No. 755,447. PATENTED MAR. 22, 1904.

G. F. CAHILL.

SYSTEM FOR ILLUMINATING FIELDS SO THAT GAMES MAY BE PLAYED AT NIGHT.

NO MODEL. APPLICATION FILED DEC. 26, 1903. 5 SHEETS—SHEET 1.

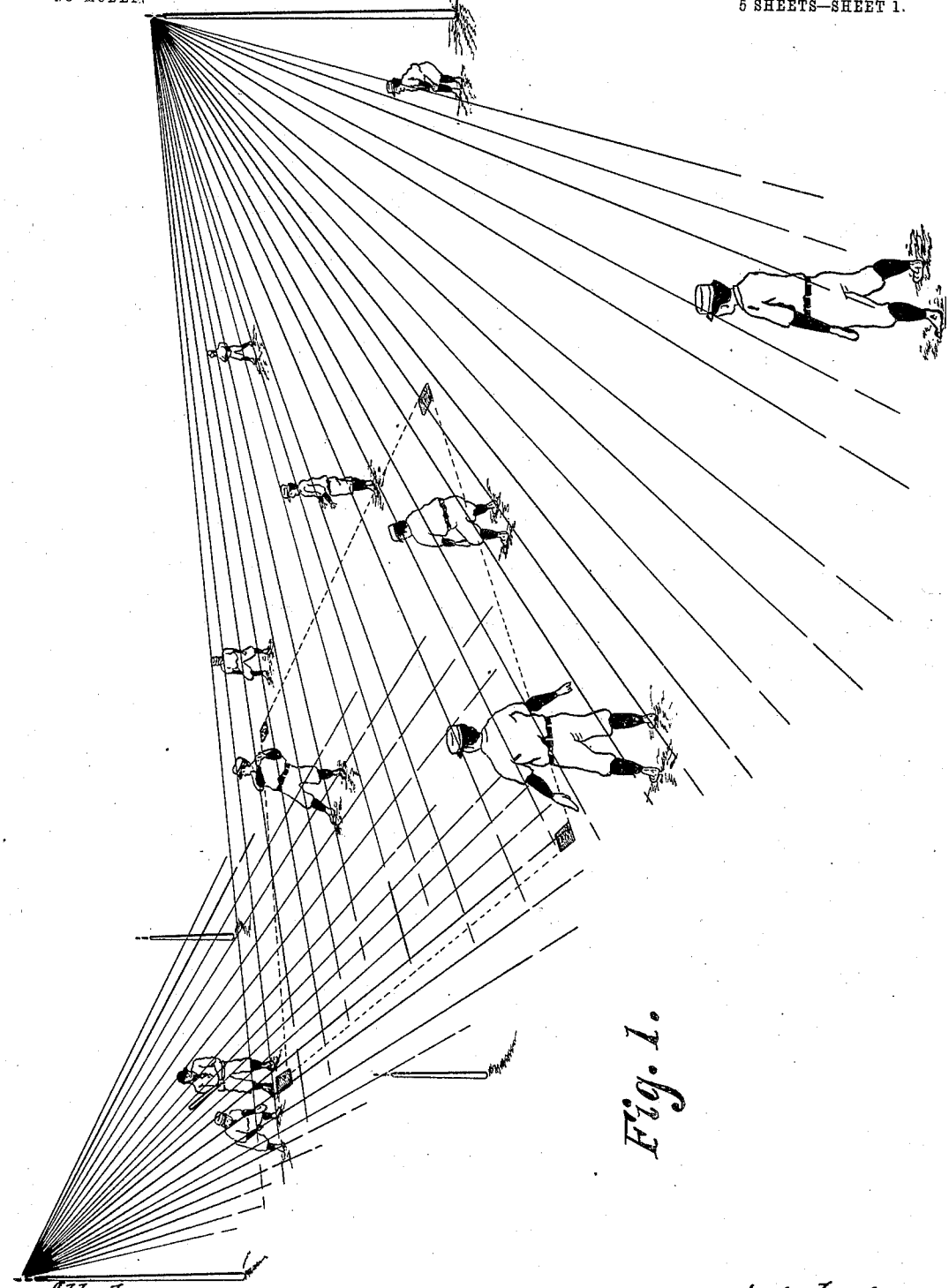


Fig. 1.

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Fig. 2.

