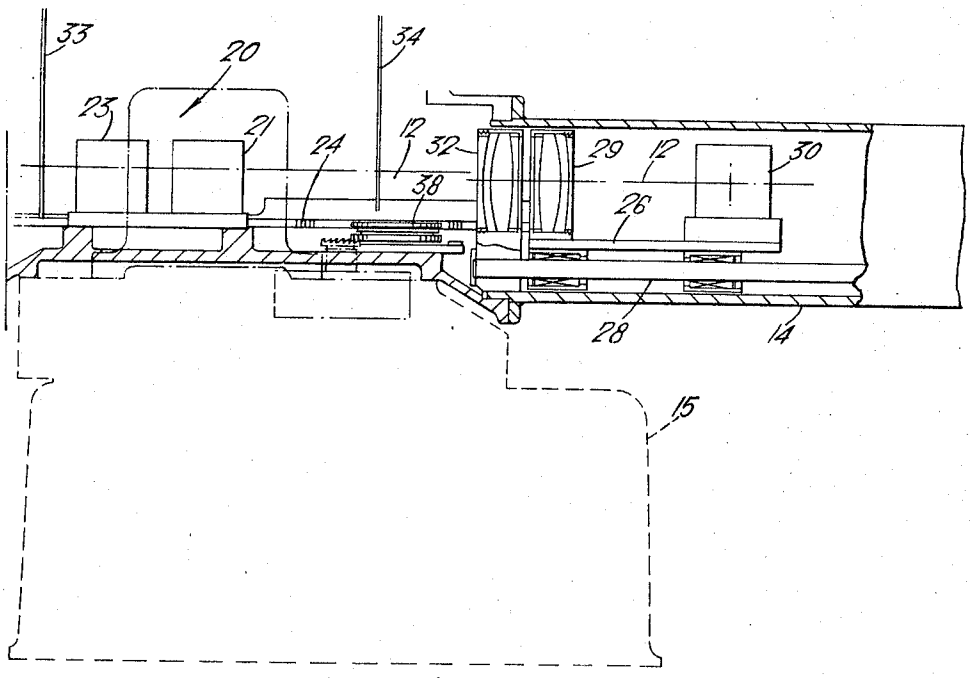
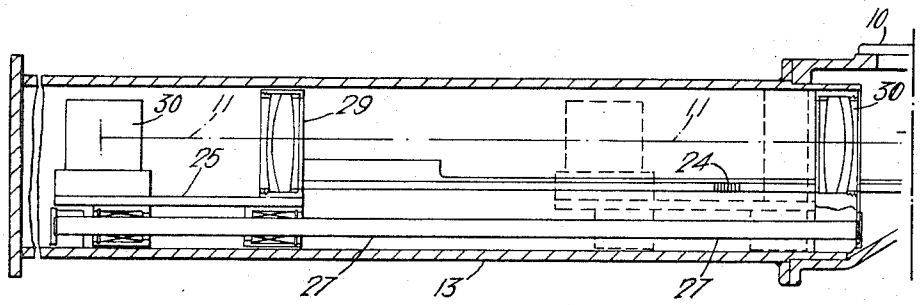
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PHOTO TYPE SETTING MACHINES

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Fig. 1.





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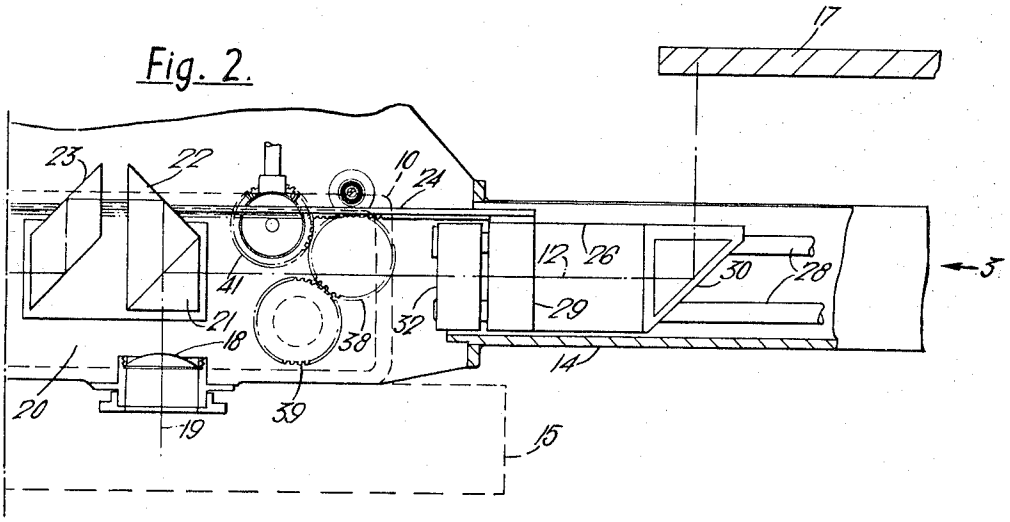
Attorneys

