Sept. 10, 1935. J. H. WATERBURY 2,013,721

LIGHTING FIXTURE

Filed March 22, 1934 2 Sheets-Sheet 1

Fig. 1

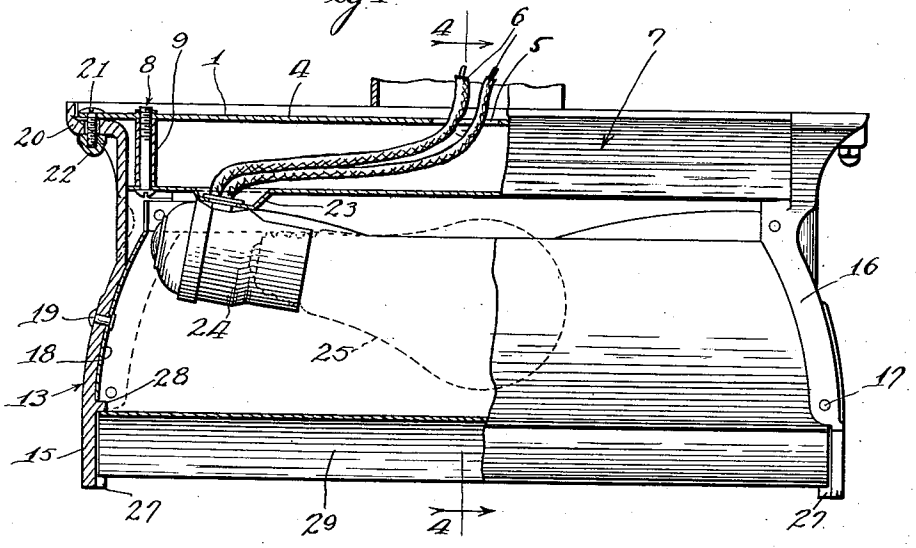

Fig. 2.

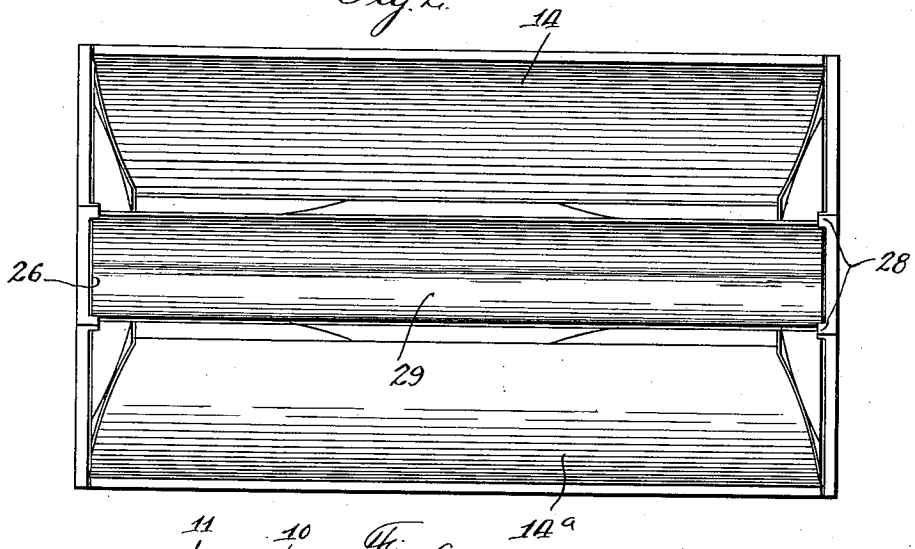

Fig. 6.

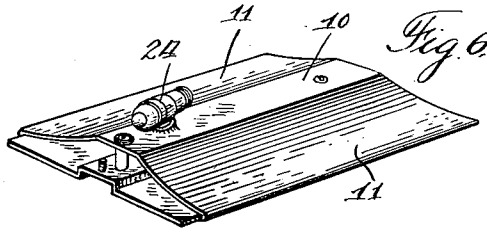

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Fig. 3.