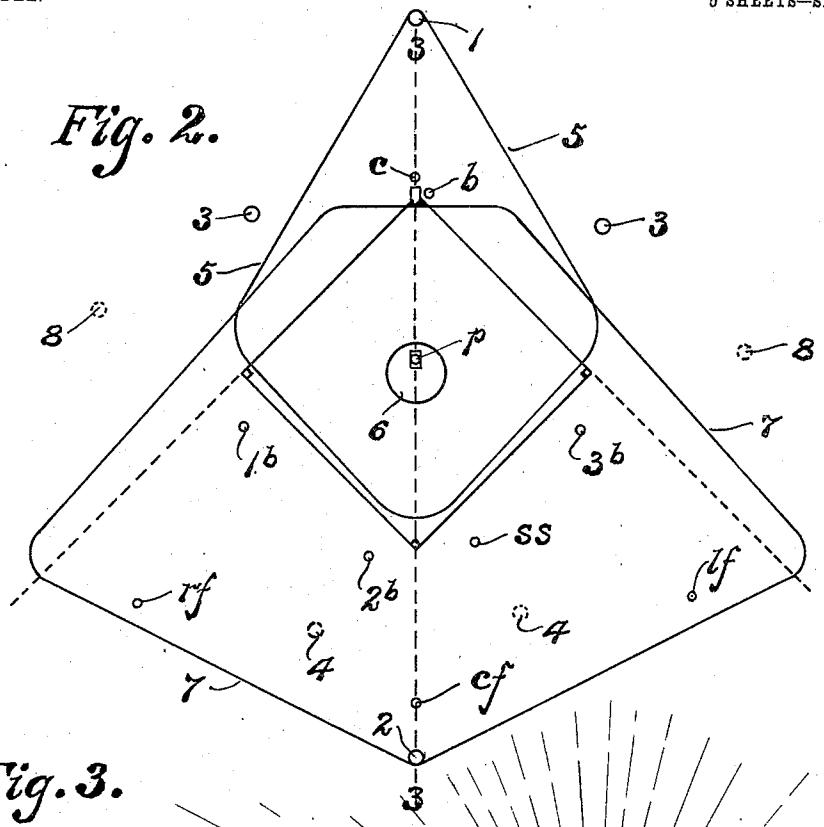
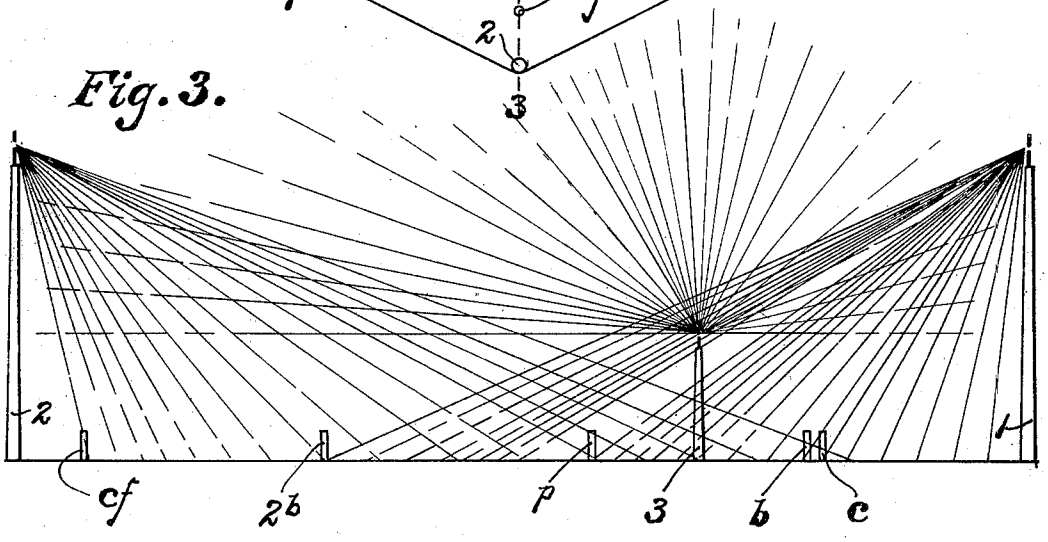


Fig. 3.



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APPLICATION FILED DEC. 26, 1903.

NO MODEL. 5 SHEETS—SHEET 3.

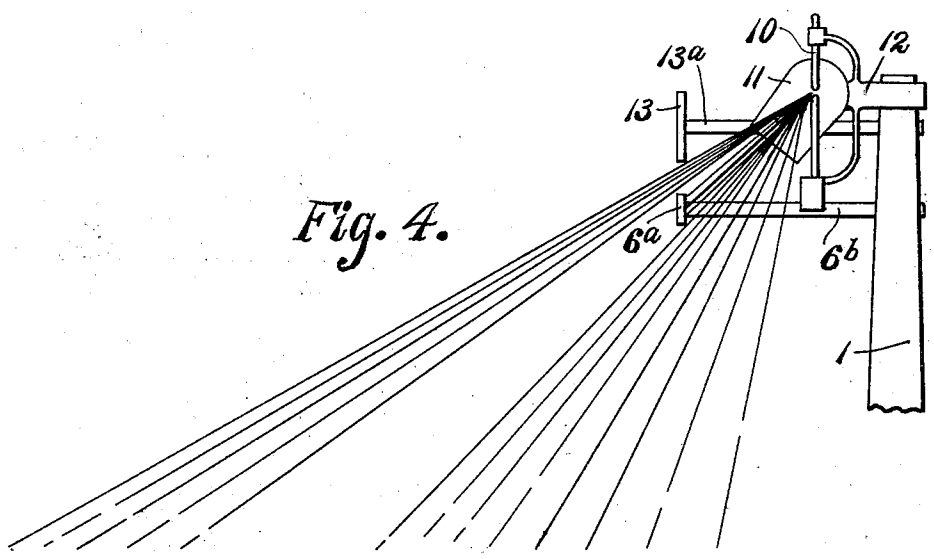
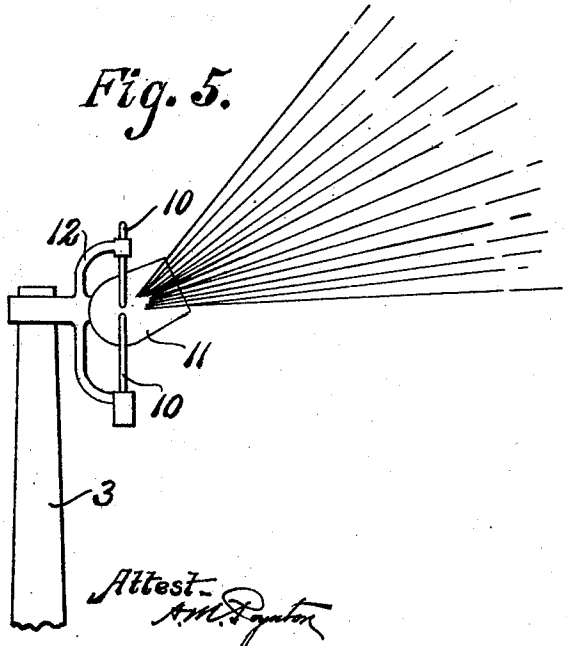


Fig. 4.

