Dec. 6, 1955

M. R. DEWHURST

CONTROL MECHANISM FOR TYPOGRAPHICAL PHOTO COMPOSING MACHINES

2,725,801

Filed June 10, 1952

3 Sheets-Sheet 1

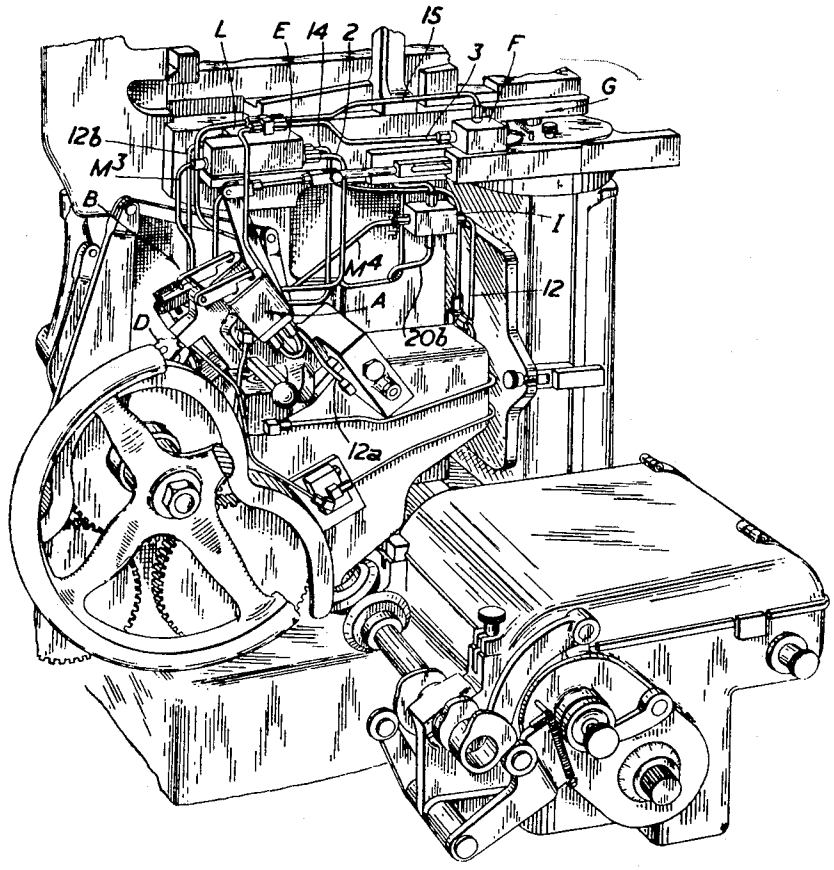


FIG. 1.

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3 Sheets-Sheet 2

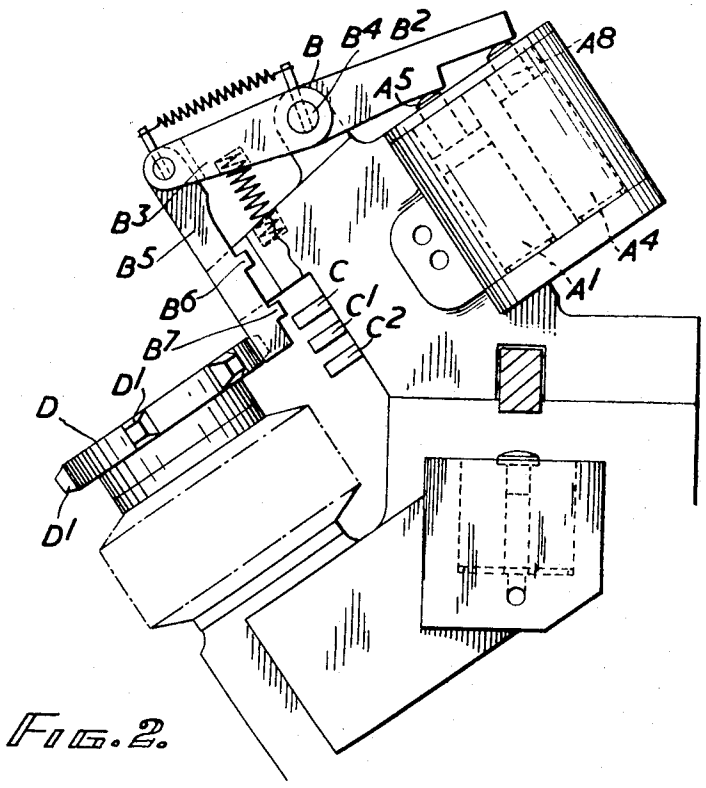


FIG. 2.

