March 26, 1968 W. N. SCHEPPE 3,375,366

HIGH INTENSITY PRINTING LAMP

Filed Dec. 28, 1965 2 Sheets-Sheet 1

FIG. 2

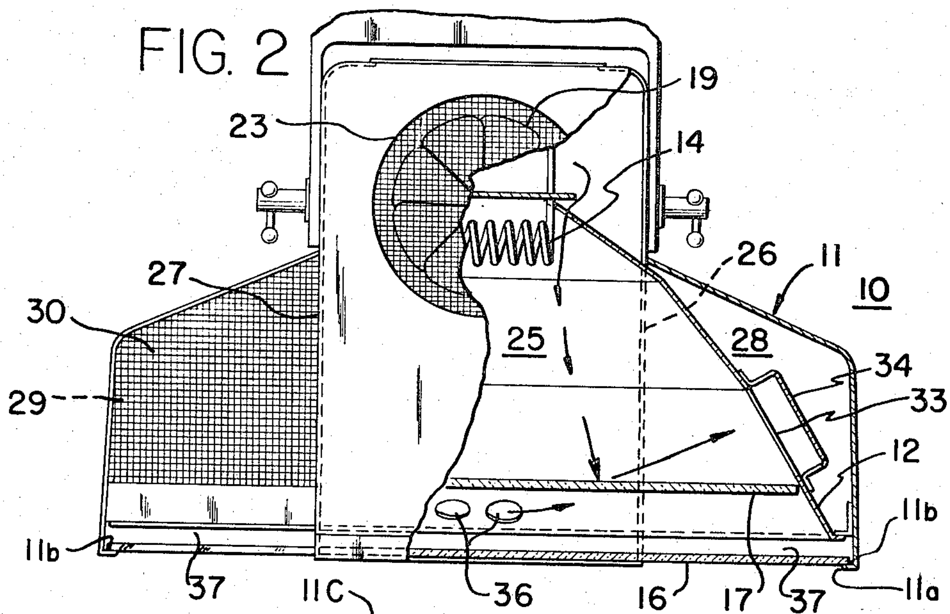
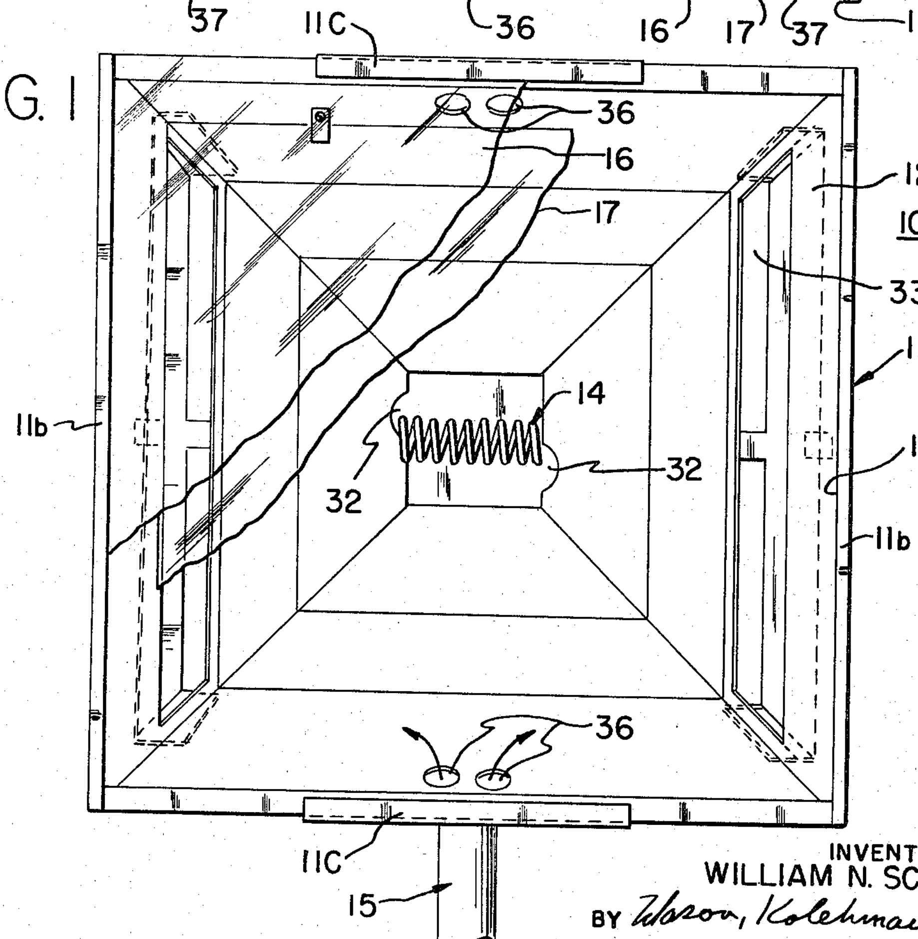