Fig. 5.



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NO MODEL. 5 SHEETS—SHEET 4.

Fig. 6.

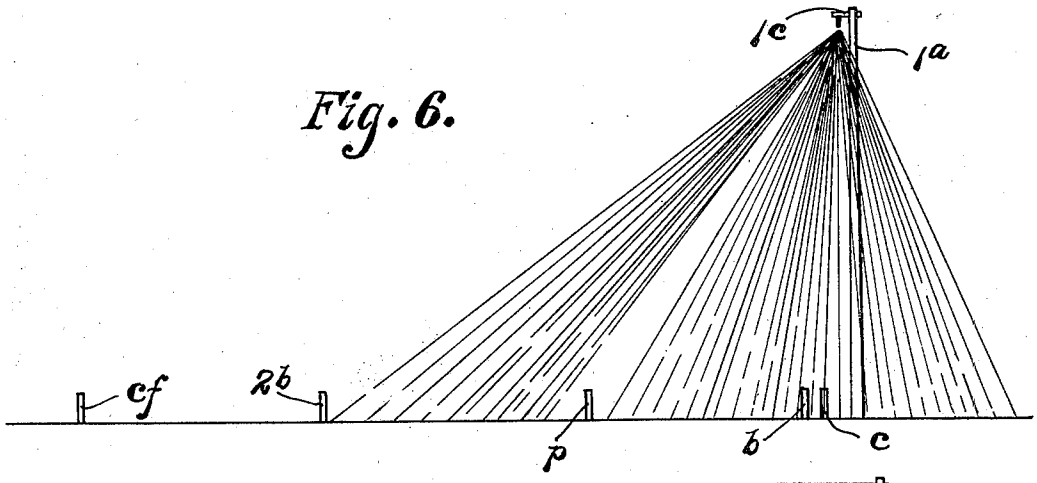


Fig. 7.

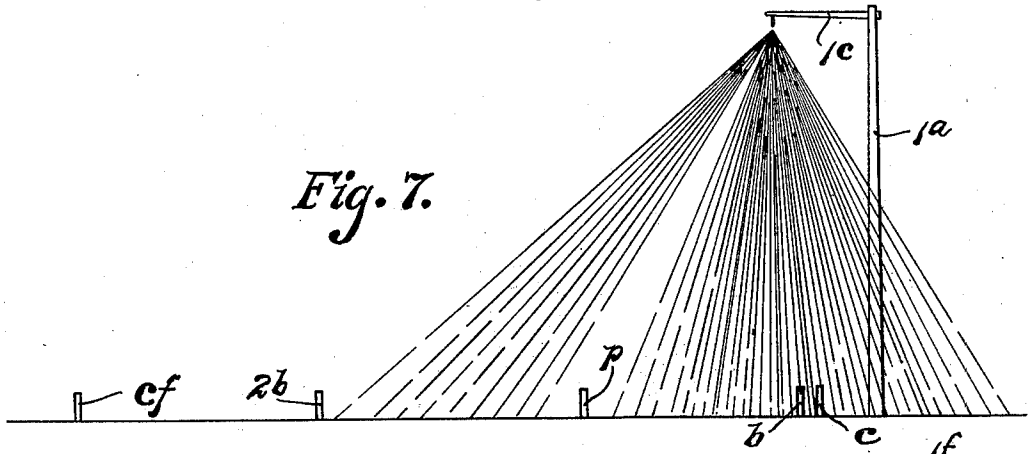
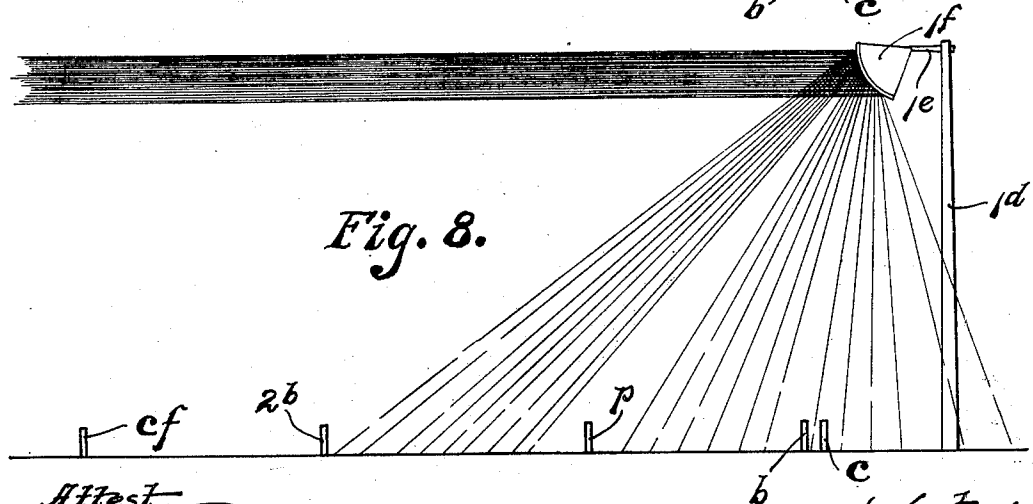


Fig. 8.



