Title of the Invention: Firefighting helicopter for city concepts
Abstract Title: A firefighting helicopter having firefighting apparatus positioned above the helicopter rotor blades

A firefighting helicopter having firefighting apparatus positioned above the helicopter rotor blades, allowing fire extinguishing fluid such as water, to be directed under pressure onto a building for example. The apparatus has four foldable tubal blades mounted to a telescopic structure that is positioned within the helicopter rotor mast. When not in use, the foldable tubal blades are stored within the helicopter rotor mast. When the telescopic structure extends, the foldable tubal blades extend from within the rotor mast, into a used position. In use, the tubal blades are static and supplied with water, under pressure, from a tank positioned inside the helicopter, wherein the water flows from a nozzle at the end of the blades. In use, water only flows through 2 of the tubal blades at any one time, allowing the direction of the water to be controlled; wherein the user may change which blades are in use, according to the position of the helicopter to the building. As an alternative to water, other types of fire extinguishers can be used.
Firefighting Helicopter For City Concepts

This invention is related to new generation of helicopters, which are enabled to tackle fire in city concepts.

In the event of fire in city concepts specifically in towers and high-rise buildings, often automatic aerial ladders are used to tackle fire with water or fire extinguisher.

However, the use of automatic aerial ladders can lead to a number of difficulties. Firstly, any land equipment and machineries are required to follow certain constrictions like traffic, whereas firefighting helicopter can largely prevent any wasting in regards of time and speed. Secondly, unlike automatic aerial ladders, firefighting helicopter can offer height adjustment for towers and high-rise buildings, thereby providing direct vision over scene. Thirdly, since tackling fire is a time sensitive matter, quick performance and maneuvers are important factors, which can be achievable more in firefighting helicopter than any land equipment and machineries. Lastly, with automatic aerial ladders at each time point smaller area of fire can be tackled compared with firefighting helicopter thereby complete tackling of fire can take so much longer when automatic aerial ladder is used.

To overcome these problems, the present invention propose a firefighting helicopter for city concepts with extension means for four tubal blades with rotor like structure just above rotor blades in order to flow water with pressure to targeted building, and cushioning means such that the tubal blades and telescopic mast like structure can fold away inside helicopter’s mast. There is also additional cushioning means for easy movement of helicopter’s mast due to its thickness compared with other helicopters, which is provided by zigzag pattern of mast on outside.

The extension means for four tubal blades is provided by a telescopic mast like structure, which is an extension from helicopter’s mast with three compartments, and an attachment point (a compartment with two holes in opposite directions) at the end of telescopic mast like structure.

The first cushioning means is designed in the way that four tubal blades are capable of folding away, thereby four tubal blades and telescopic mast like structure can fit in a helicopter’s mast like telescopic anchor when they are not in use.

The additional cushioning means is provided in the way that speed chain can lock around zigzag pattern of helicopter’s mast. In turn, sprockets help the movement of speed chain around the mast by their clockwise and anti-clockwise movements.

The firefighting helicopter is supplied with water from a tank inside the helicopter. Flexible spiral tube is responsible for delivering water from the water tank to the end of telescopic mast like structure in order to supply water to tubal blades. Current invention
considered use of water for tackling fire since other types of fire extinguisher can cause allergy reaction for some people. However, with this design any other types of fire extinguishers can be used.

At the end of telescopic mast like structure, there is a compartment with two holes in opposite directions (right and left sides) and each hole is connected to just two tubal blades with the same orientations. This is because at each time point, one of the holes is closed; thereby water can be flowed through nozzle with pressure just from two tubal blades according to the position of helicopter relative to the targeted building.

The invention will now be described solely by way of example and solely with reference to accompanying drawings in which:

Figure 1 shows a general picture of firefighting helicopter in order to relate basic structures to the function.

Figure 2 shows extension arrangements for a firefighting helicopter in order to be capable of flowing water with pressure through nozzle to the targeted building.

