

E. F. TWEEDY.
HEATER.

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1,308,380.

Patented July 1, 1919.

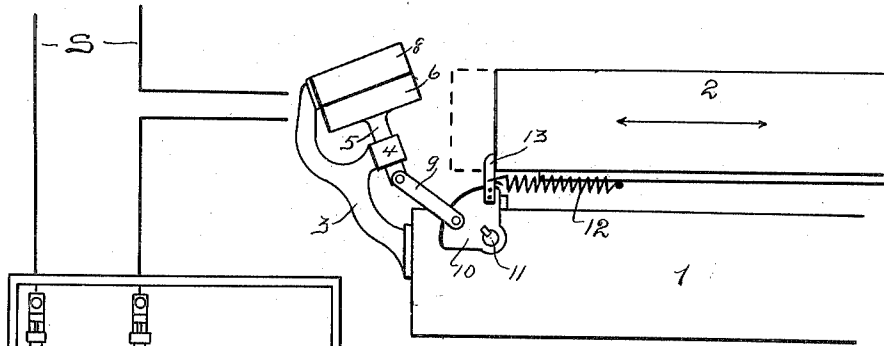


Fig 1

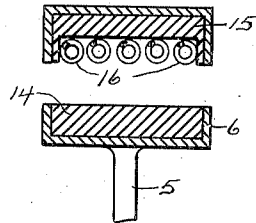


Fig 2

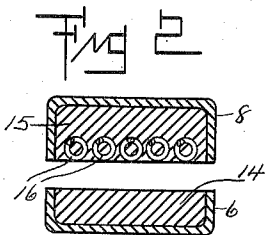


Fig 3

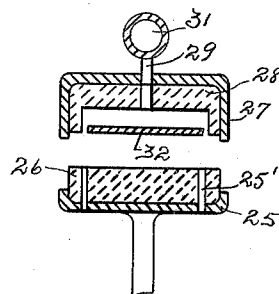


Fig 4

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HEATER.

1,308,380.

Specification of Letters Patent.

Patented July 1, 1919.

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To all whom it may concern:

Be it known that I, EDMUND FRANCIS TWEEDY, a citizen of the United States, and resident of the town of Glenbrook, county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Heaters, of which the following is a specification.

The invention herein set forth is a device wherein heat is generated or produced, and the heater which I have designed is intended to operate and disseminate its heat for useful purposes periodically, and while I have discovered that my heater may be utilized for a great number of purposes, I will describe it as it is shown in the drawings which accompany this application, and wherein my heater is applied to a printing press for applying heat to the paper before it leaves the printing press and after the printing operation has been accomplished.

A number of devices have been designed, utilized and patented for the purpose of drying the ink impressed upon paper to prevent what is commonly termed "offset" of the ink, and a number of devices have been employed to remove the static electric charge from the paper, as it is the general belief that with the static electricity removed, "offset" of the ink is prevented to a great extent due to the fact that sheets of paper devoid of static electricity will not adhere one to another as firmly as when static electricity or currents are present.

I believe, as do many others, that the removal of the static electricity alone is not all that is necessary to prevent "offset." I believe that it is necessary to warm the paper and ink to an appreciable degree to accomplish rapid drying of the ink.

To obtain the required heat, the printed paper has, in the past, been caused to pass over an open gas flame. The use of an open gas flame constitutes a fire hazard of considerable magnitude, besides heating and vitiating the air of the press room, and for these reasons, electrical heaters have been employed over or adjacent to the sheet during its passage from the press or printing plates. The use of an electric heater, the heating element of which is designed to constantly radiate heat to the surrounding air is expensive, and therefore, in most instances, the open gas flame has been employed.