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Fig. 9.

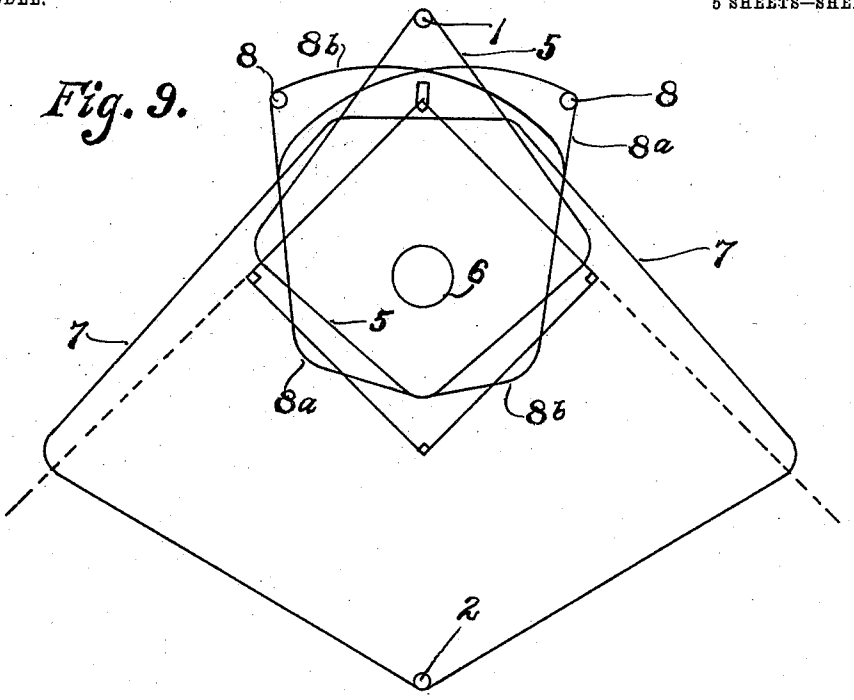
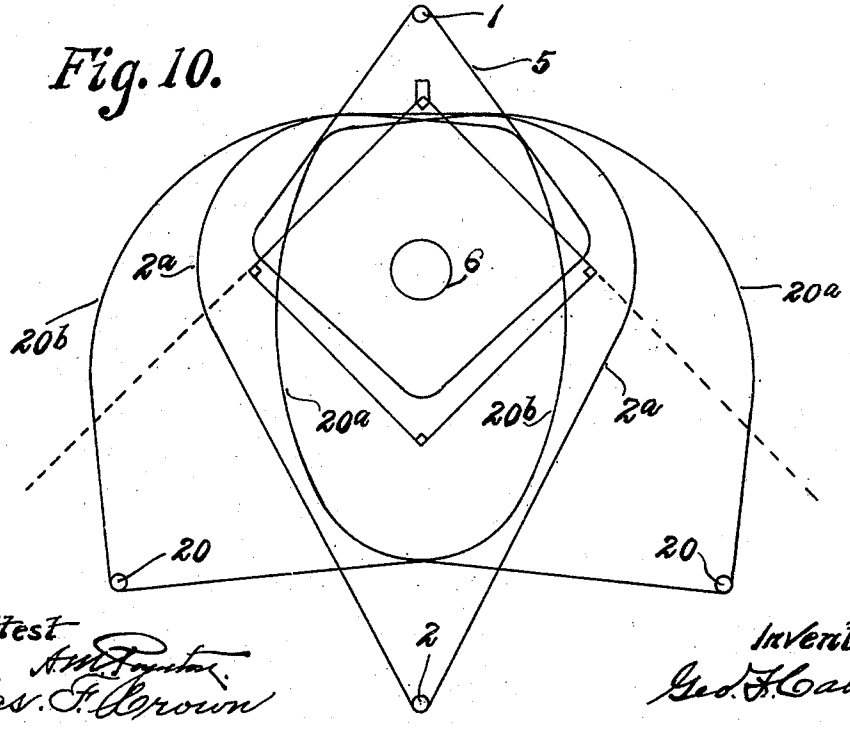


Fig. 10.



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No. 755,447. Patented March 22, 1904.

UNITED STATES PATENT OFFICE.

GEORGE F. CAHILL, OF HOLYOKE, MASSACHUSETTS.

SYSTEM FOR ILLUMINATING FIELDS SO THAT GAMES MAY BE PLAYED AT NIGHT.

SPECIFICATION forming part of Letters Patent No. 755,447, dated March 22, 1904.

Application filed December 26, 1903. Serial No. 186,618. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. CAHILL, a citizen of the United States, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented a new and useful System for Illuminating Fields so that Games may be Played at Night, of which the following is a specification.

My invention relates to the illuminating of a field or area so that base-ball and other games may be played at night; and the object of my invention is to render it possible to play such games at night in substantially the same manner as they are played in daylight and to make it convenient and enjoyable for spectators to watch the playing of the game. To accomplish these ends, especially in the game of base-ball, three things are necessary: first, that a powerful light or lights be thrown upon the field and players; second, that the space above the field for a considerable distance into the air where batted balls may pass be brightly illuminated, and, third, that so far as possible the eyes of the players be screened or shaded from the glare of the powerful light or lights before mentioned.

