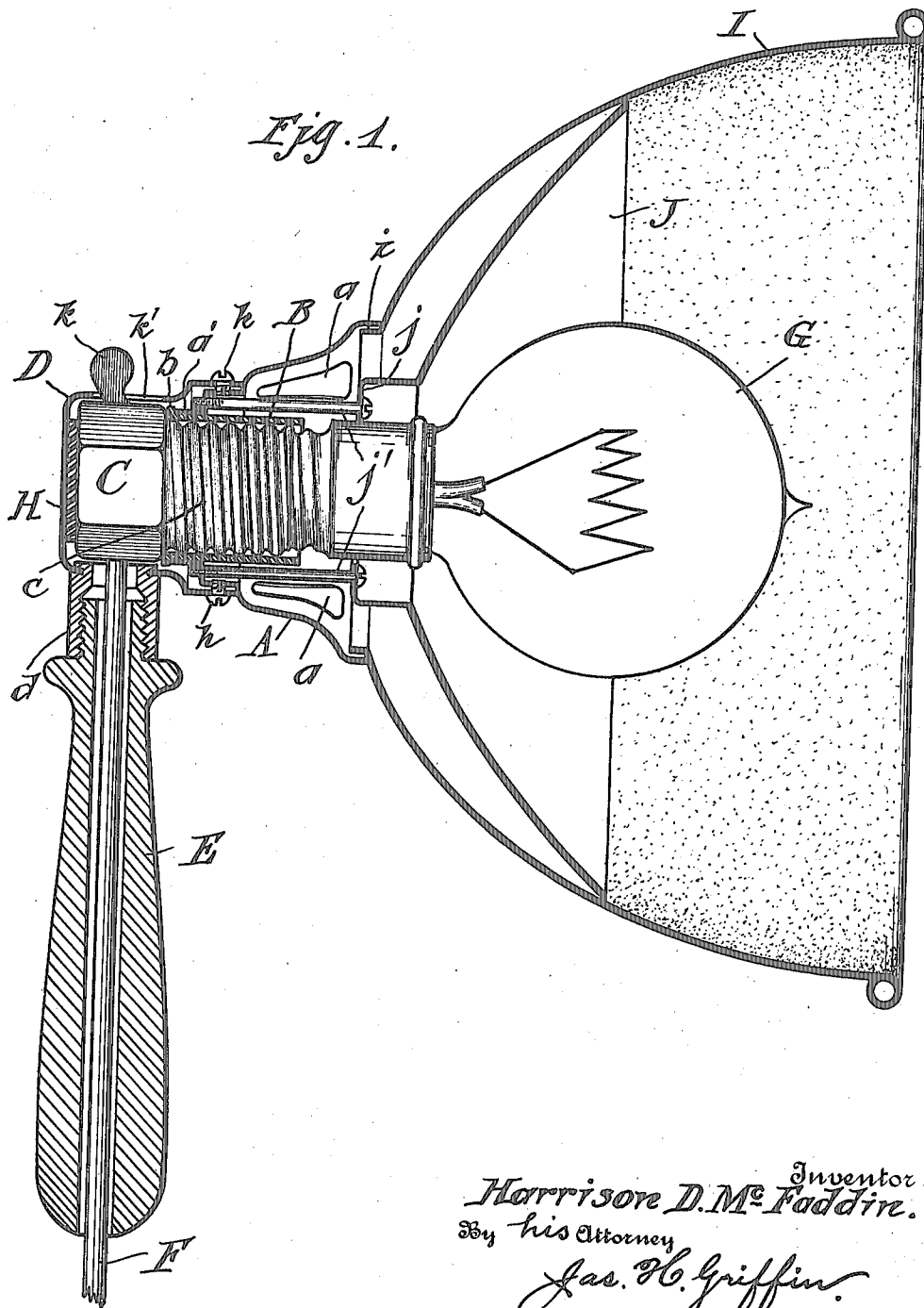


H. D. McFADDIN.
HAND LAMP FOR THERAPEUTIC PURPOSES.
APPLICATION FILED AUG. 2, 1917.

1,267,882.

Patented May 28, 1918.
2 SHEETS—SHEET 1.



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Fig. 2.

