

(No Model.)

3 Sheets—Sheet 1.

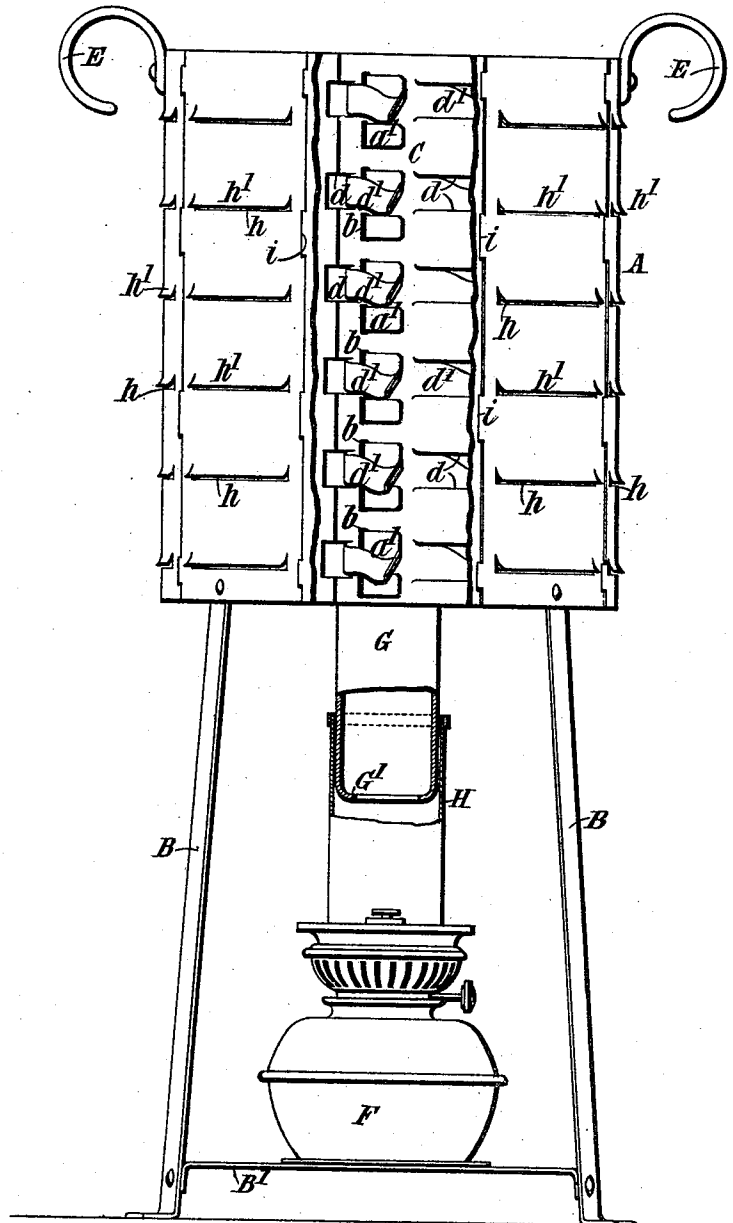
J. REYNOLDS.

APPARATUS FOR HEATING AND VENTILATING, &c.

No. 515,250.

Patented Feb. 20, 1894.

Fig. 1.



Witnesses:
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J. A. Saul.

Inventor:
John Reynolds,
By James L. Norris,
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(No Model.)