FIG. 1



INVENTOR
WILLIAM N. SCHEPPE
BY Wason, Kolehmainen,
Rathburn & Wyss.
ATTORNEYS

FIG. 3

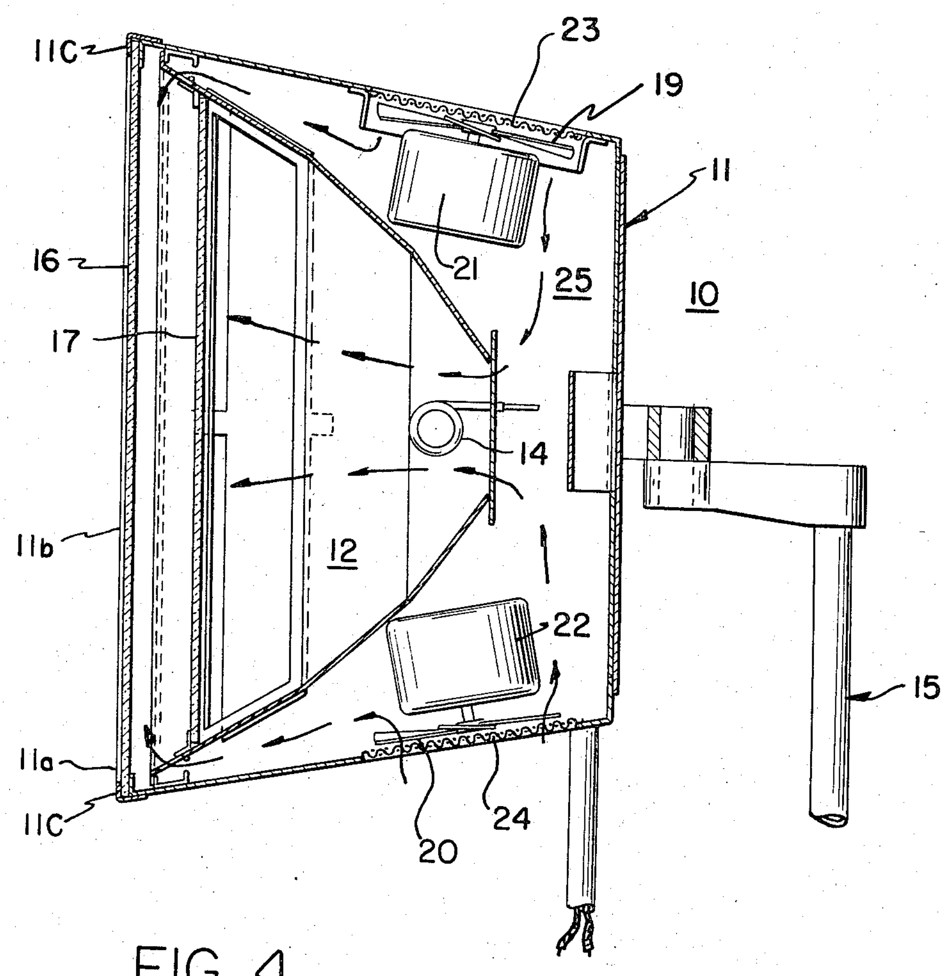
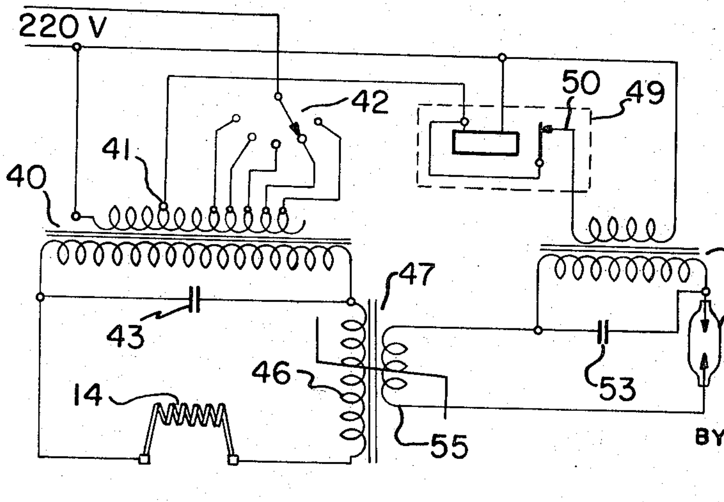