In the preferred embodiment of my invention for playing the game of base-ball the lights are so arranged that powerful rays of light are thrown upon and around each player when in his normal position facing the batter from above or from behind and above him, while the light or lights toward which he faces are trained down or shaded, so as to illuminate the area in front of him, but not to fall in his eyes—that is, so that he does not look at the light itself. In this manner the player and all his movements are plainly visible to the other players and to the spectators. The area in front of him and toward the batter is illuminated (in the case especially of the in-fielders) by the light or lights back of or to the side of or above the batter, so that he can see the ball when it is batted or thrown toward him, and yet his eyes are protected from the direct rays or glare of the light itself. With such an arrangement of lights and shades or screens each player (when in his normal position facing the batter) has the advantage of looking from a shielded place upon a brightly-illuminated area in front of him. At the same time the player (especially the in-fielders) being in the rays of a powerful light from behind and above him is plainly visible to the other players and spectators. The space above the field to a considerable distance should also be brightly illuminated. This may be done by the lights already mentioned; but it is considered better to have additional lights for this purpose, which lights may be so trained or shaded or screened that their rays will pass across and above the field, none of them falling upon the field itself or the players.

In the accompanying drawings, Figure 1 is a perspective view of a ball-field and players intended to illustrate the preferred arrangement of lights, with special reference to the two main lights or sources of light for illuminating the field. The scale of the drawing is, however, so small (the distance between the lights in the drawing being but about one four-hundredth the actual distance) that the draftsman has found it very difficult to clearly illustrate the manner in which the lights are trained upon the field and players and the manner in which the same are shaded or screened from the eyes of the players. In order to more clearly illustrate the invention, recourse has been had to diagrammatic views in some of the figures to show areas which may be illuminated by certain lights. Fig. 2 is a plan or diagrammatic view indicating by lines or loops about the area lighted by each of the two main sources of light and indicating also at 3 3 and 4 4 where lights for illuminating space above the field may be placed. Fig. 3 is an outline section or elevation on about the line 3 3, Fig. 2, illustrating diagrammatically one manner in which the rays of light may be trained upon certain of the players while being screened or shaded from others and substantially as shown in Figs. 1 and 2, the position of the players being indicated as shown. Fig. 4 is a detail view of a light, reflector, and shade adapted to throw light upon the batsman, catcher, and parts of the in-field, while screening the direct rays of said light from the eyes of the pitcher and other fielders. Fig. 5 is a similar detail view of one of the lights for illuminating space above the field where batted balls may pass. Fig. 6 is a detail diagrammatic elevation showing a light to illuminate the bats-

man, catcher, and parts of the in-field as brought up close behind said batsman and raised high in the air. Fig. 7 is a similar view showing said light as carried high above the batsman and catcher and over a point somewhat in front of the batsman—that is, over a point within the diamond. Fig. 8 is a similar view illustrating a system in which a pencil of light projected from a considerable distance is so reflected as to serve in place of one of the lights shown in the other figures. Fig. 9 is a view somewhat similar to Fig. 2, in which a plurality of lights behind or to the sides of the batsman are employed, while Fig. 10 is a somewhat similar view, in which a plurality of lights in the out-field are employed.

Similar reference characters refer to similar parts in all the drawings.

c is the catcher. *b* is the batsman. *p* is the pitcher. 1*b* is the first baseman; 2*b*, the second baseman; 3*b*, the third baseman; *ss*, the short stop; *lf*, the left fielder; *cf*, the center fielder, and *rf* the right fielder.

1 is the light or source of light back of the batsman and catcher or above them.

1^a, 1^c, 1^d, 1^e, and 1^f are certain parts, (seen more particularly in Figs. 6, 7, and 8,) and which will be more fully explained in connection with those figures.

2 represents the light or source of light back of or to the rear of the center fielder. 2^a is a loop or line (see particularly Fig. 10) inclosing a suggested area which may be lighted by said light.

3 3 (seen in Fig. 1 merely as posts to carry lights, but without light radiating therefrom) are the lights or sources of light or the positions where such lights might be established which are trained to light the space above the field. 4 4 are positions where similar lights might be established, as hereinafter explained.

5 is a line or loop inclosing the area to be illuminated by the light 1, except the space or area 6, which is shaded or screened from such light.

6^a is a shade or screen which shades or screens the area in which the pitcher stands from the rays of the light 1. 6^b is a support therefor.

7 is a line or loop inclosing an area lighted by the light 2.

8 8 are positions where certain other lights to illuminate parts of the in-field especially might be erected, as hereinafter explained.

10 10, 11 11, 12, 13, and 13^a are parts of an electric lamp or the reflectors or screens connected therewith, especially as illustrated in Figs. 4 and 5, while 20, 20^a, and 20^b are positions where lights might be erected and the areas illuminated thereby.