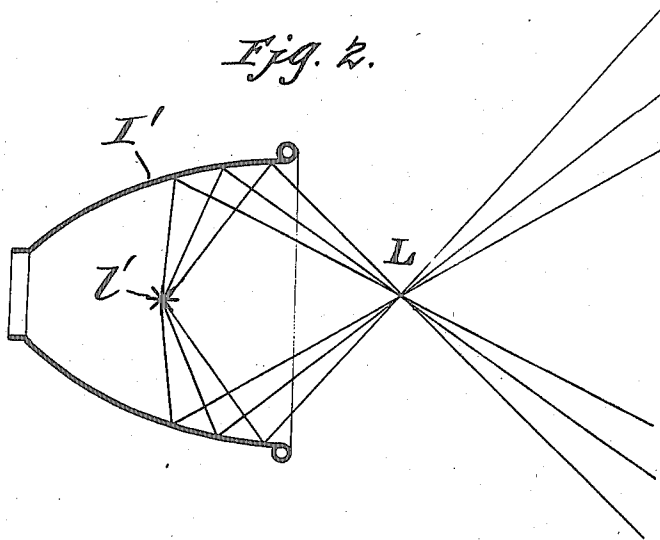
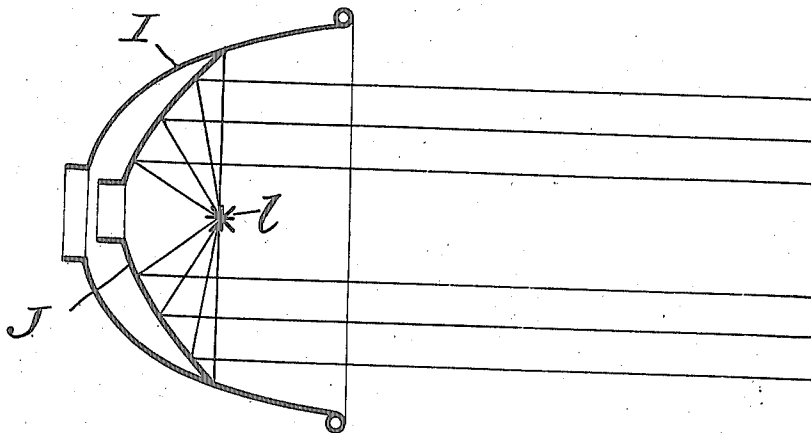


Fig. 3.



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UNITED STATES PATENT OFFICE.

HARRISON D. McFADDIN, OF EAST ORANGE, NEW JERSEY.

HAND-LAMP FOR THERAPEUTIC PURPOSES.

1,267,882.

Specification of Letters Patent. Patented May 28, 1918.

Application filed August 2, 1917. Serial No. 184,051.

To all whom it may concern:

Be it known that I, HARRISON D. McFADDIN, a citizen of the United States, residing in East Orange, county of Essex, and State of New Jersey, have invented a certain new and useful Hand-Lamp for Therapeutic Purposes, of which the following is a specification.

Medical science has established that the health, strength and elasticity of body tissue, nerve and bone are dependent, mainly, upon the proper circulation of the blood for the carrying out of its functions, among others, of restoring waste tissue, and assisting in the elimination of the waste products constantly forming in the system. If the flow of blood is normal, the body, in the absence of organic ailments, is healthy and strong, while, if the circulation is sluggish, a sickly or weak condition results, manifesting itself, frequently, in local congestions and inflammations of well known specific types. The present invention is aimed at preventing, as well as relieving, the pathological conditions specified, as well as numerous others which will readily suggest themselves to the medical profession.

The profession has recognized the utility of, and has employed to some extent, strong lights for the purpose of infusing heat to accelerate blood circulation, and in applying nature's method of destroying germs by exposing them to combined light and heat, so that therapists now recognize that through the employment of light rays, properly applied, congestion is relaxed, pain ameliorated and relieved, and the vital parts stimulated.

While the employment of light rays for the foregoing purposes has long been known, and various methods of applying such rays employed, all of the constructions heretofore used have been open to serious objections, many of them causing burning of the patient if the device were positioned too close to the body, while, if positioned at a greater distance therefrom, they would not heat the parts sufficiently, and, as a result, the desired therapeutic effects would not be produced. Accordingly, the manipulation of the prior art devices has required great caution, and the results therefrom have not given the desired satisfaction even in the hands of physicians. Such devices have

generally been built on a more or less hit or miss principle, without any particular attention being paid to the proper projection of the light rays, the quality of said rays, or the physical and medical phenomena resulting from the application of rays of different character. Accordingly, they have operated on a like principle and have not achieved the desired results.