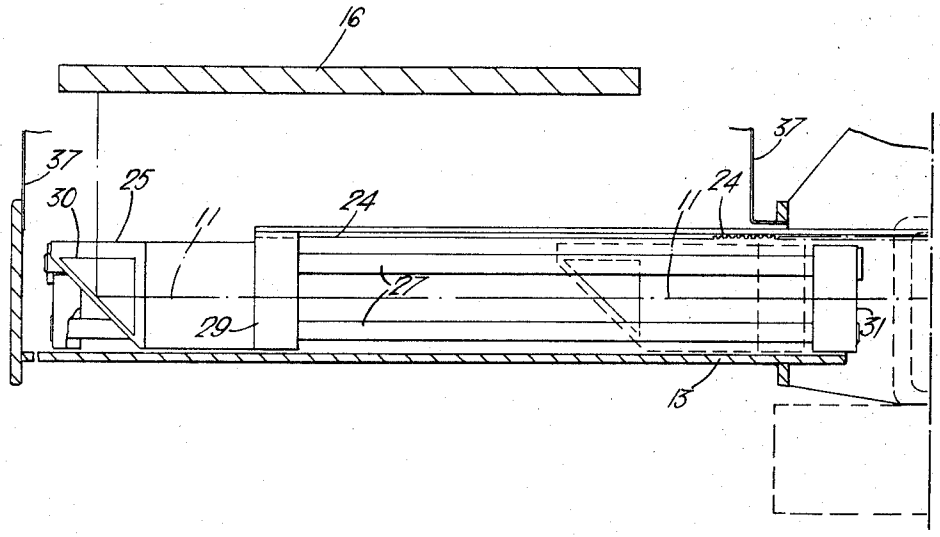
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PHOTO TYPE SETTING MACHINES

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Fig. 2.