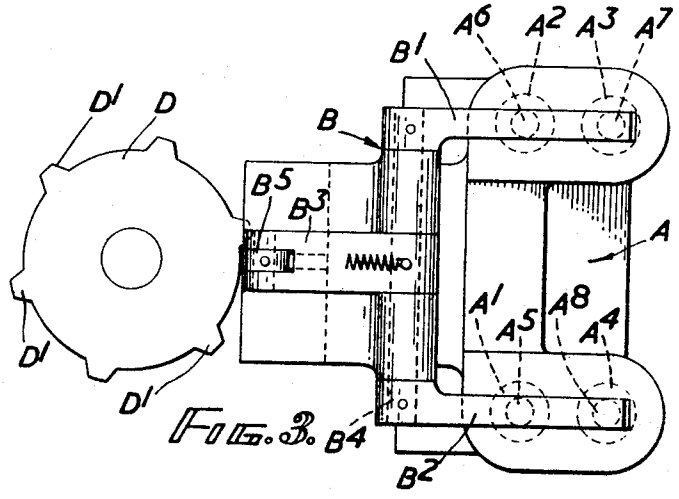


FIG. 3.

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3 Sheets-Sheet 3

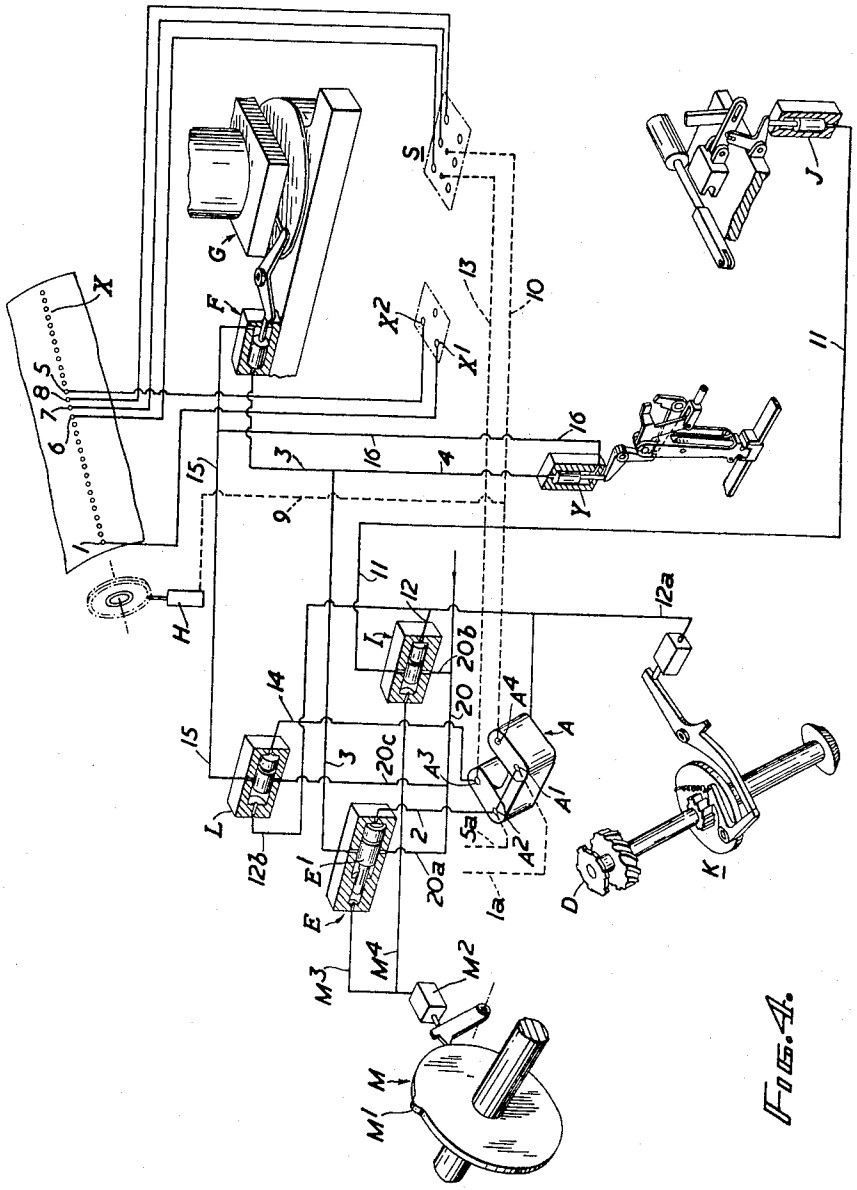


FIG. 4.