I have discovered that the application of

heat is only necessary during that period of time when the printed sheet is being delivered to the fly or from the delivery carriage, and I have further discovered that this space of time constitutes about 10% of the entire period of feeding, printing and delivery operations, and therefore, we may roughly presume that 90% of the energy consumed by an open heater is wasted. With this in mind, I have designed and devised a heater which will be later described, and it is an important object of my invention to so construct my heater, that the radiation of heat therefrom will be possible, only when the printed paper is actually between the sections of the heater, except for a constant slight unavoidable loss of heat; by so doing, it is possible to usefully utilize practically all of the heat generated, and further, it is possible to utilize heating elements of smaller capacity, thus reducing the cost of operation.

The construction and operation of my device will be set forth as the specification progresses.

The following is what I consider a good means of carrying out my invention, and the accompanying drawings should be referred to for a complete understanding of the description which follows:

In the drawings:

Figure 1 shows in diagram the said portion of the printing press with my device attached.

Fig. 2 is a sectional view of the device employing an electrically heated element as the source of heat.

Fig. 3 shows an electrically heated device of modified construction.

Fig. 4 is a sectional view of the device heated by means of gas, employing the principle of surface combustion.

Similar reference numerals indicate like parts in all of the figures where they appear.

In Fig. 1, I have shown one side of a printing press and, therefore, it must be understood that in printing presses, or devices of considerable width, and where a long heating element is employed, certain parts of the device shown in Fig. 1 will be duplicated at the other side of the press or device so as to obtain uniform movement without mechanical strain.

At 1, I indicate a portion of the frame-work of a printing press, and at 2, a sliding table or carriage moving upon the frame 1.

Connected to the frame 1, or to a suitable support, is a bracket 3 provided with ways 4, and movable in these ways is a projection 5 from a plate which I may term a cover 6.

5 An extension from the bracket 3 or from other suitable means for the support thereof, connects with a member which I may later refer to as a heater box 8, and this member 8 is retained in a relatively stationary position.

10 Pivottally connected to the lower end of the extension 5 is a link 9, the other end of which is pivoted to a sector 10, and this sector is supported upon a shaft 11. The spring 12 tends to return the sector 10 to the position in which it is shown in Fig. 1, and a projection or finger 13 secured to the sector 10 extends into the path of movement of the delivery table or carriage by which the finger 13 and sector 10 and parts connected therewith are operated.

The shaft 11 may extend across the press and at the other side of the press and upon the shaft 11, I may place another sector 10, or a lever, connected by means of a link 9 to a second projection from the cover 6, and by means of which I may obtain a simultaneous and equalized movement of the cover 6.

As shown in Fig. 3, the cover 6 may be a metal tray having a projection 5 formed integral therewith, and within the cover 6, I place a suitable material which should not only be refractory, but should also possess low thermal conductivity. I desire that this material 14 within the cover 6 should intermittently store and then radiate appreciable quantities of the heat generated within the member 8.

When electrically heated, the member 8 will consist of a box filled or lined with a material 15 similar to that referred to as contained within the cover 6, and embedded in or supported upon this material is a plurality of coils or strips of metal or other suitable substances having electrical conductivity and comparatively high resistance. It is my desire that the coils 16 should heat up during the passage of electric currents therethrough, and further it is my intention and desire that the heat generated in the coils should not radiate to any appreciable extent from the box or cover when the cover is in position closing the box.

The operation of the device just described is generally as follows:

When the delivery table 2 is moved forward to deliver the sheet the table impinges upon the finger 13 partially rotating the sector 10, and shaft 11, drawing downward the links 9 and projections 5 thereby moving the cover 6 away from the box 8. The printed sheet will pass between the box proper and the cover, and will be subjected to the influence of the heat generated by the coils 16 and that absorbed by and radiated

from the material within the box, and cover. It is obvious that when the cover 6 is in position closing the box, the material 14 within the cover will be influenced by the coils 16 and will be heated thereby, and the heat within the material 14 and 15 together with that given off by the heating element itself is the useful heat that I depend upon for drying the paper which is caused to pass between the cover 6 and the box 8. Upon the return of the delivery table 2, the cover 6 will again close the box and the interior of the cover and box will again absorb the heat that would otherwise be wasted.