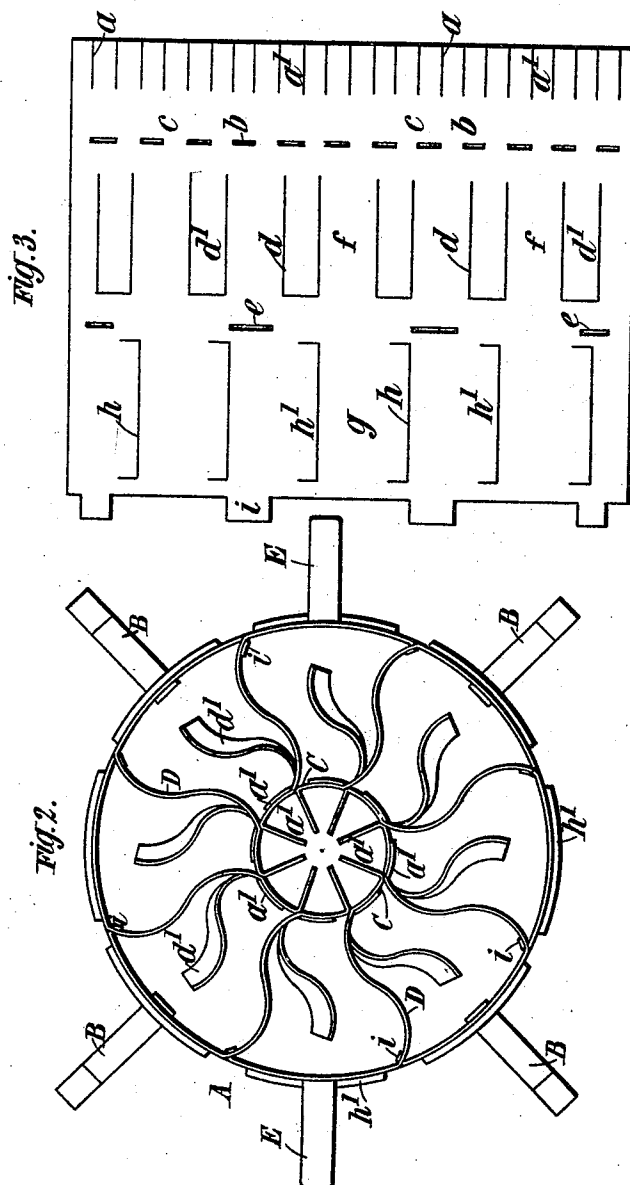
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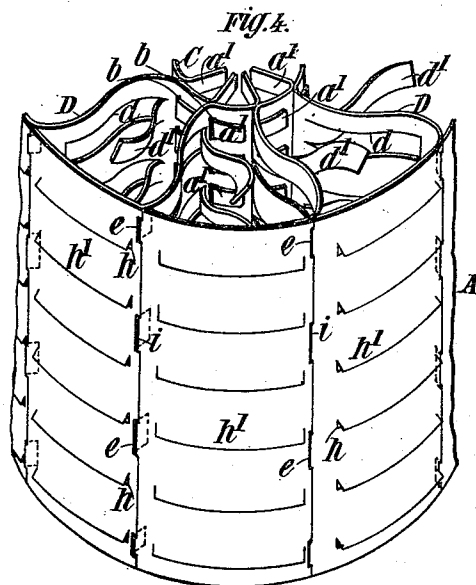
3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

JOHN REYNOLDS, OF LONDON, ENGLAND.

APPARATUS FOR HEATING AND VENTILATING, &c.

SPECIFICATION forming part of Letters Patent No. 515,250, dated February 20, 1894.

Application filed October 12, 1893. Serial No. 487,988. (No model.)

To all whom it may concern:

Be it known that I, JOHN REYNOLDS, a subject of the Queen of Great Britain, and a resident of London, England, have invented a new and useful Improved Apparatus for Heating and Ventilating Rooms or Inclosed Spaces, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to apparatus for heating and ventilating rooms or inclosed spaces.

According to my said invention I utilize the heat of an ordinary lamp preferably a paraffine oil lamp, or of a stove or gas flame for heating and ventilating rooms or inclosed spaces in such a manner that the heat is rapidly and regularly transmitted to, and diffused throughout, the air of the room or inclosed space in which the apparatus is placed. I may utilize my said apparatus for inducing external air to enter through suitably arranged channels a room in which the apparatus is placed, and thus provide for ventilating the room without causing drafts.

An important feature of my invention is that the oil reservoir and burner are external to the heating surfaces and have inserted between them and the said surfaces a very bad or imperfect conductor of heat. By this construction the communication of heat to the oil reservoir and burner either by conduction or by radiation is prevented, and an element of danger such as is present in heaters having an internal oil reservoir is avoided.

Another important feature of my invention relates to the heating surface which I construct in a very simple and inexpensive manner.

My said invention also comprises other improvements in detail as hereinafter described.

In the accompanying drawings I have shown how my invention may be conveniently and advantageously carried into practice.

Figure 1 is a side elevation of the apparatus, a part of the external case being removed to show the interior. Fig. 2 is a plan of the same. Fig. 3 shows one of the flat plates or blanks from which I build up the apparatus. Fig. 4 is a perspective view of a portion of the apparatus showing more clearly the construction.

Like reference-letters denote corresponding parts throughout the drawings.

A is a cylinder made of thin sheet-metal say iron or copper for example which are good conductors of heat. It is open at the top and bottom, and is mounted with its axis vertical on legs or standards B.

C is a smaller inner cylinder concentric with the outer cylinder A. Said cylinder C is also open at both ends and is of the same length and made of the same metal as the outer cylinder A.