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MAURICE R. DEWHURST

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CONTROL MECHANISM FOR TYPOGRAPHICAL PHOTO COMPOSING MACHINES

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Application June 10, 1952, Serial No. 292,663

Claims priority, application Great Britain May 20, 1952

5 Claims. (Cl. 95—4.5)

This invention relates to photo-mechanical typographic composing machines of the kind wherein single characters or other typographical symbols can be projected in succession by photographic means, from an assembly of master symbols or characters, through a lens or lens system onto a sensitised or light-sensitive surface or element to produce thereon composed and justified lines of text or letter-press.

More particularly the present invention purports to be an improvement on the machine described in the specification of U. S. A. Patent No. 2,388,961.

In the machine according to this earlier patent, the movements of co-operating elements or mechanisms are controlled by a pre-prepared record strip, which represents a preliminary setting of the entire matter to be photographically composed. The record-strip is perforated according to a well-known system and as the strip passes through the photo-composing machine, the perforations uncover ports in an air supply bar, allowing air to pass to several parts of the machine to be operated by such air. The master characters or symbols of any typographical fount are arranged on a master plate or sheet which is mounted in adjustable frames and under control of signals in the record strip this plate or sheet is moved in two directions to bring any character or symbol thereon into alignment with a lens for projection onto a selected point on a light-sensitive element.

A lens or lens system is arranged between the master plate and a support for the light-sensitive element. The master plate and the support for the light-sensitive element are arranged in fixed focal planes and the light-sensitive element is maintained stationary during the composition of text matter. Between the lens and the support for the light-sensitive element, is arranged a linearly movable reflector which by successive step-by-step movements projects single images of characters and determines the individual position of each along a line on the focal plane of a light-sensitive element.

Mechanism under control of signals in the record-strip is provided for advancing the reflector step-by-step for successive projections of single characters or the like and for varying this advance in accordance with the space to be allotted to such characters or the like, in selected spaced relationship on a stationary light-sensitive element and also for varying the advance of the reflector for interwork spaces in any given line, so as to produce justified lines of composition.

Mechanism is also provided, which is likewise under the control of signals in the record-strip, for returning the reflector to initial position and for advancing the sensitised element for the reception of a fresh line of composition.

Photo-composing machines of the kind above indicated are satisfactory and efficient for the production of straight text matter in column or page form, but their use hitherto has been limited, as provision has not been made therein for the production of complicated matter involving the temporary suspension of, or a variation in, the movement

or functions of certain units controlled from the record-strip, whilst allowing other units or devices to function in their normal manner.

Theoretically the dimensions of the controlling record-strip are not limited so that by enlarging existing dimensions, extra perforataions might be included to control additional operations of the machine. In practice, however, such an increase would introduce complications and also involve a substantial redesigning and reconstruction of the entire machine to a extent that would not be economical.

The chief object of the present invention, therefore, is to increase the capacity and efficiency of the machine by providing air controlled valve mechanism which can be selectively operated by new combinations of components of existing record-strip signals, to perform new or additional functions, or to perform normal functions in an improved manner.

The valve mechanism, according to the present invention, comprises four pistons having different lengths of stroke and operated separately by perforations in the record strip, a pivoted three-armed lever each of two arms of which extends over a separate pair of the said pistons, an interponent carried by the third arm of the lever and adapted to be variably positioned, by the operation of one or another of the said pistons, in line with the stems of three air supply valves, which, according to the set position of the interponent, are operated mechanically once during each cycle of the operation of the machine to supply air to one or more of a number of air distributing valves, which when operated, supply air to several devices controlling various functions or operations of the machine.

Referring to the accompanying drawings:

Figure 1 is a perspective view of the record-strip controlled valve mechanism according to the present invention shown in position on a photo-composing machine.

Figure 2 is a side elevation of the valve mechanism alone, shown in Figure 1.

Figure 3 is a plan of Figure 2 and

Figure 4 is a diagrammatical view of the control mechanism showing the connections therewith to the record-strip controlled air supply ports and the connections between the valve-mechanism and the various elements of the machine the movements which are controlled by the valve mechanism of the present invention.

