting position. To commence operation, a signal 74 energizes motor 63 to rotate gears 64, 65 and shaft 62. This signal may be derived directly through one of the micro-switches 14 from a given pin 12 on the negative mask 11 or it may be derived from initial movement of rotary switch 20. As magnet 72 rotates in close proximity to the circumferentially mounted normally open reed switches 70, it will cause each switch to close as it passes thereby. However, closing of these switches will have no effect until it reaches the switch which is connected to the power source 15 through switch 20D and line 21D.

Upon closing of the selected magnetic switch, an electrical circuit is completed from electrical energy source 15 through switch 20, line 21D, the selected switch 70, ring 69, and lines 75, 75A and 75B to ground. Current in line 75A will cause disengagement of clutch 66 while current in line 76B will cause pawl 68 to engage ratchet wheel 67 thereby braking the movement of shaft 60. In this manner, roller 61 can be moved a selected amount from a small fraction of a circle to a complete circle depending upon which one of the reed switches 70 is selected.

FIGURE 5 illustrates an alternative form of a paper metering mechanism. Certain elements in the embodiment of FIGURE 5 correspond to the elements in the embodiment of FIGURE 3, and in such instances are designated by the same numerals primed.

The main difference between the embodiments of FIGURES 3 and 5 is that in the latter the metering roller may be rotated more than one complete rotation. In fact, it may be rotated substantially continuously depending only upon the size limitations of a selector switch which is used in this embodiment to terminate rotation of the roller.

Referring now to FIGURE 5, a metering roll 61' is connected to a main shaft 60' which in turn is connected to a drive shaft 62'. The drive shaft 62' is driven by suitable power means such as motor 63' through pulleys 64' and 65' over which a belt 80 is trained. Engagement between shafts 62' and 60' is provided by a normally engaged clutch shown schematically at 66', and braking of shaft 60' may be provided through the action of a ratchet wheel 67' mounted on shaft 60' and a pawl 68' normally disengaged from ratchet wheel 67'.

Whereas the embodiment of FIGURE 3 employed a single rotating magnet and a plurality of stationary reed switches, the embodiment of FIGURE 5 employs a plurality of circumferentially spaced rotating magnets 87 mounted on a drum 86 which is in turn mounted on shaft 60'. Mounted proximate to the path of rotating magnets 87 is a stationary magnetically operated normally open reed switch 84. One end of this reed switch is connected to a suitable electrical energy source 83 while the other contact is connected along line 85 to a uniselector device 79. This uniselector device includes a plurality of switches 81, each including a first contact 81A connected to a different contact point on rotary switch 20D, and a second contact 81B connected along an outlet line 89 to control a relay device 90 to cause disengagement of clutch 66' and engagement of the pawl and ratchet wheel 68', 67' respectively, in a manner to be described in greater detail hereinafter. The uniselector 79 includes a selecting member, for example, a contact member 82 which moves serially, step by step, through the uniselector device from a starting position, which may be, for example, the furthermost counterclockwise position as shown in FIGURE 5. The purpose of this contact member is to select the two contacts 81A and 81B of any given switch 81 at which the contact member is located. The contact member 82 may be made to move one step by any well known stepping circuit, that is from one switch 81 to the next switch 81 each time that reed switch 84 closes. Therefore, assuming that contact member 82 starts from the furthermost counterclockwise position, then as drum 86 rotates one complete revolution, switch 84 will close four times. This will cause contact member 82 to move through four steps. The magnets 87 are circumferentially spaced about drum 86 such that the closing of successive switches 84 represents given distances. For example, one revolution may represent four inches of paper travel, and hence each closing of switch 84 will represent paper travel of one inch. Of course, the uniselector device 79 may include tens or even hundreds of contacts so that it may be possible to select, in increments of one inch, a paper length from one inch up to very large lengths. Obviously, the magnets 87 may be positioned to provide increments of paper travel of any other distances.