FIG. 4



INVENTOR
WILLIAM N. SCHEPPE

BY Mason, Kolehmainen, Rathburn & Wyss
ATTORNEYS

United States Patent Office

3,375,366

Patented Mar. 26, 1968

3,375,366

HIGH INTENSITY PRINTING LAMP

William N. Scheppe, Chicago, Ill., assignor to The Nuarc Company, Chicago, Ill., a corporation of Illinois

Filed Dec. 28, 1965, Ser. No. 516,904
2 Claims. (Cl. 240—47)

ABSTRACT OF THE DISCLOSURE

An improved cooling arrangement is provided for a high intensity lamp such as used for printing, photocopying and the like. The cooling arrangement includes means for directing cooling air against the high intensity light source and further directing the cooling air against the translucent cover of the lamp. Additionally the translucent cover includes spaced plates and cooling air is directed between the spaced plates.

The present invention relates to a high intensity printing lamp, and more particularly, to a high intensity printing lamp for photocomposing machines such as the step and machine.

Photographic materials such as photographic film are commonly used commercially in the photocomposing art. Such photographic film stretches with heat so that close register between the film and copy is lost as the film is heated. It is particularly important with the photocomposing of color work that there be close register between one color and another, since the separate colors are individually printed and will tend to separate if not closely aligned.

One method of preventing overheating of photographic material by a lamp is simply to move the lamp further away from the photographic material; but this is unsatisfactory as it increases the required exposure time. Another known method is to direct cooling air on the exposure surface to blow the heat away from the photographic material. This has also been found not to be effective and moreover such cooling air picks up room dust and deposits it on the working surfaces.

Accordingly it is an object of the present invention to provide a high intensity printing lamp which overcomes the aforementioned difficulty;

Another object of the present invention is to provide a new and improved high intensity lamp;

Yet another object of the present invention is the provision of a printing lamp which does not overheat the surfaces on which it is directed.

In accordance with these and other objects, there is provided a new and improved high intensity printing lamp for photocomposing and the like and including a generally diverging reflector positioned within an outer housing and employing a xenon lamp or mercury vapor lamp as the light source. In accordance with one aspect of the present invention, a cover including spaced translucent plates close the reflector. The plates are provided with infrared reflecting surfaces to block the transmission of infrared rays while permitting useable light to pass therethrough. In accordance with another aspect of the present invention, air is directed against the xenon lamp and then strikes against the inner surface of the inner one of the translucent plates to provide for cooling the enclosed reflector area. In accordance with yet another aspect of the present invention, air is directed between the spaced translucent plates to provide cooling of the plates.