If the apparatus is intended to be used with an ordinary paraffine lamp the inner cylinder C will be made about the same diameter as the lamp chimney.

The cylinders A and C are secured together by metal radial webs D which may be straight or curved. In the construction illustrated which is the one I prefer to adopt the two cylinders A and C are built up from metal sheets or blanks interlocked with each other, no bolts, rivets, solder or the like being used to hold the parts together. Each one of the said sheets or blanks is constructed to form part of the inner cylinder, one of the radial webs, and part of the outer cylinder. In the apparatus illustrated the two cylinders A, C and the radial webs are made from eight sheets of metal suitably perforated to form the blanks, and then bent and interlocked the one with the other to build up the apparatus as hereinafter described. One such blank is shown in Fig. 3 as it appears before being bent. At one side of this blank I form a number of parallel horizontal slits *a* extending from the edge for a suitable distance into the sheet. Every alternate tongue of metal *a'* thus formed by the slits is intended to be used for locking with the neighboring sheet as hereinafter described, and the intermediate tongues are bent to form radial strips clearly shown in Figs. 2 and 4 projecting into the inner cylinder. A little distance from the inner ends of the slits *a* are formed a row of vertical slots *b* each of a size adapted to receive one of the tongues *a'* of an adjoining sheet. The plain space *c* between the ends of the horizontal slits *a* and the vertical slots *b* forms when the sheet is in place a portion of the inner cylinder C.

d, d are U-shaped slits made in the blank. The tongues d', d' formed by said slits are intended to be pushed out and preferably twisted as seen in Figs. 2 and 4. Next the slits d, d are formed other vertical slots e, e . The portion f of the sheet or blank between the series of vertical slots b, b and e, e forms the radial webs between the inner and outer cylinders, and the part g of the sheet from the slots e, e to the edge forms a portion of the outer cylinder A. In the latter part of the sheet, I cut U-shaped slits h , and I turn outward the tongues h' thus formed for a purpose hereinafter explained.

i, i are tongues projecting from the edge of the blank, level with and the same in number as the vertical slots e, e . Said tongues are intended to be passed through the corresponding slots e, e of an adjacent sheet or blank and locked therewith.

Having thus fully described the construction of one of the sheets or blanks it will be clear how several such can be put together to build up the apparatus. A number of such blanks say eight are taken and each one is bent to the form indicated for example in Figs. 2 and 4. They are then locked together to form a rigid structure by passing the tongues i, i at the edge of each blank through the corresponding slots e, e of the adjacent sheet or blank and bending said tongues when so inserted in a manner that will be well understood from Fig. 4, and also by passing the alternate tongues a', a' at the other edge of each sheet through the corresponding slots b, b of the adjacent sheet and bending the same until they are closely applied to the part c of said adjacent sheet. The intermediate tongues a', a' are then bent in a radial direction, and the tongues d', d' are pushed out to occupy an intermediate position between the radial webs and are preferably twisted as indicated in Figs. 2 and 4, to present to a slight extent their broad sides to the ascending current of air and so cause eddies, thus bringing the current of air into contact with every part of the heated surface. The radial tongues a' are arranged to present their sharp edges toward the ascending current of heated air without baffling or obstructing the same more than is absolutely unavoidable, and so allow the utmost freedom of upward movement of the heated air and products of combustion. The apparatus thus made is mounted on the legs or standards B and is then furnished with handles E by which it can be conveniently lifted and transported from place to place. The handles E may be covered with a non-conducting material so that they can be touched without risk of burning the fingers.

F indicates a paraffine oil lamp which is supported on the horizontal cross stays B' of the legs B and therefore is carried by and travels with the heater when the latter is moved about.

G is a thin metal tube which is secured in the lower end of the inner cylinder C and pro-

jects downward to a short distance above the top of the lamp flame. The lower edge G' of this tube is curved inward as shown, thereby causing a sharp inward draft which operates to promote perfect combustion and avoids smoke and that unpleasant smell which is so objectionable in many oil stoves.

H is a thin transparent tube or chimney, made preferably of mica, that surrounds the flame of the lamp and is made to slide up and down on the tube G thus allowing the lamp or burner to be removed very easily for trimming and cleaning.