Figure 3 shows cushioning arrangements, which are considered in order to bend and fold away tubal blades and telescopic mast like structure inside helicopter’s mast when they are not in use.

Figure 4 shows additional cushioning arrangements in order to ease fast movement of helicopter’s mast due to its thickness compared with other helicopters.

In figure 1, vertical number 1 (helicopter’s mast) is bigger in diameter compared with other helicopters in order to provide a space for vertical number 2 (telescopic mast like structure) and horizontal number 3 (four tubal blades) to fold away inside vertical number 1. When vertical number 2 and horizontal number 3 are folded away inside vertical number 1, horizontal number 4 (rotor hubcap) is close and horizontal number 5 (hubcap for tubal blades) is located in the middle of horizontal number 4. Each rotor blade is connected to horizontal number 4 by feathering hinge, which allows it to swivel. When vertical number 2 is fully extended through the opening of horizontal number 4, horizontal number 6 (gas strut and shock absorber), which connects vertical number 2 to the middle of horizontal number 3, will result in extension of horizontal number 3. Horizontal number 5 is closed all the times and horizontal number 3 are static and cannot rotate unlike rotor blades.

Water is supplied from a tank inside of helicopter in order to flow with pressure to targeted building from horizontal number 3. Water is supplied from water tank to horizontal number 3 through vertical number 7 (flexible spiral tube) which travels from water tank to the end of vertical number 2.

If present invention is built based on configuration that is described in figure 1, then pilot will benefit from direct vision over scene unlike with any machineries and vehicles available in the market now, but will also develop its ability to predict progression of fire
based on environmental factors such as direction of wind and smoke in order to swiftly tackle fire in complex environments such as cities with high-rise buildings and towers with maximum efficiency. It is important to point out that, there is no escape option for those who affected by fire in top floors of high-rise buildings and towers. Meanwhile, at the moment there is no effective solution in order to tackle fire in complex environments like city concepts when top floors of high-rise buildings and towers are affected. In addition, since fire progression is always from down to top, in complex environments there is always concern of fire in top floors if any floor in high-rise buildings and towers is affected. Therefore, current invention is designed to swiftly tackle fire specifically when top floors are affected in such environments. This is achievable by having direct vision over scene and fast maneuvers which are made by pilot based on factors that affect the progression of fire.

Figure 2 shows extension arrangements for a firefighting helicopter which are designed for flowing water with pressure from end of horizontal number 3 (four tubal blades) through horizontal number 8 (power flow water nozzle). At the end of vertical number 2 (telescopic mast like structure), horizontal number 9 (a compartment with two holes in opposite direction) is located which allow water to flow to just two tubal blades with the same orientations at each time point according to position of firefighting helicopter relative to targeted building. At each time point, water can only flow to two tubal blades with the same orientations since one of the holes of horizontal number 9, which direct water just to two tubal blades with the same orientations, is always close.

Figure 3 shows cushioning means in which vertical number 2 (telescopic mast like structure) and horizontal number 3 (four tubal blades) are designed to fold away in vertical number 1 (helicopter’s mast). Vertical number 2 is comprised of three compartments. First two compartments are designed for protection as well extension, whereas the last compartment is just for extension and supplement of water to horizontal number 3 through its attachment with a horizontal number 9 (a compartment with two holes in opposite direction). The diameter of last compartment is the same as vertical number 7 (flexible spiral tube), which travels from water tank to the end of vertical number 2.

Similar to vertical number 2, horizontal number 3 are telescopic and can easily fold away in vertical number 1. In the middle of each horizontal number 3, there is a hinge, which allows it to bend. At the same time horizontal number 6 (gas strut and shock absorber) connects vertical number 2 to the middle of each horizontal number 3, which allows horizontal number 3 to fully bend and fold away inside vertical number 2.