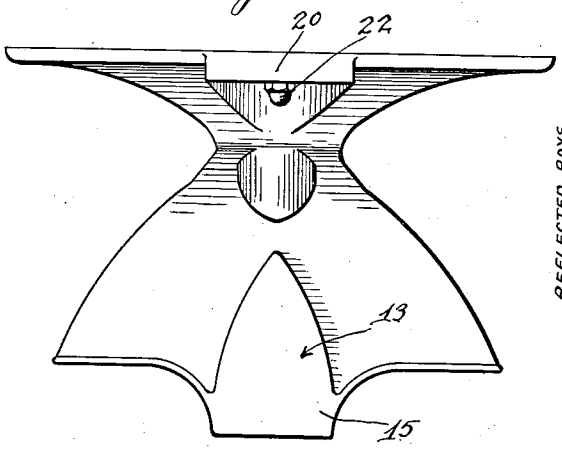


Fig. 5.

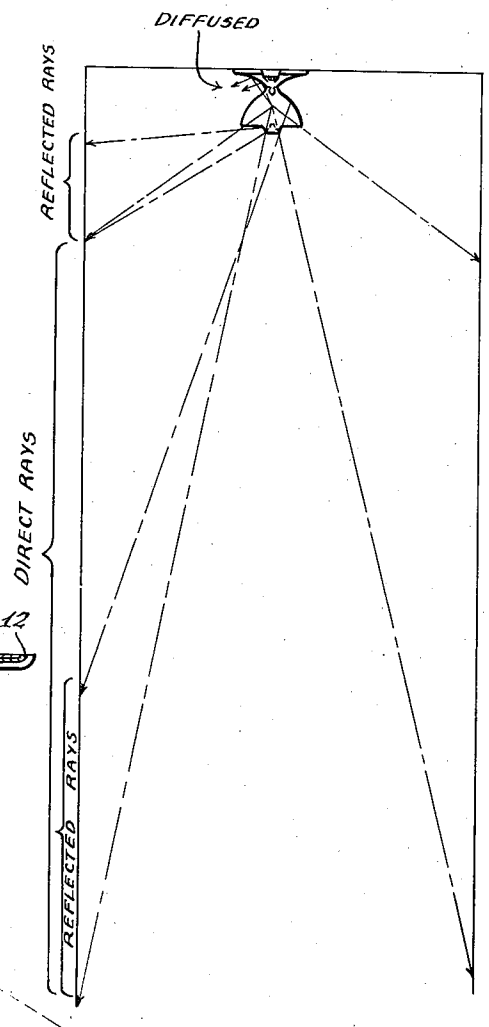
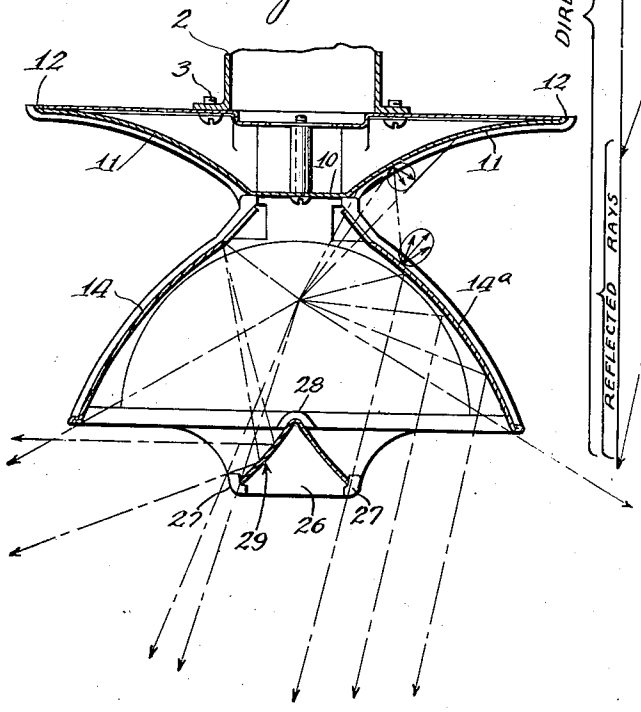


Fig. 4.



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UNITED STATES PATENT OFFICE

2,013,721

LIGHTING FIXTURE

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Application March 22, 1934, Serial No. 716,783

13 Claims. (Cl. 240—78)

This invention relates to lighting fixtures and more particularly to lighting fixtures suitable for use in lighting book stacks, corridors and, in general, any comparatively narrow passageways.