The embodiment of FIGURE 5 operates as follows. The motor 63' is started by a starting signal 88 which is similar to starting signal 74 in the embodiment of FIGURE 3. However, motor 63' is not a one revolution motor as motor 63, but rather rotates continuously until shafts 60' and 62' are disengaged, at which time a suitable signal may be provided to cut off operation of motor 63'. Now assuming that (1) it is desirable to meter five inches of photosensitive printing paper, (2) that the distance between magnets 87 represents a metering of one inch, and (3) that contact member 82 is located initially at the counterclockwise position as shown in the drawings, switch 20D would have to be moved by any suitable means to select a contact 81 representing the fifth step of the uniselector device 79.

As motor 63' rotates shafts 62' and 60', roller 61' meters out the paper while drum 86 rotates. When the first magnet closes switch 84, current from source 83 acts

through circuit 85 to move contact member 82 from its initial position to the first step to close the gap between the two contacts 81A and 81B of the first switch 81. However, since nothing is connected to first switch 81, no current will be delivered to terminate operation of the metering apparatus. However, upon the fifth closing of switch 84, contact member 82 will connect the contacts 81A and 81B of the fifth switch 81 which has been selected by switch 20D. This will close a circuit from source 15 through switch 20D, line 21D across the contacts 81A, 81B of the fifth switch 81, and line 89 to act upon a relay device 90. This will close switch 91 thereby delivering current from source 15 through lines 92, 92A and 92B. Current in line 92A will operate a solenoid 93A thereby moving a lever 94A about pivot axis 95A to disengage clutch 66'. Similarly, current along line 92B will actuate solenoid 93B thereby moving lever 94B about axis 95B to urge pawl 68' into engagement with ratchet 67' thereby terminating movement of metering roller 61'. Any suitable means, not shown, may be provided to return pawl 68' to its normal disengaged position prior to a subsequent metering of the print paper.

This invention has been described in detail with particular references to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinabove and as defined in the appended claims.

We claim:

1. In a photographic printing apparatus having a light source for projecting an image of a negative onto a light sensitive printing paper at an exposing station for exposing a portion of the paper, and having a negative mask carrier at said exposing station adapted to receive any one of a number of negative masks having different size negative areas, the combination comprising:

actuating means on each negative mask corresponding to the size of the negative area of said mask,

an adjustable paper mask for masking the printing paper to uncover a selected portion of the printing paper for exposure, and

control means responsive to said actuating means when a selected negative mask is received by said negative mask carrier for adjusting the paper mask to uncover a selected portion of the printing paper corresponding to the size of the negative area of said selected negative mask.

2. The invention according to claim 1 wherein said control means comprises switch means responsive to said negative mask actuating means for selecting and controlling an electrical circuit, means including a motor responsive to said selected electrical circuit, and means interconnecting said motor to said adjustable paper mask.

3. The invention according to claim 1 wherein said control means comprises switch means responsive to said negative mask actuating means for selecting and controlling an electrical circuit, a motor, means connecting said motor to said adjustable paper mask, and means electrically interconnecting said switch means and said motor and responsive to said selected electrical circuit for controlling said motor.

4. The invention according to claim 3 wherein said electrical interconnecting means comprises a first contact connected to said switch means, a relay connected to said motor, a second contact connected to said relay, and a movable contactor driven by said interconnecting means for electrically connecting and disconnecting said first and second contacts.

5. The invention according to claim 3 and further including a shaft driven by said motor, said electrical interconnecting means comprises a plurality of contacts encircling said shaft in angularly spaced relation, a relay connected to said motor, a first one of said contacts connected to said switch means, a second one of said contacts connected to said relay, and a split ring slidably mounted on said contacts and secured to said shaft for rotation therewith, said ring electrically connecting said first and second contacts whereby said motor is energized to adjust said paper mask, and disconnecting said first and second contacts to de-energize said motor.