With the foregoing in mind, the object of the present invention is to provide an easily manipulated hand lamp for therapeutic purposes, based on scientific principles, so as to produce the proper quality of light, the waves and rays of which are so distributed and projected as to produce maximum benefit without fear of burning of the body tissues.

Experimentation has shown that the infra-red rays are the heat rays of the spectrum of incandescent carbon which have the greatest power of penetration, and with this in mind, the first object of the present invention is to provide a lamp which will deliver to the patient these infra-red rays in such manner that their penetrating qualities will not be interfered with through the distortion of the rays. For this reason, the rays are parallel, and all conditions which would interfere with the paralleling of said rays are obviated. When delivered in this manner, the rays are conducive to maximum sub-cutaneous treatment, have the greatest power of penetration, and give the best results, whereas when the rays are crossed or brought to a focus, as heretofore, the infra-red rays beyond the focus are usually distorted or thrown into shadow by the remaining rays of the spectrum so that their penetrating power and heat value are lost.

In the accompanying drawings I have illustrated one practical embodiment of the present invention, but the construction therein shown is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a central section of a therapeutic lamp constructed in accordance with the present invention.

Figs. 2 and 3 are diagrammatic central sections of a lamp reflector, Fig. 2 illustrating the type heretofore commonly employed, and Fig. 3 illustrating the type of the present invention. In order that the im-

portance of the present invention may be clearly understood, theoretical light rays projections are shown in these figures.

Referring to the drawing, A indicates the base shell of the lamp, which is preferably made bell shape, as shown, and is provided around its side with a plurality of ventilating openings *a*. The rear portion of the base shell A is formed into a tubular, cylindrical portion *a'*, through which is adapted to be thrust an insulating bushing B provided at its rear end with a flange *b*. The bushing B fits tubular portion *a'* tightly and forms a rigid support or seat for the threaded portion *c* of a lamp socket C. The major part of socket C is inclosed in a thimble-like casing D on which is rigidly mounted an interiorly threaded stem *d*, in which is adapted to be screwed the stem of a handle E. Handle E is provided with a central passage through which a cable F, connected with a suitable source of electrical energy, leads to the lamp socket C and is adapted to energize a lamp G screwed into the threaded portion *c* of the socket. The thimble-like casing D is secured to the base shell A by means of a plurality of screws *h* which thread into the base shell, as clearly shown, and a piece of insulation H, which is positioned between the back of the socket C and the closed end of the thimble, causes the shoulder of the socket at the base of the threaded portion *c* thereof to be maintained tightly pressed against the rear end of the insulating bushing B and, at the same time, insulate the socket C from the thimble. In this manner, thimble D is rigidly secured to the base shell A, the handle E is made rigid therewith, and the socket is held tightly in place.

Coöperating with the forward end of the base shell A is a reflector casing I provided at its rear end with a flange *i* fitting into the open forward end of the shell A. Within the reflector casing I is positioned the reflector proper J. Reflector J is of less diameter than the open end of its casing I and is adapted to be seated within said casing with its outer edge in engagement with the inner wall of the casing in substantially line contact at a point intermediate the forward and rear edges of the casing.

The rear edge of the reflector is provided with an inturned flange *j* having holes through which may be passed binding screws *j'*, the opposite ends of which thread into the base shell A, as clearly shown. It is manifest that, when the screws *j'* are tightened, reflector J is pulled tightly within its casing I and said casing is, in turn, jammed tightly against the forward edge of shell A. In this manner, the reflector and its casing are rigidly maintained in proper positions relative to shell A and in such manner that expansion or contraction of the

materials, due to quick changes in temperature, do not affect the integrity of the structure, which is, practically at all times, under more or less tension.

Reflector J is, preferably, highly polished, while that portion of casing I intermediate the forward edge of the reflector and the forward end of said casing is matted. Moreover, the parts are so relatively situated and the reflector is so shaped that the filament of the lamp G will be at the focus of the reflector, which is dished in such manner that the reflected rays from the filament are projected forwardly in parallel relation. Lamp G is preferably of the type embodying a carbon filament, and, by thus paralleling the rays, the penetrating peculiarities of the infra-red rays of incandescent carbon are preserved, the same being projected beyond the open front of casing I in a manner ideal for therapeutic treatment.