In narrow passageways, particularly between book stacks, it has heretofore been difficult to obtain a uniform illumination throughout the passageway and on the book stacks in a manner whereby the titles and other data on the books may be easily read at any location on the shelves.

The present invention is especially adapted to be supported on the ceiling midway between the book stacks or walls or, in case of high ceilings, may be secured to a suitable support at a desired height. It will, of course, be understood that the fixture may be used in various locations where a similar distribution of light is desired.

The invention is intended to provide in a single fixture a construction whereby the book stacks or the sides of the passageway will be substantially evenly illuminated throughout their extent, and the entire passageway may be substantially evenly illuminated by a blending of direct reflected rays and diffused light whereby brilliant highlights and light streaks as well as dark shadows are avoided.

It is also an object to provide a construction in which direct light rays from the light source will be directed downwardly to illuminate a suitable portion of the side walls or stacks with a comparatively high intensity and in which a suitable shield will prevent the direct rays from striking the eye of an observer in substantially any location in the passageway.

It is a further object to provide a construction in which such direct rays from the light source as may be most efficiently used are directed to illuminate a large portion of the side walls with high intensity and in which the longer and therefore weaker direct rays, preferably those adjacent the floor, are reinforced by suitable reflected rays in a manner to tend to equalize the illumination over substantially the entire side walls. The reinforcement is provided by reflecting direct rays which would otherwise be inefficiently distributed and would provide too great illumination adjacent the fixture.

A still further object is to provide a construction in which the longer direct light rays are reinforced by reflected light rays in that the portion of the field nearest the floor and in which the field above the direct rays will be illuminated by other reflected rays. Also, in which the ceiling and other portions of the entire passageway will be illuminated by diffused light, and wherein all of the fields covered by the various rays, and diffused light will overlap and blend in a manner to provide a substantially uniform illumination over all of the surfaces of the passageway.

It is also an object to provide a fixture of few parts which can be easily and quickly assembled and which will be durable and efficient in light distribution.

Further objects and advantages will be apparent from the specification and appended claims.

In the drawings:

Figure 1 is a side elevation partly in vertical axial section and illustrates one embodiment of my invention.

Fig. 2 is a bottom view of the embodiment illustrated in Fig. 1.

Fig. 3 is an end elevation of the structure as illustrated in Fig. 1.

Fig. 4 is a vertical section taken on a line corresponding substantially to line 4—4 of Fig. 1.

Fig. 5 is a diagrammatic view showing the location of the fixture as supported on a ceiling for illuminating a narrow passageway and illustrates the distribution of the light therein.

Fig. 6 is a perspective view of the assembled base or lamp-holding unit.

Referring to the drawings in detail, the embodiment as illustrated comprises a base or lamp-holding and diffusing reflector portion which may be permanently secured to the ceiling, and a downwardly extending inverted trough-shaped reflector unit which may be removably secured to the base. These units may be easily secured together by a simple fastening means, when the device is installed whereby the main reflector unit may be easily removed or replaced at any time as desired.

The construction illustrated comprises a rectangular base plate or anchor plate 1, which is preferably of sheet metal and may be secured to a suitable outlet box 2 or other support by means of screws 3. This base plate is formed to provide a longitudinal depression or channel 4 for the purpose of stiffening the plate, and also to provide clearance for the heads and ends of the screws used for supporting other parts of the fixture. The base plate is also provided with a central opening 5 for the passage of electrical conductors 6 from a suitable socket.

After the base plate 1 is secured to the outlet box or other suitable support, an upper diffusing reflector member 7 is secured thereto by means of screws 8 and spacing bushings 9. The diffusing reflector member 7 is preferably formed

of sheet metal into a shallow trough-like formation with its entire lower side having a diffusing reflecting surface such as porcelain enamel. This member 7 comprises a flat central portion 10, spaced from the base 1, and outwardly extending concave portions 11, and is preferably slightly wider than the base member and provided with up-turned flanges 12 engaging and overlapping the edges of the base. The base 1 is preferably slightly longer than the diffusing reflector member whereby the outwardly extending ends may provide a support for a main reflector unit 13.