The valve mechanism of the present invention comprises a casing A in cylinders in which are arranged four pistons A^1, A^2, A^3, A^4. Separate air inlets lead from ports in an air supply bar X controlled by perforations in the record-strip to the lower ends of these cylinders respectively. Stems A^5, A^6, A^7, A^8 on the pistons project through the casing and beneath two arms B^1, B^2 of a three armed lever B mounted on a shaft B^4 carried on the casing A. The third arm B^3 of the lever B on the side of the shaft B^4 opposite to the arms B^1, B^2 has pivoted to it a depending interponent B^5 which is furnished with two projections B^6, B^7. Within a separate constant air supply chamber in the casing A are arranged three sliding valves C, C^1, C^2 which control the supply of air to air distributing valves E, I and L which operate or prevent the temporary operation of certain devices on the machine.

In the preparation or composition of the record-strip, the justification signals are the last signals to be recorded for any line of composition. The record-strip is passed through the photo-composing machine in the direction reverse to composition; thus the justification signals for any particular line of composition are the first signals to be presented to the air-supply bar.

In the existing machine, the signals or perforations in the record strip, which control the setting of the justification devices, also control the resetting of the devices operated during the composition of a line of matter. This

justification mechanism embodies two wedges which are set separately during two successive cycles of the machine.

When a perforation in the record strip uncovers a port **1** in the air supply bar X a portion of the air acts as hitherto through an existing device X^1 to effect the setting of one of the justification wedges, but according to the present invention a portion of the air now passes by a pipe **1***a* to the cylinder of piston A^1 raising that piston and tilting the lever B to place the projection B^7 on the interponents B^5 carried by the arm B^3 of the lever B opposite the piston valve C. Owing to certain peculiarities of operation of the composing machine the signal above described is interpreted by the setting of the interponent and the valve C too soon in the cycle of operation to be carried into effect and a delay mechanism or a timing mechanism has to be employed. This timing device comprises a disc D which is furnished with six projections D^1. This disc is rotated from a cam shaft of the machine and so geared that it performs one sixth of a revolution for each cycle of operation of the machine. In thus rotating one or another of the projections D^1 engages the interponent B^5 and moves it to cause the projection B^7 to open the valve C. This valve on being opened allows air to pass by a pipe **2** to a cylinder E and operate the piston valve E^1 therein to allow another stream of air from a constant source of supply pipe **20** to pass by a pipe **20***a* around the valve E^1 and then by a pipe **3** to a piston F, which closes a lens shutter G of the machine and prevent this shutter from opening so that no image is projected during the setting of the justification element. Another portion of air from the valve E^1 passes by a pipe **4** to the mechanism Y which controls the step-by-step advance of a reflector which determines the position of a photographed character on a sensitized receiving sheet and prevents this mechanism Y from operating during one cycle of operation of the machine while one justification element is being set.

The second justification wedge is set when a perforation in the record strip admits air to the port **5**. A portion of the air admitted will act on the existing mechanism X^2 for setting the second justification wedge, but in addition another portion of this air now passes through a pipe **5***a* to raise the piston A^2 through the same length of stroke as piston A^1, thereby lifting the arm B^2 of the lever B and placing the projection B^7 on the interponent or adjustable latch B^5 again in line with the stem of the valve C. This valve is again operated at the proper time by the projection D^1 on the disc D, allowing air from a constant source of supply pipe **20***a* to pass by pipe **3** to the device F to prevent the operation of the lens shutter G, and also by the pipe **4** to prevent the operation of the feed mechanism Y for the reflector.

When composing straight or simple matter according to existing machines, additional signals are given in the record-strip in company with the justification setting signals above referred to and these signals are for resetting various units or elements preparatory to the composition of a fresh line of matter.

For resetting or returning the devices, which have been actuated during a line of composition, the valve mechanism of the present invention is operated when perforations in the record-strip admit air to the ports **7** and **8**, in conjunction with justification signals through the ports **1** and **5**. When these ports **7** and **8** in the air supply bar X are uncovered simultaneously by perforations in the record strip and in company with the justification signal through the port **5**, the air through this port **5** acts through the valve C as already described to set one of the justification wedges, prevent the opening of the lens shutter, and release the driving mechanism Y for the reflector. The air simultaneously through the ports **7** and **8** acts on the switch S and passes by a pipe **9** to an existing lock-out device H on the feeding mechanism for the record-strip. This lock-out device is a known device and it is sufficient to state that it prevents the feed of the record-strip during three successive cycles of the machine for each justification signal, thus making six cycles in all. A further portion of this air passes by a pipe **10** to the cylinder of the piston A^4 therein and raises the latter. This piston has a longer stroke than pistons A^1, A^2, A^3 and in rising contacts the arm B^1 of the lever B, which in turning on its pivot places the finger B^6 in line with the valve stem C^2. Both these valves C and C^2 are subsequently operated by the rotating of the wheel D as already described. The operation of the valve C^2 transmits air by a pipe **12** to operate a piston valve I to admit a supply of constant air through a pipe **20***b* to travel by a pipe **11** to release a clamp J which normally holds the driving bar attached to the reflector. A further portion of the air controlled by the valve C^2 passes by a pipe **12***a* to a feed mechanism K to advance the receiving film for a fresh line of composition. Yet another portion of the air is led by a pipe **12***b* to the piston valve L to reset that valve for further operation when required by the first of the two justification signals through the air port **1** in the air bar X.