Moreover, by paralleling the rays, they will never come to a focus beyond the open end of the casing, as has heretofore so frequently been the case with therapeutic lamps, and which has occasioned burning of the patient when the body was at such distance from the lamp as to substantially coincide with the focus of the reflector, while, if these prior art lamps were either closer to, or farther away from, the patient than the focal length, a great loss of heat would result and the penetrating influence of the rays would be lost because of the intersections thereof. By matting the inner surface of the casing forward of the reflector, all those rays which cannot be satisfactorily projected in parallel relation are absorbed or diffused and do not conflict with the proper projection of the remaining rays.

A marked advantage of the present structure is that, by projecting the rays of light and heat in parallel relation forwardly through the front of the casing, the heat rays are ejected from the structure and are not concentrated upon the bulb or the lamp parts. This increases the life of the filament since a rapid burning out thereof is obviated, this having proved in prior art lamps to be universally disadvantageous. Furthermore, the area of heat generated and projected is much greater in the lamp of this invention than in the focusing type of lamp heretofore employed.

The precluding of undue heating of the lamp parts is further brought about by the peculiarities in construction of the lamp, it being noted that rearwardly of reflector J, and within the rear portion of casing I, is a circulatory air space which communicates with the outer atmosphere through the apertures or air vents *a* in the base shell A. By allowing air to freely circulate about the back of reflector J, undue heating of the reflector is precluded, and this portion of

the reflector, as well as the base shell and associated parts, are maintained relatively cool at all times, so that the operator is not apt to be burned should his hand come in contact with the rear portion of the lamp.

In order that the flow of current at the lamp may be readily controlled, a suitable switch lever *k* is associated with socket C and operates through an aperture *k'* formed in thimble D, as clearly shown. The lamp of this invention is notable for its ease in assembling and remarkable rigidity after assemblage. There are no loose joint connections which will wobble or rattle, and the whole may be readily manipulated through the medium of handle E.

In order that the method of projection of light rays of this invention may be clearly differentiated from the prior art, I have diagrammatically illustrated in Figs. 2 and 3 the manner in which prior art lamps deliver the rays to the patient, and that by which the present invention accomplishes the superior result. In Fig. 2 I' designates the reflector which is here shown as of the shape universally employed. Within the reflector is positioned a lamp the center of illumination of which is designated *l*, while *l'* denotes, in Fig. 3, the center of illumination in the lamp of the invention. In practically all prior lamps the reflector I' has been of the focusing type, the light emanating from the source *l'*, being reflected from the interior I' to substantially a focus L and the focal length of the reflector has almost universally been made extremely short, as shown.

It will be manifest that, with such a construction, if the lamp is positioned the focal length of the reflector from the patient so that the body will coincide with the focus point L the heat at this point will be tremendous, and, in the majority of prior art lamps, it is sufficiently great to scorch paper or cause the same to break into a flame after a comparatively short period. In other words, in the type of lamp shown in Fig. 2 substantially every ray of heat is concentrated at L, and if the patient is subjected to the heat at this point a serious burn, and one which is extremely difficult to heal, may result. Between the points L and *l'*, the heat is less than directly at the point L, but is nevertheless extremely high so that in order to safely use the lamp on a patient, it is necessary to have it farther away than the focal length *l'*—L. Those familiar with the projection of light, however, will immediately see that beyond the focal length the heat and light decrease very rapidly so that, at two or three times the focal length, it is practically negligible. It is thus only within a very limited zone immediately beyond the point L that any actual benefits may be derived, and, accordingly, requires

that the lamp be manipulated in the hands of a skilled practitioner in order that burning may be avoided and still sufficient heat be applied to accomplish the desired result.

Another and important disadvantage of the lamp of Fig. 2 is that beyond the point L the infra-red rays of a carbon filament are in shadow from the remaining rays and lose their power of penetration so that the real benefit of these rays cannot be had beyond the point L, while the application of the rays between the points *l'* and L is made impossible by the excessive heat.