The reflector unit 13 comprises four principal parts including two concave side reflectors 14 and 14a and two end members 15. The end members are preferably aluminum castings and are provided with inturned flanges 16 to which the concave reflectors 14 and 14a may be secured by means of rivets 17. The two end castings are preferably concave as shown and may have internal polished reflector surfaces, or such reflector surfaces may be provided by securing thereto polished sheet metal plates 18 by means of rivets 19, and the shape of these plates 18 may conform to the contour of the inner surfaces of the brackets as shown.

The concave side reflectors 14 are formed of sheet metal, preferably sheet aluminum, and are comparatively narrow and spaced to provide a longitudinal opening between their upper edges of substantially the width of the flat portion 10 of the diffusing reflector 7. They are also spaced a short distance below the portion 10 for the purpose of allowing a certain amount of direct rays from the light source to pass therethrough to the diffusing reflector 7. The outer surfaces of the side reflectors 14 and 14a are preferably semi-diffusing and a part of the diffused light from the reflector 7 will be directed thereon.

The end members 15 are provided with upwardly and outwardly extending bracket portions 20 arranged to engage and cover the outwardly extending ends of the base plate 1. Downwardly extending screws 21 are centrally located in the trough 4 of the base plate and are threaded into and through the base plate, or suitable threaded studs may be secured thereto. The bracket portions 20 of the end members are provided with openings for the passage of these screws and the entire main reflector unit 13 may therefore be removably secured to the base plate 1 by suitable clamping nuts 22.

The diffusing reflector 7 is formed at 23 to support the angle socket 24, in which latter may be supported a suitable lamp 25. The light source of the lamp 25 is thereby supported substantially on the vertical axial line of the fixture and the reflectors 14 and 14a are so shaped and positioned relative thereto as to reflect converging rays at an angle tending to cross below the fixture—that is, the reflector 14 will direct reflected rays downwardly and toward the wall opposite therefrom, and the reflector 14a will reflect rays in a similar manner toward the lower part of the other wall.

The end members 15 are also provided with downwardly extending portions 26 having inwardly extending lugs 27 and 28 on which is supported a comparatively narrow inverted V-shaped combined reflector and shield member 29. The sides of the V-shaped reflector 29 are preferably slightly concave, and the apex is arranged to be engaged and positioned by the lugs 28, and the corners of the sides are engaged in suitable notches in the lugs 27. This reflector shield is for the purpose of directing certain reflected rays outwardly and above the field illuminated by the direct rays and, together with the end members 15, is also for the purpose of preventing direct rays from reaching the eyes of any one in the passageway. The reflector shield 29 is preferably of sheet aluminum or other resilient material and may be easily inserted or removed by springing the side portions inwardly to engage with or disengage from the lugs 27 and 28. It is desirable that the reflector shield 29 should be easily removable in order that lamp replacement may be made or the fixture cleaned.

In installing the fixture, the base plate 1 is first secured to an outlet box or other suitable support and the diffusing reflector member 7 is then secured to the plate 1 by means of the screws 8, thus forming a lamp supporting base section as illustrated in Fig. 6. The main reflector unit 13 is then placed in position with the screws 21 in the base plate extending downwardly through the brackets 20, and secured in place by means of the clamping nuts 22. The lamp 25 is inserted in socket 24 and the reflector shield 29 is inserted and removably retained in position by means of the lugs 27 and 28.

It will therefore be apparent that the above described construction provides a fixture which may be easily and cheaply manufactured and very easily assembled and installed.

Many book stacks are so positioned as to provide passageways from thirty to thirty-six inches wide therebetween, and in such installation the light distribution may be substantially as indicated in Fig. 5. The fixtures are preferably spaced about eight feet apart on a center line between the stacks and, with such an installation, a substantially even illumination may be provided throughout the passageway.

When the fixture is installed as illustrated in Fig. 5, such direct rays as are emitted between the reflector shield 29 and the lower edges of the side reflectors 14 and 14a will be directed on the side walls and cover a field from the floor to a point slightly below and adjacent the fixture. The longer rays directed toward the bottom of the side walls will, of course, provide a less intense illumination and the side reflectors 14 and 14a are, therefore, of such a curvature as to direct reflected rays from the opposite side of the fixture to reinforce the direct rays covering that portion of the field adjacent the floor. The V-shaped reflector shield 29 is of such a curvature that the rays therefrom will be reflected to cover that portion of the field above the direct rays and which is not cut off by the lower edge of the main reflectors 14 and 14a.

Other direct rays from the light source will pass upwardly through the opening between the upper edges of the reflectors 14 and 14a and will be diffused by the diffusing surfaces of the reflector 7. A portion of this diffused light is again reflected by the semi-diffusing surfaces of the outside of the reflectors 14 and 14a and the flat portion 10 also reflects diffused light downwardly through the fixture. The combination and positioning of these diffusing and semi-diffusing surfaces distribute a diffused light over the ceiling and upper portion of the passageway and blending downwardly into the field illuminated by the other reflectors and direct rays, thereby providing a substantially even illumination over the entire field. The inner reflecting surfaces of the end members 15, together with the fact that all of the

other reflectors are longitudinally arranged, assists in directing the light over a comparatively long longitudinal field, and, with the proper spacing of the fixtures on a longitudinal line, a long passageway may be substantially uniformly illuminated over its entire extent.

The embodiment herein disclosed is illustrative only and it is not intended that the scope of the invention, as defined in the appended claims, should be limited to the particular structure illustrated.

Having thus described this invention what is claimed and desired to be secured by Letters Patent is:

1. A lighting fixture for narrow passageways comprising a centrally and longitudinally depressed ceiling portion having an outside diffusing-reflector surface, an inverted trough-like reflector having inner reflecting surfaces and sides spaced from each other and from said diffusing surface, a light source in said inverted reflector, and a relatively narrow inverted V-shaped reflector below said light source.

2. A ceiling fixture for narrow passageways comprising a base plate for securing to an outlet box, a diffusing reflector secured to and substantially covering said base plate and longitudinally depressed to provide a wiring passage therebetween, a socket on said diffusing reflector for supporting a light source, an inverted longitudinal trough-like reflector having inner reflecting surfaces around said light source and having sides spaced from each other and spaced from said diffusing reflector, and a longitudinal inverted trough-like member below said light source and having outer reflecting surfaces.

3. A ceiling fixture for narrow passageways comprising an elongated base portion having a lower diffusing reflector surface, means on said base for supporting a light source substantially on the vertical axis and spaced below said diffusing surface, an inverted trough-like reflector unit having spaced longitudinal side reflectors and having end reflectors associated therewith, and means for removably securing said reflector unit to said base portion with said reflectors positioned around said light source and in spaced relation with said diffusing surface whereby direct rays from said light source may strike a substantial portion of said diffusing surface.

4. A ceiling fixture for narrow passageways comprising an elongated base portion having a lower diffusing reflector surface, means on said base for supporting a light source substantially on the vertical axis and spaced below said diffusing surface, an inverted trough-like reflector unit having spaced longitudinal side reflectors and having end reflectors associated therewith, means for removably securing said reflector unit to said base portion with said reflectors positioned around said light source and in spaced relation with said diffusing surface whereby direct rays from said light source may strike a substantial portion of said diffusing surface, and a comparatively narrow inverted V-shaped longitudinal reflector below said light source and having an outside reflecting surface; all of said reflectors being symmetrically positioned relative to the vertical median plane of the fixture.

5. A lighting fixture of the character described comprising an elongated substantially rectangular base having a lower diffusing reflector surface, downwardly extending end plates secured to said base and having oppositely disposed inner reflecting surfaces, means for supporting a light source between said end plates and below said base and on the longitudinal axial plane of said fixture, and a longitudinal inwardly directed reflector on each side of said light source and spaced from each other and from said diffusing base and secured to said end plates.

6. A lighting fixture of the character described comprising an elongated substantially rectangular base having a lower diffusing reflector surface, downwardly extending end plates secured to said base and having oppositely disposed inner reflecting surfaces, means for supporting a light source between said end plates and below said base and on the longitudinal axial plane of said fixture, a longitudinal inwardly directed reflector on each side of said light source and spaced from each other and from said diffusing base and secured to said end plates, and closely adjacent oppositely disposed reflectors removably supported on said end plates below said light source for reflecting both direct and reflected rays outwardly.