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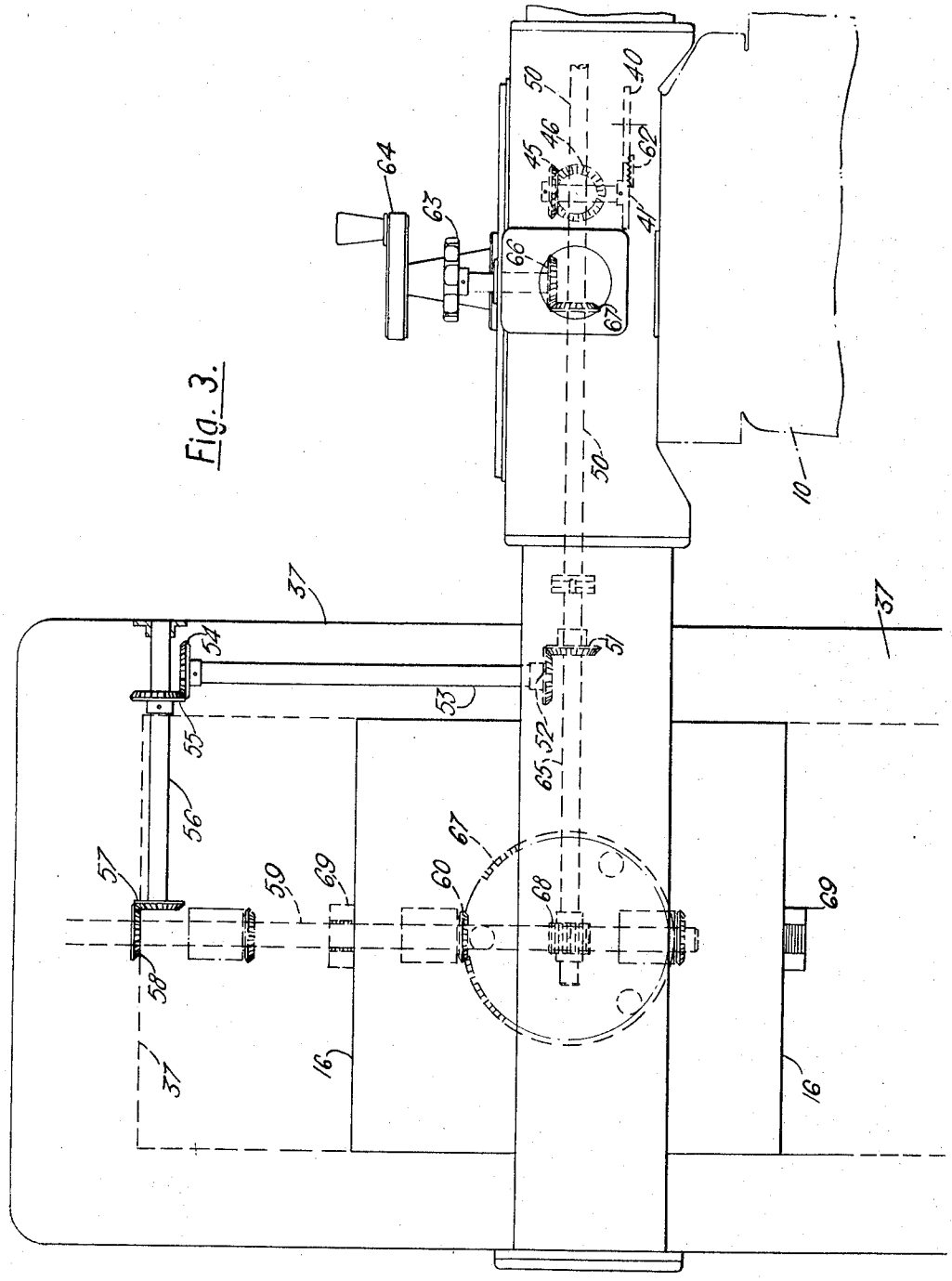
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PHOTO TYPE SETTING MACHINES

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Fig. 3.



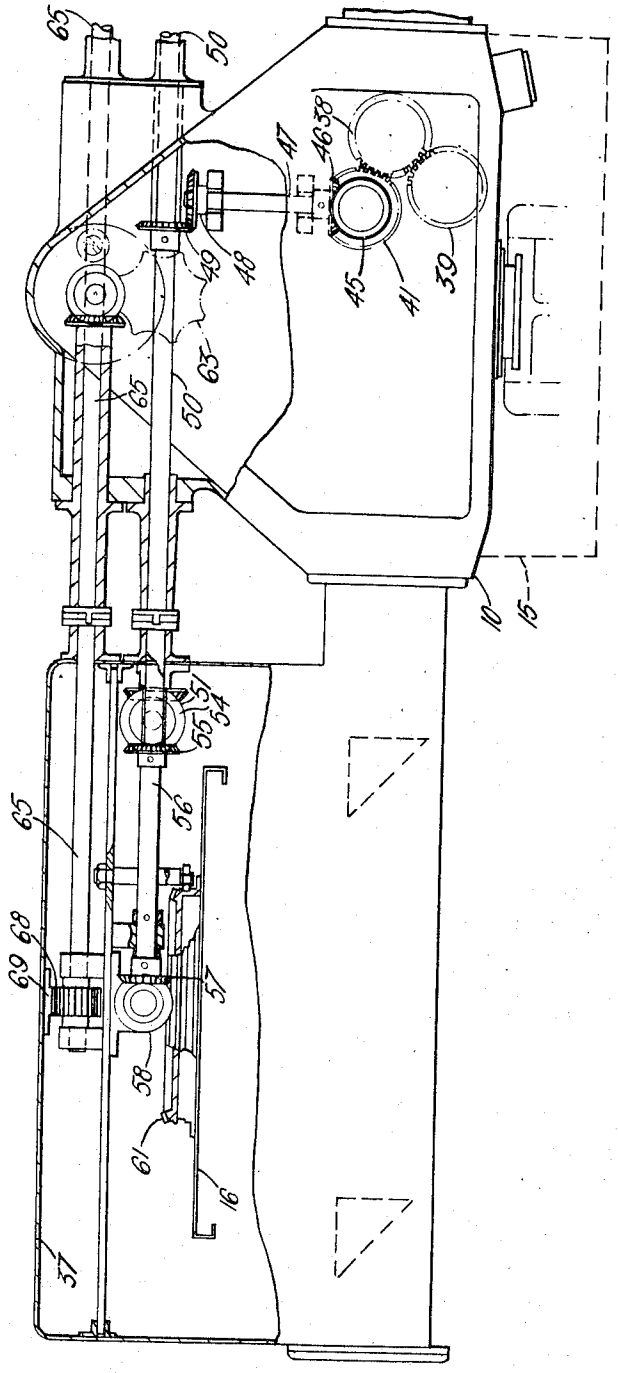
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PHOTO TYPE SETTING MACHINES