For these reasons, it is absolutely impossible to obtain an efficient treatment by a lamp of the character shown in Fig. 2, since these lamps are constructed on a hit-and-miss principle, and operate on the same principle. It is not argued that a lamp of this character will not prove beneficial to some extent but its efficiency cannot compare with a lamp of the type shown in Fig. 3, wherein the rays are projected from a source of illumination *l* in parallel lines so that the penetrating qualities of the infra-red rays are preserved. Moreover, in a lamp of this invention the heat and light very gradually decrease as the distance from the reflector increases. Thus, while the heat of the lamp may not be excessive at six or eight inches from the reflector, said heat will not appreciably change for double that distance and, moreover, may be appreciably felt at a distance of three feet. In fact experiment has shown that heat rays of the lamp of Fig. 3 have a warm penetrating effect at a distance of several feet, while the lamp of Fig. 2 would be entirely inoperative at a distance greater than six inches while employing the same amount of electricity. It will, of course, be understood that lamps of this character are not generally employed at great distances from the patient, but the foregoing example well illustrates the manner in which the penetrating qualities of the rays of the lamps of this invention are obtained, while they are entirely lacking in the lamp of Fig. 2.

The matting of the interior of the housing I further assists in the paralleling of the rays through the ability of this matted surface to disburse or absorb such rays which cannot be conveniently paralleled. In practice, the matting of the interior of said housing may be accomplished either through the coating of said surface with a non-reflecting medium, or in any other suitable way. Moreover, by causing practically all of the heat units to be projected out of the housing the heating of the housing is minimized, and this is further facilitated by the substantially knife-edged contacts between the parts. In this respect, it will be noted that the outer edge of the reflector J has a knife-edged engagement with the in-

terior of the housing I, while the shell A makes a substantially line-contact with housing I. Contacts of this character preclude the rapid transmission of heat from one part to another, and the dead air or circulatory space back of the reflector J within the housing forms a most efficient insulating medium against the heating of the parts.

In view of the scientific principles which are carried out in the construction as hereinbefore specifically described, the lamp of this invention is so constituted that it may be operated by the patient, himself, without fear of deleterious results through burning, or otherwise, and is, therefore, in marked contrast to the prior art devices which could only be safely employed by skilled physicians or persons familiar with body tissue as well as dangers to be avoided. The present invention renders therapeutic treatment financially within the reach of all persons requiring the same, whereas heretofore it has generally been necessary in order to safely administer the same, to attend laboratories, or clinics specially equipped for this purpose.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. A hand lamp for therapeutic purposes embodying a lamp, a polished reflector therefor, which reflector is so shaped and positioned relative to the filament of the lamp as to project the rays thereof in parallel relation, and a housing for said reflector, which housing projects forwardly of the forward edge of the reflector and is provided with a matted interior, whereby those rays which cannot be satisfactorily projected in parallel relation by the reflector are absorbed or diffused and the penetrating qualities of the infra-red rays are preserved.

2. A hand lamp for therapeutic purposes embodying a base shell, a lamp socket supported thereby, a reflector housing seated at the forward end of the base shell, and a reflector seated within the housing and threaded connections extending directly between the reflector and the base shell for drawing the reflector toward the base shell to seat the reflector within the housing and simultaneously draw the housing into rigid engagement with the shell.

3. A hand lamp for therapeutic purposes embodying a base shell, a lamp carrying socket supported thereby, a flaring reflector housing seated in the forward end of the base shell, a reflector seated within the housing, and means directly connecting the reflector to the base shell for drawing the reflector toward the base shell to wedge said reflector within the housing and hold the housing firmly to its seat within the base shell, whereby the reflector is placed under tension and the housing under compression, and the parts remain rigidly secured to-

gether irrespective of changes in temperature due to the heat of the lamp.

4. A hand lamp for therapeutic purposes embodying a base shell, a lamp socket supported thereby, a lamp associated with the socket, a polished reflector positioned rearwardly of the lamp and shaped to project the rays of light impinging the same in parallel relation, a reflector housing engaging with the base shell and projecting forwardly beyond the reflector, that portion of the housing which projects beyond the forward edge of the reflector being matted, whereby the rays which cannot be satisfactorily projected in parallel relation by the reflector are absorbed or diffused and the penetrating qualities of the infra-red rays are preserved, in combination with means for drawing the reflector toward the base shell for simultaneously seating the reflector within the housing and drawing the housing into rigid engagement with the shell.

5. A hand lamp for therapeutic purposes embodying a base shell, a lamp socket supported thereby, a flaring reflector housing seated in the forward end of the base shell and provided with a matted interior, a polished reflector seated within the housing, and so shaped and positioned relative to a lamp supported by the socket as to project the rays of light impinging the same in parallel rays, and means for drawing the reflector into the base shell for the purpose of wedging said reflector within the housing and forcing said housing firmly to its seat in the base shell, the reflector serving to project the rays of the lamp in parallel relation beyond the forward end of the housing and the matted portion of said housing operating to diffuse or absorb those rays which cannot be satisfactorily so absorbed.