For a better understanding of the present invention, reference may be had to the accompanying drawings wherein:

FIG. 1 is a front view of the improved lamp with the translucent cover plates partially broken away;

FIG. 2 is a plan view of the high intensity lamp of FIG. 1, in broken away section;

FIG. 3 is a cross sectional side view of the high intensity lamp of FIG. 1; and

FIG. 4 is an electrical schematic of the control circuit for the lamp according to the present invention.

Referring now to the drawings, there is illustrated a high intensity lamp **10** according to the present invention. The lamp **10** includes an outer housing **11** of suitable material such as cold rolled sheet steel. In order to operatively position a suitable reflector **12**, the housing **11** is open at its front, as indicated at **11***a*. The reflector **12** is of generally diverging shape, having its open end positioned adjacent the open front end **11***a* of the housing **11** and having an inner end supporting a suitable light source, here shown as a pulsed xenon lamp **14**. The reflector **12** is of substantially square cross section with decreasing outward divergence from its inner end toward its open end. In the illustrated embodiment the reflector **12** is of crinkled aluminum to provide for some diffusion of light. The lamp **10** may be supported in any suitable manner as on a tripod or stand **15**.

In order to block the transmission of infrared or heat rays from the xenon lamp **14** from striking against the illuminated surface, there is provided a cover means closing the open end of the reflector **12** and in the illustrated embodiment formed of a pair of spaced translucent plates **16** and **17**. Each of the plates **16** and **17** is of the type which blocks the transmission of infrared rays while transmitting useable light. The plates may be treated by firing a suitable metallic oxide coating into the surface of Pyrex glass to provide the plates **16** and **17** with an infrared reflecting surface. The coated surface of the plates **16** and **17** in the illustrated embodiment is faced toward the xenon lamp **14**.

To provide for cooling the lamp **10**, there is provided a pair of cooling fans **19** and **20** each driven by a suitable electric motor **21** and **22**. The fans **19** and **20** in the respective top and bottom of the housing **11** are positioned to draw air through upper and lower air intakes **23** and **24** respectively and to force the air into an air duct or passageway **25**. The air duct **25** is defined at its top and bottom by a portion of the upper and lower walls respectively of the housing **11**, by the upper and lower surfaces of the reflector **12**, and by partitions **26** and **27**, FIG. 2, which divide the housing **11** to define the air duct **25**. Moreover the remainder of the housing **11** defines suitable exhaust ducts **28** and **29** terminating in upper and lower air exhausts **30**.

To provide for cooling the xenon lamp **14** and the inner area defined by the reflector **12** and the inner plate **17**, there is provided a pair of spaced air openings **32**, FIG. 1, communicating with the air duct **25** and formed adjacent the inner end of the reflector **12** to direct air against the xenon lamp **14**. Moreover the vertical sides of the reflector **12** are provided with exhaust slots **33** to permit for the escape of air from the enclosed chamber. A baffle **34** spaced outwardly of each exhaust slot **33** is effective to direct the air toward the air exhausts **30** and to provide a reflective surface along the exhaust slots **33**. It will be understood that air from the fans **19** and **20** which is forced into the air ducts **25** will in part be directed through the air openings **32** against the xenon lamp **14**, and then will be directed forwardly to strike the inner surface of the plate **17** and exhaust through the vertical slots **33**.

To provide for further cooling of the glass plates **16** and **17**, the reflector **12** is provided with upper and lower air openings **36** communicating with the air duct **25** and directing air into the space between the spaced plates **16** and **17**. The housing **11** is provided with opposed inwardly extending flanges **11***b* along its side walls to retain the glass, and upper and lower segments of inwardly extending flanges **11***c* position the glass while defining exhaust opening **37**, FIG. 2, from the space between the plates **16** and **17**. Consequently a portion of the air from the fans **19** and **20** forced into the air duct **25** will be directed through the air openings **36** between the plates **16** and **17** to exhaust through the openings **37** and provide for cooling of the plates **16** and **17**. Moreover the side flanges **11***d* cover the edge of the glass plates **16** and **17** so as to shield the operator's eyes.