Figure 4 shows an additional cushioning means, which are designed to ease fast movement of helicopter’s mast due to its thickness compared with other helicopters. To achieve this, vertical number 1 (helicopter’s mast) should have double glazed structure with zigzag pattern on outside and groove pattern inside in order to attach two walls together. With this pattern horizontal number 10 (speed chain) can easily lock around the vertical number 1 and horizontal number 11 (sprockets) in order to provide fast movement for vertical number 1. In total there are two horizontal number 11 which
located in opposite directions. Two horizontal number 11 ease the fast movement of horizontal number 10 by their clockwise and anti-clockwise movements.
Claims

1. A firefighting helicopter comprises a helicopter, extension means for four tubal blades from helicopter’s mast (telescopic mast like structure), attachment point (a compartment with two holes in opposite directions) to connect end of telescopic mast like structure to four tubal blades, water tank inside the helicopter, flexible spiral tube in which water can travel from water tank to the end of telescopic mast like structure in order to pass water through a compartment with two holes in opposite directions to tubal blades and two cushioning means. One cushioning means for folding away four tubal blades and telescopic mast like structure inside helicopter’s mast when they are not in use and the other to ease fast movement of helicopter’s mast due to its thickness in this design compared with other helicopters.

2. A firefighting helicopter according to claim 1, in which extension means for four tubal blades is provided by a telescopic mast like structure, which is an extension from helicopter’s mast with three compartments, and an attachment point (a compartment with two holes in opposite directions) at the end of telescopic mast like structure.

3. A firefighting helicopter according to claim 1, in which one of the cushioning means is provided by telescopic arrangement of mast like structure, tubal blades as well as hinge in the middle of each tubal blades, strut and shock absorber, which connects the telescopic mast like structure to the middle of each tubal blades, for folding away four tubal blades and telescopic mast like structure inside the helicopter’s mast when they are not in use.

4. A firefighting helicopter according to claim 1, in which the additional cushioning means is provided by a double glazed structure of helicopter’s mast with zigzag pattern on outside and groove pattern inside in order to attach two walls together. With zigzag pattern of mast on outside, speed chain can easily lock around the mast and two sprockets located in opposite directions. Clockwise and anti-clockwise movement of two sprockets as well as zigzag pattern of mast provide fast movement for helicopter’s mast with the help of speed chain.

5. A firefighting helicopter according to claim 1, in which water is supplied from a water tank inside the helicopter, which travels from tank to tubal blades in order to flow with pressure to targeted building.
6. A firefighting helicopter according to claim 1, in which flexible spiral tube is extended from water tank to the end of telescopic mast like structure in order to supply water to four tubal blades through a compartment with two holes in opposite directions which connects the end telescopic mast like structure to four tubal blades.

7. A firefighting helicopter according to claim 1, in which extension means for four tubal blades from helicopter’s mast (telescopic mast like structure) comprises three compartments. First two compartments are designed for extension and protection, whereas the last compartment just provides extension and its diameter is the same as flexible spiral tube, which supplies water from water tank to tubal blades through a compartment with two holes in opposite directions which connects the end of telescopic mast like structure to four tubal blades.

8. A firefighting helicopter according to claim 1, in which at the end of telescopic mast like structure there is an attachment point which connects end of telescopic mast like structure to four tubal blades (a compartment with two holes in opposite directions). At each time point, one of the holes is close and water from flexible spiral tube can only pass to two tubal blades with the same orientations in order to flow with pressure to targeted building. This is because based on position of helicopter relative to targeted building just two tubal blades can flow water with pressure to targeted building effectively.

9. A firefighting helicopter according to claim 2, in which four tubal blades are static and cannot rotate unlike rotor blades of helicopter.

10. A firefighting helicopter according to claim 2, in which four tubal blades are connected together via a hubcap which is always close unlike helicopter’s rotor hubcap which can be opened when telescopic mast like structure and four tubal blades need to be extended for use.
Application No: GB1801865.5  
Examiner: Mr Jorge Quintero  
Claims searched: 1-10  
Date of search: 2 August 2018

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

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  - A62C, B64C, B64D

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- WPI, EPODOC, INTERNET
### International Classification:

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