6. A hand lamp for therapeutic purposes embodying a base shell, a lamp socket mounted thereon and supported thereby, a lamp associated with said socket, a flaring reflector housing seated in the forward end of the shell, a reflector seated within the housing, direct connections between the reflector and the base shell for drawing the reflector tightly within the housing and simultaneously forcing said housing tightly to its seat within the base shell, whereby the housing is clamped between the reflector and the base shell.

7. A hand lamp for therapeutic purposes embodying a base shell, a lamp socket mounted thereon and supported thereby, a lamp associated with said socket, a flaring reflector housing seated in the forward end of the shell, a reflector seated within the housing, means cooperating with the base shell for drawing the reflector tightly within the housing and simultaneously forcing said housing tightly to its seat within the base shell, said base shell being provided

with openings to allow of the circulation of air through the interior thereof and rearwardly of the reflector for the purpose of precluding undue heating of the parts.

5 8. A hand lamp for therapeutic purposes embodying a base shell, a lamp socket mounted thereon and partially projecting
10 thereinto, a casing for housing the remainder of said socket, and a handle rigid with the casing, in combination with a re-
15 flector housing having a portion fitted into the forward end of the shell, a reflector positioned within the housing, and means for drawing the reflector toward the shell,
15 whereby the periphery of the reflector is jammed within the housing and said housing forced tightly against the forward edge of the shell.

9. A hand lamp for therapeutic purposes
20 embodying a base shell, a lamp socket mounted thereon and partially projecting thereinto, and a casing for housing the remainder of the socket, in combination with
25 a flaring reflector housing seated at the forward end of the base shell, a reflector positioned within the housing, means for drawing the remainder within the shell,
30 whereby the periphery of the reflector is jammed within the housing and the housing forced tightly to its seat within the shell, and a handle for manipulating the lamp.

10. A hand lamp for therapeutic purposes embodying a base shell having ventilating
35 apertures, a lamp socket cooperating therewith, a reflector housing seated on the base shell, a reflector positioned within said housing and spaced therefrom so as to provide
40 an air insulating space between the housing and reflector, and means for drawing the reflector toward the base shell for wedging the reflector within the housing and simul-
45 taneously forcing the housing to its seat on the base shell, the reflecting surface of said reflector being of such conformation as to
reflect light rays in parallelism, in combination with an incandescent lamp having its filament located substantially in the focus of the reflecting surface.

11. A hand lamp for therapeutic purposes
50 embodying a lamp, a polished reflector therefor, which reflector is so shaped and positioned relative to the filament of the

lamp as to project the rays thereof in parallel relation, and a housing for said reflector, which housing projects forwardly from
55 the forward edge of the reflector and is provided with an interior adapted to absorb or diffuse light rays and impinging the same, whereby substantially all of the rays leaving the lamp housing are projected in
60 parallel relation and the penetrating qualities of the infra-red rays are preserved.

12. A hand lamp for therapeutic purposes embodying a lamp, means positioned rearwardly of the lamp for reflecting such rays
65 as impinge the same in parallel relation to one another, and means circumferentially of the reflecting means for diffusing or absorbing those rays which cannot satisfactorily be projected in parallel relation, whereby
70 the penetrating qualities of the infra-red rays are preserved.

13. A hand lamp for therapeutic purposes embodying a lamp, a casing therefor, that
75 portion of the casing rearwardly of the lamp being polished and so shaped and positioned relative to the filament of the lamp as to project the rays thereof in parallel relation, and the portion of casing forwardly
80 of the reflecting portion being matted, whereby those rays which cannot be satisfactorily projected in parallel relation by the reflecting portion are absorbed or dif-
fused and the penetrating qualities of the infra-red rays are preserved.

14. A hand lamp for therapeutic purposes
85 embodying a base shell, a lamp supported thereby, a flaring reflector housing seated at the forward edge of the base shell, a reflector seated within the housing, the re-
90 flector having a greater flare than the housing, and means for drawing the reflector toward the base shell, whereby said reflector is wedged within the housing and the housing firmly held to its seat at the
95 forward end of the base shell, the difference in the flare of the housing and reflector providing a dead air space between the back of the reflector and the housing for the purpose of facilitating the escape from the housing
100 of the heat of the reflector.

In testimony whereof I have signed my name to this specification.

HARRISON D. McFADDIN.