Filed Jan. 29, 1965 4 Sheets-Sheet 4

Fig. 4.



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3,347,140

PHOTO TYPE SETTING MACHINES

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Filed Jan. 29, 1965, Ser. No. 429,328
Claims priority, application Great Britain, Feb. 1, 1964, 4,374/64
7 Claims. (Cl. 95—4.5)

ABSTRACT OF THE DISCLOSURE

A photo-setting machine having a main platen and a proof platen with an image splitting means projecting identical images on each and a rotative drive means connected to a letter spacing drive to rotate each platen a given amount to achieve proper letter spacing for non-linear printing.

Photo-setting machines generally comprise a lettering head where high quality photoprint is produced on film, and a projection system which includes a letter holder on which are provided the various symbols that may be printed, a light source for illuminating a selected symbol that is to be printed, an optical system for passing the image of the selected symbol to the film and a drive mechanism under the control of the letter holder for producing movement of the letter image on the film.

Heretofore proposed photo-setting machines produce photoprint in single or multiple lines. It is necessary, however, in some forms of composing, such as that for mathematical printing or in advertising display, to have greater flexibility and an ability to handle more complicated layouts involving symbols in unusual positions on both straight and curved base lines. These problems cannot be handled on conventional lettering heads, and in metal type techniques give rise to considerable difficulties.

It is an object of the present invention to obviate or mitigate these difficulties.

The present invention is a lettering head for a photo-setting machine, including a beam splitting device for receiving an image of a symbol, means defining two optical paths from the beam splitter, a carriage movable along the optical paths, directing means on said carriage for projecting a light beam from each optical path, two mounting means for mounting photo-sensitive sheets disposed each to intercept one said light beam projected by said directing means and means providing relative movement in two different directions between each mounting means and the carriage, one of said plattens being shielded against extraneous light.

The present invention also provides a photo-setting machine including a lettering head as defined in the last preceding paragraph, a letter holder on which are provided the various symbols that may be printed, a light source for illuminating a selected symbol, an optical system for passing an image of the selected symbol to the lettering head, and a drive mechanism connected to the head to allow for the appropriate letter spacing.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIGS. 1 and 2 are respectively a sectional elevation and a sectional plan view of a lettering head according to the invention; and

FIGS. 3 and 4 are respectively elevation and plan views of platten moving means in the head shown in FIGS. 1 and 2.

Referring now to FIGS. 1 and 2, a lettering head for a photo-setting machine consists of a central casing **10**,

aligned optical paths **11** and **12** defined by channels **13** and **14** extending on opposite sides thereof, a carriage movable in the channels, two plattens **16** and **17**, and means for producing relative movement of the carriage and the plattens.

The lettering head is, of course, to be used in conjunction with a conventional projection system **15** comprising a letter holder, light source, optical system and drive mechanism, and the casing **10** is therefore provided with a lens **18** for admitting a light beam **19** from the projection system **15**. A beam splitter **20**, consisting in this embodiment of three prisms **21**, **22** and **23** produces from the light beam **19** two equal beams which are directed axially along the optical paths **11** and **12** respectively.

The carriage consists of two interconnected frames **25** and **26** movable respectively on guides **27** and **28** in the channels **13** and **14**. Each frame, **25**, **26**, mounts a lens system **29** and a prism **30** which are included in the optical paths **11** and **12**. The frames **25** and **26** are interconnected by a rack **24**.

The channels **13** and **14** are each provided with a fixed lens system, **31** and **32** respectively, at their inner ends, whereby the optical paths from the beam splitter **20** pass through the fixed lens systems and the lens systems **29** and are terminated by the prisms **30** which project light beams from the optical paths onto their respective plattens **35** and **36**.