The transparent tube H is particularly useful in bedrooms for example where it is desirable that the apparatus shall give out some light as well as heat. If desired an external opaque tube may be mounted on the transparent tube H in such a manner that by raising and lowering the same the light may be more or less obscured. The flame may be surrounded moreover with cathedral glass or other ornamental cover to increase the attractiveness of its appearance. The mica tube H being a bad conductor transmits but very little heat to the lamp. The latter therefore remains quite cool and no danger of overheating the oil is experienced. By placing the lamp outside the heater and separating it therefrom by a bad conductor I not only avoid an element of danger present in heaters where the heat is liable to be conducted to the oil lamp, but I also avoid the vaporization of the oil which usually clings to the various parts of the lamp, which vaporization would contribute to produce a disagreeable odor.

In lieu of a tube H made of mica I may employ one made of glass or talc or other non-conductor, or in cases where light is not required, I may use a tube made of asbestos.

When the lamp is lighted, the inwardly projecting radial strips or tongues a' which are situated in the hottest zone just above the lamp flame become very hot and conduct the heat rapidly to the wall of the inner tube whence the heat passes along the radial vanes to the outer cylinder. The whole apparatus being thus heated communicates its heat freely to the air between the cylinders and webs which air rapidly ascends into the room, and its place is taken by other colder air from the room which becomes heated and rises in its turn; the operation is continuous and a large upward current of heated air is produced which air rapidly diffuses itself through and warms the entire room. While a lateral rush of outside air is prevented by the apparatus from disturbing the upward current of heated air, the outwardly projecting lips h' on the outer cylinder A serve to gently divert the air which rises up the outside of the cylinder and to pass a portion of the same through the slots h into the cylinder, where it mixes with the hotter air inside.

The inner tube or cylinder may be connected with a flue tube which serves to convey the

products of combustion out of the room. In case such outlet tube is used I prefer to furnish it with a valve to admit of regulating the current of air as required.

5 In some cases I close the lower part of the free air space between the two cylinders and provide a pipe or tube for conducting air from outside the room to said air space whence it rises into the room. By this means the room
10 is kept supplied with warmed fresh air and is thus effectually ventilated. The fouled air in the room makes its exit by way of the chimney and through the usual crevices around the doors and windows.

15 I sometimes dispense with the outer cylinder while retaining the inner cylinder and the radial vanes.

My improved apparatus may be constructed in an ornamental manner, as for instance
20 the radial vanes may be made in the form of petals and leaves of flowers and plants, the stems being fixed or mounted on the outer side of the outer cylinder or on the outer side of the inner cylinder if the outer cylinder is
25 dispensed with, or said stems may be fixed or mounted in any other convenient or suitable position.

What I claim is—

1. The combination of an air-heater comprising an inner and an outer cylinder made
30 of thin sheet metal through which the air to be heated passes, an oil lamp external to said heater, and a metallic tube secured in the lower end of the said inner cylinder, the lower
35 of said tube being bent or curved inward at its edge, substantially as described for the purpose specified.

2. The combination of an air-heater comprising an inner and an outer cylinder made
40 of thin sheet metal through which the air to be heated passes, an oil lamp external to said heater, a metal tube secured in the lower end of the said inner cylinder, the lower of said tube being bent or curved inward at its edge,
45 and another tube made of a substance which

is a bad conductor of heat, and which slides on the aforesaid metal tube and serves to conduct the products of combustion from the lamp to the heater, substantially as described, for the purpose specified.

3. An air-heater comprising an inner and an outer cylinder and connecting vanes or webs built up of thin sheet metal stamped and bent and furnished with tongues and slits whereby each sheet is attached to its neighbors, each said sheet being constructed to form a part of the outer and of the inner cylinder and one of the radial vanes, substantially as described.

4. An air-heater comprising an inner and an outer cylinder and connecting vanes or webs built up of thin sheet metal stamped and bent and furnished with tongues and slits, whereby each sheet is attached to its neighbors, each said sheet being constructed to form a part of the outer and of the inner cylinder and one of the radial vanes, and U-shaped slits in the outer cylinder forming tongues which are pushed outward to divert the air rising up outside the heater into the heater, substantially as described.

5. An air-heater comprising an inner and an outer cylinder and connecting vanes or webs built up of thin sheet metal stamped and bent and furnished with tongues and slits whereby each sheet is attached to its neighbors, each said sheet being constructed to form a part of the outer and of the inner cylinder and one of the radial vanes, and having tongues that project radially into the inner cylinder and arranged to present their sharp edges toward the ascending heated column of air, substantially as described, for the purpose specified.

In witness whereof I have hereunto set my hand this 28th day of September, 1893.

JOHN REYNOLDS.

Witnesses:

GEORGE HOAR,
THOMAS LAKE.