In the system illustrated in Figs. 1, 2, and 3, for example, but two sources of light are shown for illuminating the field itself, one back of the batsman and the other back of the fielders—say in deep center field. 1 is the light (or position where a light may be erected) back of the batsman, and the line or loop 5 indicates an area which may be lighted by the rays of said light 1, except the area 6, where the pitcher stands, which should be screened from the rays of said light. 2 is the light back of the center fielder, and 7 a line or loop suggesting an area which may be illuminated thereby. In each case the light should be so screened as to be shaded from the eyes of the players facing toward it when in their normal positions facing the batsman, the light back of the batsman being so screened as to be shaded from the eyes of the pitcher, the basemen, and the fielders, while the light in deep center field is so screened as to be shaded from the eyes of the batsman and catcher. If desired, however, more than two sources of light may be used. For example, instead of the light 2 in deep center field two lights might be erected, one back of left field, throwing light from more directly back of the short stop and third baseman and screened or shaded from the eyes of the batsman, catcher, first baseman, and second baseman, if desired, the other back of the right fielder, throwing light from more directly behind the first and second basemen and screened or shaded from the eyes of the batsman, catcher, third baseman, and short stop, if desired, or such lights might be used in conjunction with the light in deep center field. Such a system is shown in Fig. 10 illustrative of the principle of my invention. In this view 2 is the light (or position where a light might be erected) in deep center field, while 20 20 are similar lights back of the left fielder and right fielder. The line or loop 2^a suggests an area which may be lighted by the rays of said light 2, the loop 20^a an area which may be lighted by the light 20 in left field, and the loop 20^b an area which may be lighted by the light 20 in right field. It will be noticed that each of these lights is so screened as to be shaded from the eyes of the batsman, catcher, and any other player into whose eyes their rays might fall when said player is looking toward the home plate and the batsman. Again, in place of the single source of light back of the batsman and catcher two or more lights might be used in, for example, the positions marked 8 8, Fig. 2, or other suitable positions, each light being trained upon the diamond and shaded or screened from the eyes of the players most directly facing it when in their normal positions facing the batsman. Such lights might of course be used not only in place of the lights 1 and 2, before referred to, but they might also be used in conjunction with such lights. In Fig. 9 such a system is outlined, the loop 5 including an area lighted by the light 1, the loop 8^a suggesting an area lighted by the light 8 back of the batsman and toward third base, while the loop 8^b (which

loops coincide at places) suggests an area lighted by the light 8 back of the batsman and toward first base. It might sometimes be found desirable when a batsman whose position at bat is such as to cause him to face one of the lights 8 comes to the bat to have such light 8 turned off or screened from him while he is at bat. In this way with the three lights 1, 8, and 8 a batsman who faces straight toward the pitcher could have all three lights turned upon him, while a batsman who faces one or the other of said lights could have turned upon him the light 1 straight back from the home plate and that one of the lights 8 which would be back of him. It is, however, believed preferable to have but a few sources of light trained upon the field where sufficient illumination can be so obtained, although a system using a plurality of lights back of the batsman and a plurality back of the fielders, Figs. 9 and 10 combined, might of course be used.

The lights or sources of light 3 3, one of which is shown in Fig. 3, to illuminate the space above the field are illustrated as being so screened as not to shine upon the field at all—that is, their rays do not fall low enough to shine into the eyes of the players at all—so that they need only be trained or directed to so light the space above the field as to make it possible for the players and spectators to follow the flight of a ball batted into the air. Such lights may be established entirely outside the foul-lines. However, as it appears to be more difficult to light the space above the field than the field itself and as there is a small area between center field, left field, and short stop and another between center field, right field, and the second baseman, where a batted ball is very seldom caught, similar lights might be erected at such places for the better illumination of the space above the field. Two such places 4 4, Fig. 2, are marked upon the drawings. Such lights might of course be placed in the deep field also.

Although I speak in this specification and in the statement of claim at the end hereof of the light 1 or the lights 8 8 as the light or lights "back of the batsman" or "to the rear of the batsman," I wish it to be very distinctly understood that such light or lights are not limited to being placed actually behind the batsman—that is, in a line from the pitcher to the home plate. Such position, especially if only one light be used, is believed to be much the best position for said light. So far as the principles of my invention are concerned such light or lights may be placed in any convenient and suitable position and be shaded or screened in any convenient and suitable manner so long as the three main requirements are complied with—first, that the batsman and the ball when it comes into contact with the bat be properly illuminated; second, that the light does not so glare or shine directly into the eyes of the batsman as to prevent him from clearly seeing the pitcher and the ball, and, third, that such light does not so glare or shine directly into the eyes of players facing the home plate as to prevent them from clearly seeing the ball when batted. It will be clear from the drawings, (particularly Figs. 2 and 9,) that either one of the lights 8 8 might be almost directly back of a batsman or to the front of a batsman, according to what position he takes when at bat. It is well known that batsmen generally assume one of three positions when at bat. Some (either right or left hand batsmen) face almost directly toward the pitcher. Others (right-hand batsmen) face almost at right angles to a line drawn from the home plate to the pitcher, while others (left-hand batsmen) face almost directly at right angles to said line, but in the opposite direction. Again, any one or all of these lights might be placed well back from the batsman or brought up near to the home plate, so that it or they would naturally be spoken of as above the batsman. In such case the lights 8 8 would still be in front of or to the rear of the batsman, according to his position at the bat, or they or one of them might be carried upon a cable or cross-bar high above the batsman and over a point or points within the diamond. Similarly, the light 1 might be brought forward until it was just behind the batsman and high above his head, or it might even be swung forward of the batsman, (in which case it would bear about the same relation to a batsman that faces straight toward the pitcher as one of the lights 8 to a batsman facing about at right angles to a line drawn to the pitcher if such light 8 be raised equally high and were placed about an equal distance from the home plate,) but sufficiently high up so that its rays would come from so nearly straight overhead as not to glare into his eyes, especially when protected by a cap with a good peak, such as players almost universally wear. Such positions for the light to illuminate the batsman are not thought to be nearly so good as the one more fully illustrated in Figs. 1, 2, and 3. It is believed that the best results will be obtained from one powerful source of light placed pretty well back of the batsman and high up in the air, where sufficient light can be obtained from one light or group of lights. In Fig. 6, however, the light 1 (here marked 1^a) is shown as brought close up behind the home plate and raised high in the air, while in Fig. 7 such light is actually carried forward of the home plate and batsman and raised quite high. A light so placed would pour a powerful light upon the batsman and ball, but would be open to the objection that if the batsman or catcher should quickly look straight upward his eyes would suddenly encounter the glare of the light above him.