The platten **16** is enclosed in a light-tight box **37** and thereby shielded from extraneous light and supports a photosensitive sheet from which the subsequent printing operations are to be carried out, whereas the platten **17** supports a sheet of printing out paper which has the property that it will produce an immediate picture when exposed to strong image light and without the need of developing. A shutter **33** and a filter **34** are provided to be interposed in the optical paths to the plattens **16** and **17** respectively as will be described hereinafter.

The carriage is moved along the head relative to the plattens by means of a gear **38** which engages the rack **24** and is driven through a gear **39** by the letter spacing drive mechanism of the machine. A manually operable clutch (not illustrated) is provided in the drive to the rack **24** to enable the carriage to be moved by hand against the drive.

Also driven from the gear **38** is a gear train which comprises, as shown in FIGS. 3 and 4, for each platten spur gears **40** and **41**, bevel gears **45** and **46**, a shaft **47**, bevel gears **48** and **49**, a shaft **50**, bevel gears **51** and **52**, a shaft **53**, gears **54** and **55**, a shaft **56**, gears **57** and **58**, a shaft **59** and gears **60** and **61**, the latter being connected with the platten **16** to cause it to rotate about an axis perpendicular to its surface.

A manually operable clutch **62** is also provided in the drive to the bevel gear **45** so that rotational movement of the plattens may, if desired, be under the control of a handwheel **63**.

Vertical movement of the plattens is under the control of a handwheel **64** which drives for each platten a shaft **65** through bevel gears **66** and **67**, a pinion **68** driven by the shaft **65** engaging a rack **69** to which a platten is secured for vertical movement.

In use, the image of the symbol selected is passed through the lens **18** and thence to the plattens from the beam splitter **20** the optical paths **11** and **12** and the prisms **30**. A permanent record is formed on the photo-sensitive sheet on the platten **16** while on the platten **17** the printing out paper provides an immediate indication of the overall effect. As each symbol is printed, the carriage is moved an appropriate distance to allow for the correct spacing of the symbols. Vertical spacing is, of course, under the control of the handwheel **64**. If it is

desired to use a curved base line rotation of the plattens may be effected either manually or automatically as previously described. The shutter **33** and filter **34** are used when it is desired to experiment with a layout on the sheet of printing out paper without exposing the photosensitive sheet and/or the printing out paper.

The shutter **33** and filter **34**, which are solenoid operated, are normally opened for a controlled period for symbol exposure purposes by signals from the projection system of the photo-setting machine.

What I claim is:

1. A lettering head for a photo-setting machine comprising means for receiving and splitting an image of a character into two optical paths, a carriage movable along said optical paths, means mounted on said carriage for projecting light beams intercepted from said optical paths, means for mounting first and second photosensitive plates to respectively intercept light beams emitted from said projecting means, means for simultaneously moving said mounting means relative to said carriage along two rectilinear lines of travel, rotative drive means connected to the output drive of a letter spacing drive mechanism for simultaneously rotating each of said mounting means identical amount about axes perpendicular to the planes of said plates in accordance with the output of said letter spacing drive mechanism to achieve proper letter spacing and means for shielding one of said mounting means from extraneous light.

2. A lettering head according to claim **1**, wherein said carriage is driven along one line of travel by means of a rack and gear combination.

3. A lettering head according to claim **1**, wherein said carriage includes two interconnected frames, each carrying a lens system, and said projecting means comprise prisms mounted on said frames.

4. A lettering head according to claim **1**, wherein said optical paths are disposed within channels including guide means for slidably supporting said carriage.

5. A lettering head according to claim **1**, wherein said beam splitting means comprises a combination of three prisms.

6. A lettering head according to claim **2**, wherein each mounting means is provided with a rack and gear combination connected to a common drive, for moving said mounting means relative to said carriage along said second line of travel.

7. A lettering head according to claim **6**, wherein said common drive is manually operated.

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JOHN M. HORAN, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,347,140 October 17, 1967

David S. Ritchie

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the printed specification, lines 3 and 4, for "David S. Ritchie, Caxton St., Anniesland, Glasgow W. 3, Scotland" read -- David S. Ritchie, Glasgow, Scotland, assignor to Barr and Stroud Limited, Anniesland, Glasgow, Scotland --.

Signed and sealed this 31st day of December 1968.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents