conflict solution, conduct detailed analysis on the existing high building fire facilities from a new angle and look for a perfect conjunction point between theoretical innovation and practical work.

IV. RESEARCH METHODOLOGY

A. Discover Conflict

The existing high building fire escape devices fails to reach the escape effect and has the disadvantages like large land area, small effect and low efficiency. In accordance with the category standard of TRIZ theory on resources, realize the resource summary and category on the extinguishing design system, divide the resource in the high building fire design system into hard resource and soft resource from tangible and intangible features, and establish the resource library to provide references for the designer to obtain resources [6].

B.Realize Innovation by Substance-Field Model Analysis Method

It applies TRIZ invention and creation principle to improve the problems in high building fire, and it analyzes the application of the designimprovementof fire aid facilityin TRIZ. Besides, it reanalyzes [7] thethree design barriers,i.e. high death rate of the existing high building fire escapedevice, long rescue time, andhigh cost and low efficiency of the existing solution (See Fig. 1).

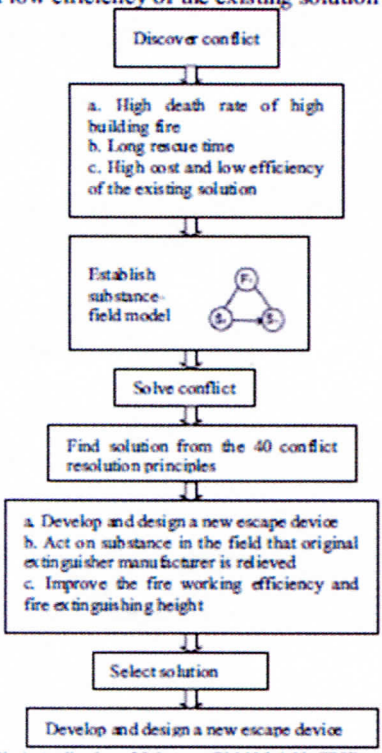

Fig 1: Application of Substance-Field Model in TRIZ

It applies TRIZ innovation principle to clearly define the product design functions, optimize the design scheme and effectively solve barriers, which is helpful for realizing the ideal design ofhigh building fire escape devices (see Fig. 2).

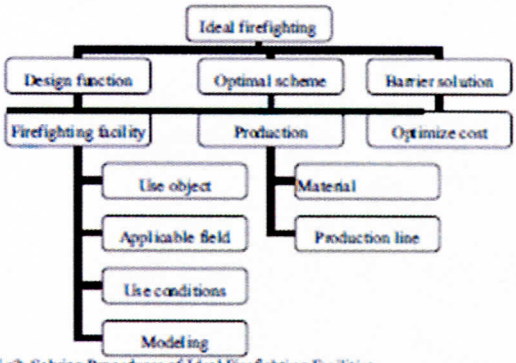

Fig2: Solving Procedures of Ideal Firefighting Facilities

C.Application of Technical Innovation Principle

High building fire escape device system can solve the defects and problems of the escape device through many TRIZ innovative theory methods.It includes the13th Reverseprinciple, the24thintermediate principle,the 25th self-service principle and the 34th abandon and repair principle among the 40 principles of TRIZ technical innovation.

The 13th reverse principle, before, elevator evacuation is the escape method which is abandoned by people. However, the emergency of outdoor elevator means that the elevator will become a kind of effective escape method. This emergency elevating facility can shuttle among all floors and ground of high buildings at the key time of high building fire. If at the initial stage of fire, the fire fighters can rapidly reach the fire source floor through the emergency elevating facility to control the fire in a certain scope. In case that the fire has spread, this facility also can put out the fire and rescue. Guide rail, elevating facility and the evacuation passageway window constitute a temporary emergency passageway which is connected with the ground (see Fig. 3).

Fig3：Outdoor Elevator