That the exact locations of the lights is not

material to the carrying out of my invention is well illustrated in Fig. 8. In these days of powerful search-lights that throw a "pencil" of light having parallel or substantially parallel rays for miles any one or perhaps all the lights illuminating a field so that the game of base-ball may be played at night might be placed a mile away and in any direction and suitably-formed mirrors or reflectors employed to deflect and spread the rays of light to illuminate the area desired. In Fig. 8 a pencil of light, broken off at one end to show that it comes from a distance, is shown as deflected and spread by a mirror or reflector 1^f in such manner as to serve in place of the light 1 back of the batsman. (The reflector 1^f shown is given in illustration of the principle and is probably not curved with mathematical exactness. The making of mirrors and reflectors is a science in itself and is no part of my invention.) Such a system would have advantages and disadvantages, one of the latter being that a very small tremble or movement of the mirror 1^f would cause a large tremble or movement of the rays of light passing therefrom. It is clear, however, that if a ball-field were located at some distance from an electric connection it might be found desirable to establish a number of lights in connection with the electric service, project the rays to the ball-field, and there use a system of mirrors, one or more of which would throw light upon the batsman and catcher, another or others upon the basemen and out-fielders, and still another or others serve to illuminate space above the field.

In a system in which electric lights are used it might be well, in view of the well-known fact that such lights are at times apt to temporarily lose their brilliancy while the carbons are adjusting themselves, to use a plurality of lights instead of one single light, either grouped together or separated any desirable distance. For example, in place of the light 1 it might be found desirable to use a plurality of lights or sources of light trained to illuminate substantially the same space or area and employed to prevent a temporary cessation of brilliancy—that is, so that all the lights would not lose their brilliancy at one time.

The detail views, Figs. 4 and 5, are illustrative rather of the general than the exact arrangement of lights, reflectors, and screens. The particular arrangement, especially of the reflectors, if used, would necessarily vary with varying conditions. In Fig. 4, for example, the height of the light above the ground, the distance back of the batsman, the exact area to be illuminated or to be shaded or screened would be conditions determining the shape of the reflector and the position and size of the shades or screens. The shape of the reflectors herein shown is intended to be merely illustrative. In these figures, 10 10 are the carbons of an electric light, (although, of course, any other suitable light might be used.) 11 11 are reflectors; 12, the bracket or holder by which the light is attached to the upright or post; 13, a shade or screen by which the brightness of the light back of the batsman is obscured from the eyes of the baseman; 13^a, the support or frame by which said shade or screen is carried. 6^a is the shade or screen which shades or screens the eyes of the pitcher from the light back of the batsman, and 6^b is the frame or support which carries the shade 6^a. The light shown in Fig. 5 to illuminate the space above the field is shown without any shade or screen other than the reflector, which is formed to serve both purposes. Possibly, however, a screen placed at some distance from said light and on the lower side thereof would be beneficial by obscuring the brightness around the source of light from the eyes of the players.

The particular kind of light used is not essential to my invention. Naturally that artificial light having the greatest power and especially the greatest power to light at a considerable distance from the source of light would be preferred, other things being equal.

The use of reflectors is not of course an essential part of my invention; but their use is considered desirable as a means of obtaining more powerful light upon the limited area to be illuminated. To obtain the best results, the reflectors used should be constructed in such manner as to direct the rays of light upon the desired area, so that the use of shades or screens may be reduced to a minimum. The reflector for the light 1 back of the batsman might be so formed that no other screen than the walls of the reflector itself would be needed except to screen the pitcher.

Any suitable shade or screen may be used, the most essential point being that it be not placed too near the source of light. By placing the shade or screen at some distance—often as much as several feet—from the light a better protection will be afforded the player or players. Around a powerful light there is frequently a brightly-illuminated area, which should be shaded or screened from the eyes of the players. If reflectors are used, the bright surface of a reflector should not be exposed to the view of the players if not absolutely necessary.

From the preceding it will be obvious that a field might be lighted by a plurality of lights without the use of shades or screens as separate entities at all. Each light might be so surrounded by a suitable reflector and so trained upon one limited area as to throw no direct rays of light upon any player from in front, the walls of the reflector serving to shade or screen the light from the eyes of players facing it. A plurality of such lights might be trained upon different parts of the field in such manner as to illuminate the whole.

This would, however, be clearly within my invention.

When in this specification the players are spoken of as being shaded or screened from the direct rays of the light or lights in front of them, the expression "when in their normal positions facing the batsman" is frequently used. The reason for this will be apparent. It is desirable that every player be in such a light that his every movement can be plainly seen by the other players and by the spectators. At the same time it should be remembered that the several players face in several different directions and that it is necessary that their eyes be shaded or protected from the glare of the powerful lights in order that they may clearly see the ball and the movements of the other players. Apparently the one way to accomplish these results is to have the player lighted or illuminated by a light from above him or from above and back of him and to have the space in front of him, and especially the players facing him, illuminated by lights from which his eyes are protected. Should the first baseman, however, who when in his normal position facing the batsman sees no source of light at all, turn to catch a ball thrown to him from center field, he would not necessarily be screened or shaded from the light toward which he then faced. Similarly should the catcher run from his position behind the bat back toward the stand he might then come into the full glare of the light back of the batsman. This seems to be unavoidable; but these plays are of less frequent occurrence. The use of a large number of sources of light, each trained upon a small area, partially relieves this difficulty, but presents other difficulties of perhaps greater weight. To relieve the difficulty here under consideration as much as possible, the players should use caps with good peaks, especially well formed at the sides to prevent a light from striking the eye from the side.