7. A ceiling fixture for narrow passageways comprising an elongated ceiling unit provided with a lower diffusing surface and having a longitudinally depressed central portion and upwardly and outwardly inclined longitudinal side portions, a socket for supporting a light source below said surface and substantially on the vertical axial line, an elongated reflector unit below said ceiling unit and having a longitudinal reflector on each side of said light source and end reflectors associated with said side reflectors, means on said end reflectors for engaging the ends of said ceiling unit, and means for securing said units together with said reflectors in spaced relation with said diffusing surface.

8. A lighting fixture of the character described comprising an elongated base plate for attachment to a support, a diffusing reflector substantially covering said base plate and having a central longitudinal depression to form a wiring channel and upwardly and outwardly inclined side portions, a socket secured to said diffusing reflector to support a light source below said depressed portion and substantially on the axial line of said fixture, an inverted trough-like reflector unit of substantially the same length as said diffusing reflector and spaced below said depressed portion and having spaced sides, the inner surfaces of the ends and sides of said unit being all arranged to reflect rays from said light source inwardly and downwardly, and a comparatively narrow longitudinal reflector below said light source for directing a part of the reflected rays from all of the reflector unit inner surfaces outwardly in opposite directions.

9. A stack light fixture of the character described for a narrow passageway, comprising a plurality of longitudinal polished reflectors and diffusing reflectors substantially radially disposed and spaced one from another and forming substantially trough-like spaces therebetween, said spaces comprising a central downwardly directed trough-like space having polished reflector surfaces and laterally directed spaces having diffusing reflector surfaces, a light source in said downwardly directed space to direct rays into all of said spaces, said polished surfaces being arranged to converge reflected rays to cross on a vertical axial plane, and a centrally disposed longitudinal reflector and shield below said light source and arranged to direct a part of said converging rays in opposite directions, said shield being spaced from said polished reflectors to permit

direct rays to radiate therebetween to illuminate the side walls only.

10. A ceiling fixture for illuminating closely adjacent vertical walls of a narrow passageway, comprising a light source, means for supporting said light source adjacent a ceiling, and a plurality of elongated parallel reflectors radially disposed around said light source, said reflectors comprising a set of longitudinal reflectors on each side of the vertical median plane of said fixture, each set comprising a side reflector for directing rays over a substantial lower portion of the opposite wall, a bottom reflector spaced from said side reflector to permit direct rays to illuminate the lower and middle portions of the adjacent wall and arranged to reflect part of the rays from said side reflector and part of the direct rays from said light source to a substantial upper portion of the adjacent wall, and a top reflector spaced from said side reflector to permit all of the direct rays therebetween to be intercepted by said top reflector, said top reflector and the back surface of said side reflector cooperating to illuminate the ceiling and a portion of the side wall adjacent thereto with diffused light.

11. An elongated ceiling fixture for narrow passageways, comprising a support for a light source, a plurality of elongated parallel spaced reflectors symmetrically radially disposed on each side of the vertical median plane of said fixture and around said light source in a manner to intercept substantially all direct rays except angular downwardly and outwardly directed rays, one of said reflectors on each side directing reflected rays to reenforce the longer of the direct rays on the opposite wall, a second reflector directing reflected rays from said first reflector to illuminate a restricted portion above the direct rays on the adjacent wall, and a third reflector directing diffused light to illuminate the ceiling and side walls above said restricted portion, all of said illuminated areas overlapping to provide a substantially even illumination and prevent light streaks.

12. In a lighting fixture for narrow passageways including a plurality of longitudinally parallel reflectors, an elongated diffusing plate, an inverted trough-like reflector having inner reflecting surfaces and sides spaced from each other and from said plate, a light source in said inverted reflector, and an elongated relatively narrow reflector below said light source and positioned to intercept substantially all of the direct rays which would otherwise strike the floor and to reflect them laterally.

13. A lighting fixture for narrow passageways, comprising an elongated centrally and longitudinally depressed ceiling portion having an outside diffusing reflector surface, a socket mounted on the under side and adjacent one end of said ceiling portion and arranged to support a light source on the vertical axis of said ceiling portion, an inverted trough-like reflector around said light source and having inner reflecting surfaces spaced from each other and from said diffusing surface, and a relatively narrow inverted substantially V-shaped reflector below and light source and arranged to intercept substantially all direct rays which would otherwise strike the floor and to reflect them to the side walls of the passage.

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