6. In a photographic printing apparatus having a light source for projecting an image of a negative onto a web of light sensitive printing paper at an exposing station for exposing a portion of the paper, and having a negative mask carrier at said exposing station adapted to receive any one of a number of negative masks having different size negative areas, the combination comprising:

actuating means on each negative mask corresponding to the size of the negative area;

means for metering a portion of the web of printing paper to said exposing station; and

control means responsive to said actuating means when a negative mask is received by said negative mask carrier for operating said metering means to meter said portion of the printing paper to said exposing station.

7. The invention according to claim 6 wherein said control means comprises switch means connected to a power source and responsive to said negative mask actuating means for selecting and controlling an electrical circuit, means including a motor responsive to said selected electrical circuit, and means interconnecting said motor to said paper metering means.

8. The invention according to claim 6 wherein said metering means comprises a paper drive roller mounted on a shaft, a drive motor, and a clutch means normally drivingly connecting said drive motor to said shaft; and said control means comprises a power source, a stationary ring encircling said shaft and supporting a plurality of normally open magnetically actuated switches, one of said switches having one contact connected to said power source, and another contact connected to said clutch means, and a magnet mounted on said shaft and cooperating with said magnetically actuated switches upon rotation thereof to close said one switch for energizing said clutch means for disengaging said drive motor and said shaft.

9. The invention according to claim 7 wherein said switch means comprises a power source, a plurality of normally open magnetically actuated switches, and a rotary switch interposed between said power source and said magnetically actuated switches, the rotative position of said rotary switch being responsive to said negative mask actuating means wherein each rotative position of said rotary switch connects said power source to a different one of said magnetically actuated switches.

10. The invention according to claim 7 wherein said metering means comprises a paper drive roller mounted on a shaft, a drive motor, and a clutch means normally drivingly connecting said drive motor to said shaft; and said control means comprises a drum mounted on said shaft for rotation therewith and having a plurality of circumferentially spaced magnets mounted thereon, a stationary normally open magnetically actuated switch mounted proximate to said drum to close each time one of said magnets passes thereby, a uniselector device having a plurality of pairs of switch contacts, one side of each pair of switch contacts being connected to said switch means and the other side of each pair of switch contacts being connected to said clutch means, said uniselector device having a bridge member movable from one pair of switch contacts to the next pair each time said magnetically actuated switch is closed, whereby when said bridge member closes a pair of switch contacts selected by said switch means, said clutch means is operated to disengage said drive motor from said shaft.

11. The invention according to claim 10 wherein said switch means comprises a rotary switch, the rotative position of which is responsive to said negative mask actuating means wherein each rotative position of said rotary switch

connects said power source to a different pair of switch contacts of said uniselector device.

12. In a photographic printing apparatus, the combination comprising:

means for metering a light sensitive printing paper to and from an exposing station,

adjustable means for masking the printing paper to uncover a selected portion of the printing paper for exposure,

a light source for projecting an image of a negative onto the printing paper at the exposing station for exposing a portion of the paper,

a negative mask carrier at said exposing station adapted to receive any one of a number of negative masks having different size negative areas.

actuating means on each negative mask corresponding to the size of the negative area of said mask,

a plurality of electrical circuits for controlling various printing mechanisms such as said paper metering means and said adjustable masking means, and

switch means responsive to said actuating means when a selected negative mask is received by said negative mask carrier for selecting and controlling one or more of said electrical circuits.

13. The invention according to claim **12** wherein said switch means comprises a plurality of first switches responsive to said mask actuating means, a plurality of

second switches connected to said plurality of electrical circuits, and means operated by one or more of said first switches for moving one or more of said second switches to a predetermined position for selecting and controlling one or more of said electrical circuits.

14. The invention according to claim **13** wherein said mask actuating means comprises lugs extending from said mask, said first switches having pins actuable by said lugs for closing one or more of said first switches, said second switches each comprising a rotary switch having a movable contact selectively engageable with a plurality of fixed contacts, and said moving means comprising a motor drivingly connected to said rotary switches.

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