When in the accompanying specification I speak of a source of light, or a light merely, I wish it to be distinctly understood that the expression may mean either a single light or a plurality of lights grouped close together, although said lights may be used with separate reflectors and screens. Also I wish it to be understood that I include by such expression not only a light in the ordinary sense of the word, but such an arrangement as that illustrated in Fig. 8, in which the light or source of light is at a considerable distance and a reflector or mirror is used in a sense as a substitute therefor.

When in this specification, and especially in the statement of claim at the end hereof, I speak of the players facing the home plate or facing the batsman or when in their normal positions facing the home plate or batsman, I wish it to be understood that I refer to the positions base-ball players usually occupy when awaiting the batting of the ball or the delivery of the ball to the batsman and, more especially, when there are no runners on the bases, and I wish it to be clearly understood that I intend the batsman to be regarded as facing the home plate or facing the pitcher, one of which positions he frequently occupies one instant and the other the next instant, as may be necessary to the proper reading of the claim. Both positions are occupied many times during each game by the batsman. Further, it should be remembered that there are both right and left hand batsmen and that a light might be backward from one and not exactly backward from the other.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a system for illuminating a base-ball field, (*a*) a plurality of lights for illuminating said field; (*b*) a plurality of screens for said lights; said screens being so formed and positioned with relation to each light that players facing said light, when in their normal positions facing the batsman will be shaded or protected from the direct rays of said light; and (*c*) a light or lights for illuminating space above the field where batted balls may pass.

2. In a system for illuminating a base-ball field, comprising lights, reflectors and shades, the combination, with a light to the rearward of the batsman shining upon the batsman and parts of the field, and a screen to prevent the light from shining in the eyes of in-fielders, when in their normal positions facing the batsman; of another light to the rearward of the pitcher falling upon the basemen and parts of the field, and a screen to prevent said light from shining in the eyes of the batsman or catcher when in their normal positions facing the pitcher.

3. In a system for illuminating a base-ball field, comprising lights, reflectors and shades, (*a*) a light to the rearward of the batsman shining upon the batsman and parts of the field, and a screen to prevent the light from shining in the eyes of in-fielders, when in their normal positions facing the batsman; (*b*) a light to the rearward of the pitcher falling upon the basemen and parts of the field and a screen to prevent said light from shining in the eyes of the batsman or catcher when in their normal positions facing the pitcher; and (*c*) means to illuminate the space above the field.

4. In a system for illuminating a base-ball field, (*a*) two lights, one backward from the batter and the other backward from the pitcher, and adapted to throw light upon the pitcher, batsman and intervening space; (*b*) a screen so arranged with relation to the light backward from the pitcher as to shade said light from the eyes of the batsman; and (*c*) another screen so arranged with relation to the light backward from the batsman as to shade said light from the eyes of the pitcher.

5. In a system for illuminating a base-ball

field, (*a*) a light above the batsman to illuminate the batsman and part of the in-field; (*b*) a screen to shade said light from the eyes of the basemen facing toward the batsman and said light; (*c*) another light to the front of said batsman to illuminate the pitcher and part of the in-field; and (*d*) a screen to shade said last-mentioned light from the eyes of the batsman.

6. In a system for illuminating a base-ball field, (*a*) a light above the batsman to illuminate the batsman and part of the in-field; (*b*) a screen to shade said light from the eyes of the basemen facing toward the batsman and said light; (*c*) another light to the front of said batsman to illuminate the pitcher and part of the in-field; (*d*) a screen to shade said last-mentioned light from the eyes of the batsman; and (*e*) means to illuminate the space above the field where batted balls may pass.

7. In a system for illuminating a base-ball field, (*a*) a light situated more to the rear than to the front of a player facing the home plate from one direction; (*b*) another light situated more to the rear than to the front of another player facing the home plate from a different direction; (*c*) a screen for said light first above mentioned so formed and positioned as to obscure said light from the eyes of the player second above mentioned; (*d*) another screen for the light second above mentioned so formed and positioned as to obscure said light from the eyes of the player first above mentioned; and (*e*) a reflector for each of said lights to concentrate the rays thereof upon a definite area.

8. In a system for illuminating a base-ball field, (*a*) a light situated more to the rear than to the front of a player facing the home plate from one direction; (*b*) another light situated more to the rear than to the front of another player facing the home plate from a different direction; (*c*) a screen for said light first mentioned so formed and positioned as to obscure said light from the eyes of the player second above mentioned; (*d*) another screen for the light second above mentioned so formed and positioned as to obscure said light from the eyes of the player first above mentioned; (*e*) a reflector for each of said lights serving to concentrate its rays upon a definite area; and (*f*) means to illuminate the space above the field.

9. In a system for illuminating a base-ball field, embracing a plurality of lights and shades therefor, (*a*) a light situated with relation to the home plate so that its rays will illuminate space around the home plate including the batsman and the ball in the early stages of its flight from the bat; (*b*) a screen to shade the rays of said light from the eyes of a player facing toward the home plate and watching the movement of said ball; (*c*) another light to illuminate space occupied by said player above mentioned; (*d*) a screen to shade the rays of said light from the eyes of the batsman; (*e*) a light to illuminate space above the field where said batted ball may pass; and (*f*) a screen to shade the rays of said last-mentioned light from the eyes of the player above mentioned facing toward the home plate and watching the movement of said ball.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

GEO. F. CAHILL.

Witnesses:
JOSEPH GREGORY,
ARTHUR T. CAHILL.