I desire to provide a means whereby the current will not be consumed by the heating coils 16 during the time when the press is not in operation, and for that purpose, I provide an automatically operating switch device which consists of a pivoted blade 17 rotated in one direction by a spring 19.

A link 18 connects with this blade, and with a projection 20 which is, in turn, rigidly connected to the pivoted armature 21. A coil 22 energized through the leads 23 and which are connected to the main starting box or starting switch of the printing press, lifts the armature 21 and by means of the members 18 and 20, causes the blade 17 to contact through carbon or other suitable contact elements, with a block 17' which block is connected, preferably, through a fuse to one side of the heater.

One side of the supply line S is connected through another fuse with the pivot or shaft upon which a blade 17 rotates and the other side of the supply line S may be connected directly to the heater.

When the main switch or main starting box is opened, and the current cut off from the motor which operates the press, the coil 22 will be deenergized, the armature 21 will not be attracted by the coil, and the spring 19 will move the blade 17 away from the contact point 17'.

In Fig. 3, I show a heater wherein the coils are supported upon the surface of the material within the box.

In Fig. 4, I show a cover member 25 of a construction generally similar to the cover 14, and this cover 25 also contains a refractory substance of low heat conductivity, as indicated at 26, and through the refractory substance and the cover, I provide a plurality of perforations as indicated at 25', for the escape of the products of combustion when the cover is in place.

The heater shown in Fig. 4 has an exterior casing 27 and an interior lining 28, of refractory material, possessing low heat conductivity. The function of this heat insulating and refractory lining is entirely similar to that already described in connection with a type of heater box employing an electrically heated element. This type of

heater is intended to operate on what is known as the surface combustion principle, wherein the gas and the oxygen necessary for its complete combustion are supplied through the manifold 31 and a series of small gas passages 29 in the refractory lining.

A refractory plate 32 localizes the combustion at its inner surface, and becomes heated to a high degree. This plate 32 also prevents the burning gases from coming in contact with the material passing in proximity to the heater, obviating the fire hazard and the possibility of scorching. The plate 32 should fit loosely within the casing to allow the products of combustion to escape. The general operation of this device is similar to that shown and described in connection with the electrical heater.

I desire it understood that the shape of my heater may be changed at will, that the relative dimensions and sizes of parts may be varied, and other modifications made to allow my device to be employed for purposes other than in conjunction with printing presses. I intend, however, that my heater should at all times, be constructed for intermittent operation, for it is by such operation that I obtain high efficiency and low operating cost.

Having carefully and fully described my invention, what I claim and desire to secure by Letters Patent is:—

1. A heater for intermittent service consisting of a heating element and means for inclosing it, and means for opening said inclosing means and means for passing material to be heated between the parts of and out of intimate contact with said inclosing means.

2. A heater comprising a container, a refractory and heat insulating material within said container, and heating means within said container, and an automatically oper-

ated cover for said container, and heat insulating and refractory material within said cover.

3. A heater comprising a body member, heating elements arranged therein, and means for supporting said body member, a cover having a projection at each end thereof, and guides adapted to support said cover, a link and cam connected to said projections and means for operating said link and cam to periodically remove and replace said cover.

4. A heater in two parts and having a plurality of heating coils in one said part and automatically operated means for moving the other said part and means for automatically connecting and disconnecting the current supply to said coils to control the heating of both said parts.

5. The combination with a printing press of a heater comprising a body member, a stationary support connected to said press, and to said body member, a cover for said heater, guides for said cover and a link and sector connected with said cover and with said press for periodically opening and closing said cover.

6. The combination with a printing press of a heater and a cover therefor, a finger in the line of travel of an operable portion of said press and a cam and lever operated by said finger for automatically and alternately opening and closing said cover.

7. The combination with a printing press of a heater, a movable cover for said heater means upon said press for supporting said heater, and guiding the cover thereof, and means such as a sector and resilient member for alternately opening and closing said cover during the operation of said press.

Signed at New York city, in the county and State of New York this 18th day of Jan., 1918.

EDMUND FRANCIS TWEEDY.