It has been found that an 8000 watt xenon lamp without the heat blocking effect of the plates **16** and **17** will heat photographic material against which the light is directed to a temperature of around 200° F., which is not acceptable for commercial quality photocomposing; but by the use of the heat reflecting plates **16** and **17**, the temperature of the photographic material can be held to below about 105° F. to provide an acceptable temperature for the photographic film.

The xenon lamp **14** in the illustrated embodiment is of the pulsed xenon type and may be controlled in any suitable manner. FIG. 4 schematically illustrates one suitable control for the xenon lamp **14**. As therein illustrated the xenon lamp **14** is powered by a power transformer **40** which may have a 650 volt secondary adapted to be connected to a 220 volt primary. The primary is tapped at **41** to provide a 115 volt terminal for a starting circuit, while one end of the primary is connected to a suitable tap switch **42** to provide for correction in variations of line voltage. It will be understood that the light output of the xenon lamp varies approximately as the square of the applied voltage. A capacitor **43** is connected across the secondary of the power transformer **40**. The xenon lamp **14** is also connected across the secondary of the power transformer **40** through a reactor winding **46** of a square wave saturable pulse reactor **47**.

To provide positive starting of the xenon lamp **14**, there is provided a starting circuit including a time delay relay **49** having a normally closed switch **50** effective to open approximately two seconds after initial connection to the power line. A starter transformer **52** is serially connected with the switch **50** across the 115 volt tap of the power transformer **40** and accordingly is provided with a 115 volt primary producing, in the illustrated embodiment, a 4000 volt secondary output. A capacitor **53** is connected across the secondary of the starter transformer **52**. The secondary of the starter transformer **52** is serially connected with a spark gap **54** to a starting winding **55** in the pulse reactor **47**. It will be understood that the starting pulse is fed through the starting winding for approximately two seconds after switching on of the control circuit, thereafter the xenon lamp **14** is operated by the power transformer **40** limited by the impedance of the pulse reactor **47**.

Although the present invention has been described by reference to only a single embodiment thereof, it will be apparent that numerous other modifications and embodiments may be devised by those skilled in the art and it is intended by the appended claims to cover all modifications and embodiments which will fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A high intensity lamp for photocomposing and the like and comprising:
an outer housing open at the front;
a generally diverging reflector in said housing having an open end toward the front of said housing and an inner end;
a pulsed xenon lamp positioned within said reflector adjacent said inner end;
cover means closing said reflector and including spaced translucent plates, said reflector being provided with first air opening means adjacent said inner end and with second air opening means adjacent said cover means and being further provided with first air openings and second air openings both communicating with the space between said plates;
fan means; and
air duct means connecting said fan means with said first air opening means and with said first air openings whereby a portion of the air from said fan means is directed against said xenon lamp and strikes against the inner one of said translucent plates and another portion of said air from said fan means is directed through said first openings into the space between said plates, said plates being provided with an infrared reflecting material on their surfaces.

2. A high intensity lamp for photocomposing and the like and comprising:
an outer housing open at the front having top and bottom air intakes;
a generally diverging reflector in said housing having an open end toward the front of said housing and an inner end;
a high intensity light source positioned within said reflector adjacent said inner end;
translucent cover means closing said reflector;
said reflector being provided with first air opening means adjacent said inner end and with said second air opening means adjacent said cover means;
fan means comprising a pair of fans one for each of said intakes;
air duct means connecting said fan means and said first air opening means whereby air from said fan means is directed against said light source and strikes against said cover means and is exhausted through said second air opening means; and
air exhaust means extending from said second opening means.

References Cited

UNITED STATES PATENTS

1,008,661	11/1911	Meyer	240—47 X
1,909,947	5/1933	Greppin	240—47 X
2,295,863	9/1942	Paradis	240—47
2,798,943	7/1957	Prideaux	240—47
3,021,422	2/1962	Ogier et al.	240—11.4 X

NORTON ANSHER, *Primary Examiner.*

D. L. JACOBSON, *Assistant Examiner.*