When tabular matter is being composed, the line is composed by the composition of the first line of each column as if it were an open line of full measure, but the two justification setting signals above described must be presented at the completion of each section or column, without the resetting signals. When the final section or column in a line of tabular matter has been completed, then in addition to justification signals the signals above described and controlled by air ports **7** and **8** must be made to reset or return the various devices which have been operated during a full line of composition to their initial positions.

The mechanism of the present invention is also operated to prevent the characters in an inaccurate line of composition from being photographed. When the ports **6** and **8** are uncovered simultaneously by perforations in the record-strip, the switch device S is operated diverting the air supply through these ports from its normal functions. A portion of air now passes by a pipe **13** to raise piston A^3 which has a shorter stroke than piston A^4 and which contacting with the arm B^2 of lever B places the projection B^6 on the interponent B^5 in line with valve C^1. This valve on being operated transmits air by a pipe **14** to a valve L the operation of which admits constant air by a pipe **20***c* to the valve L and, after passing through the valve L, this air travels by a pipe **15** to hold the lens shutter G closed. A portion of this air also travels by the pipe **16** to release the driving mechanism Y from the driving bar of the reflector.

During each cycle of the machine a disc M operated from a cam shaft is rotated and a projection M^1 thereon operates an air valve M^2 allowing air from a constant source of supply to enter the cylinder E by a pipe M^3 and cylinder I by a pipe M^4 and restore the piston valves therein to their initial position.

What I claim is:

1. In a control mechanism for a record-strip controlled typographic photo-composing machine having a lens shutter, a character projecting reflector and advancing means therefor, sensitized sheet advancing means, and record-strip feeding means, the combination of four pistons having different extents of stroke and operated by air controlled by perforations in the record-strip, a three armed lever having each of two arms extending over a pair of the said pistons, three air supply valves, an adjustable latch carried by a third arm of the said lever and adapted to be variably positioned opposite the air supply valves by the operation of one or the other of the four pistons, a timing device to cause operation of one or more of the air supply valves through the pistons, a distributing valve operated by air through one of the air supply valves, to maintain a lens shutter closed and to interrupt the advance of the reflector; a second distributing valve operated by air from the second of the air supply valves, to supply air to prevent the operation of the lens shutter and the step by step advance of a character projecting reflector,

and a third distributing valve operated by air from the third air supply valve to supply air to valves to advance a sensitized sheet for a fresh line of composition, maintain the lens shutter closed, release the reflector, actuate a resetting mechanism and temporarily lock out the feed of the record-strip.

2. In a record-strip controlled photographic-type composing machine having a character-projecting reflector movable step-by-step, driving means therefor, a resetting mechanism, a record strip feed mechanism, a lens shutter, compressed air means for selectively actuating said driving means, said resetting mechanism and said shutter, a plurality of air-actuated air supply valves selectively and variably supplying compressed air to the selectively actuated means, and control mechanism therefor comprising four pistons having different extents of stroke and selectively operated by compressed air under control of the record strip, and a second plurality of air supply valves selectively controlled by said four pistons and controlling the selective actuation of said air actuated supply valves.

3. A composing machine as claimed in claim 2 in which the four pistons have different lengths of stroke and are individually controlled from record-strip controlled air ports.

4. A composing machine as claimed in claim 3 in which the four pistons selectively operate an adjustable latch, there are three air supply valves in said second plurality, and timing means are provided for periodically operating said four pistons.

5. A composing machine as claimed in claim 2 in which there are three air-actuated, air supply valves which control compressed air means for selectively actuating said feed mechanism.

References Cited in the file of this patent

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2,388,961 Elliott ---------- Nov. 13, 1945