

Door and baby

Generated with Solving Mill software



Author(s):

Created: 22 Jan 2020, 19:44

Deadline: 22 Jan 2020

State: 3/0 final solutions are constructed

Problem models: 3

Solution models: 2

Sets of requirements to a resource: 1

Preliminary solutions: 7

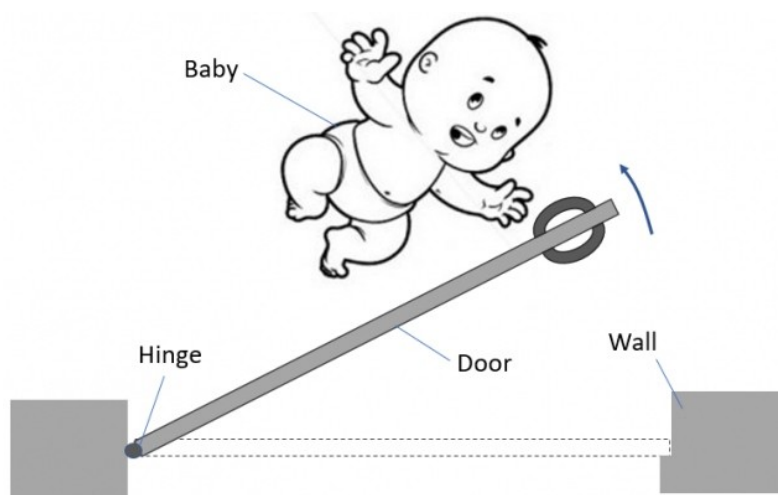
Final solutions: 3

Analysis of problem situation

Describing problem situation

Problem situation:

A child plays in front of a closed door. If you suddenly open the door, you can hit the child hard.
How to increase the safety of the child?



Undesirable effect:

Injured child

Useful product connected with problem situation:

Opened door

Production process essence:

An adult push the door. The door pivots and opens.

Revealing problem operation

Scheme of machine:



Machine function:

Provide a niche in a wall and close it

Machine components:

A door, hinges, doorway

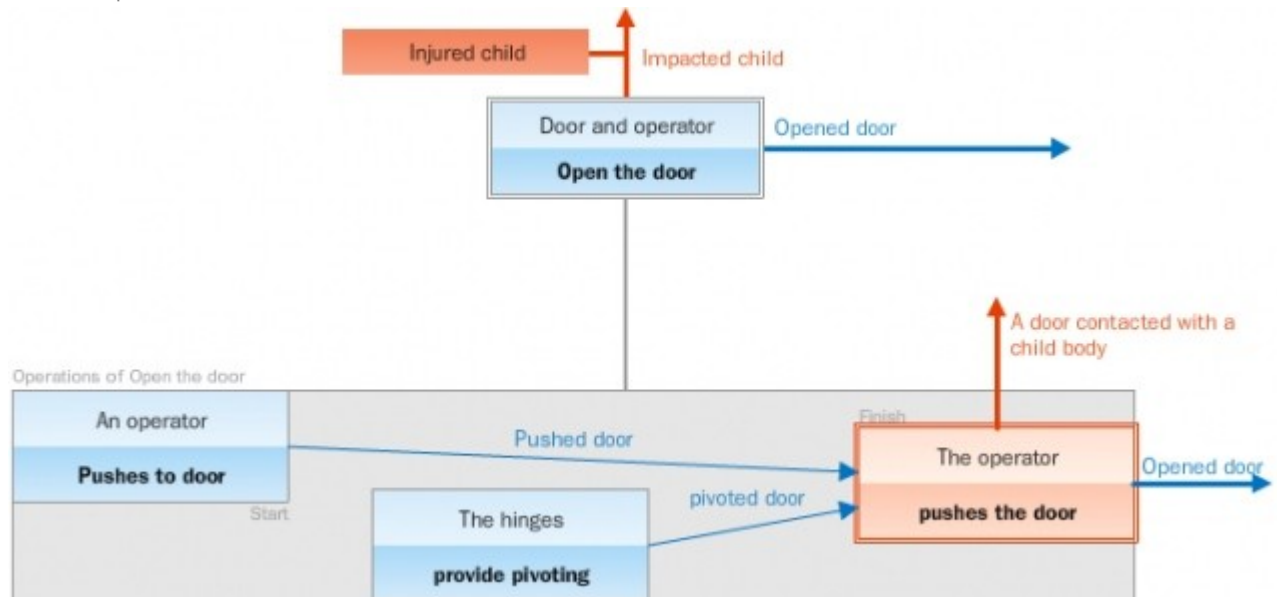
What is the structure of the machine?

the door located into doorway with possibility to pivot and open.

How does the machine work?

The operator pushes the door. The door is opened in direction to a child.

Production process model:



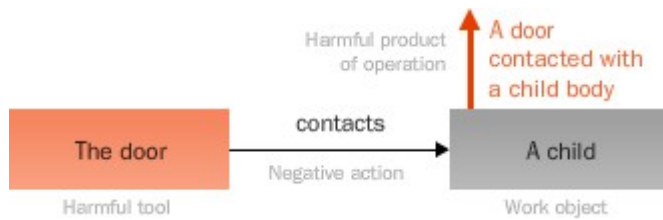
Scheme of problem operation:



Model of useful system for producing Opened door:

Investigating conflict

Scheme of conflict:

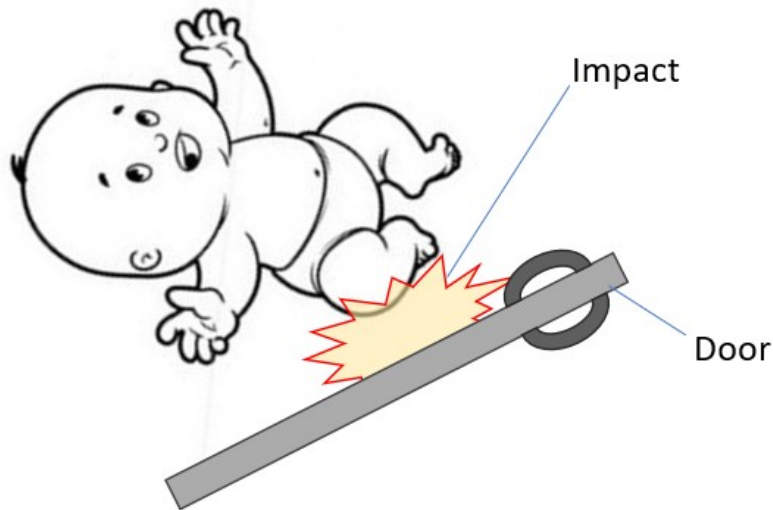


Exact conflict place:

A door and a child

Conflict time:

Time of contact a door and a child

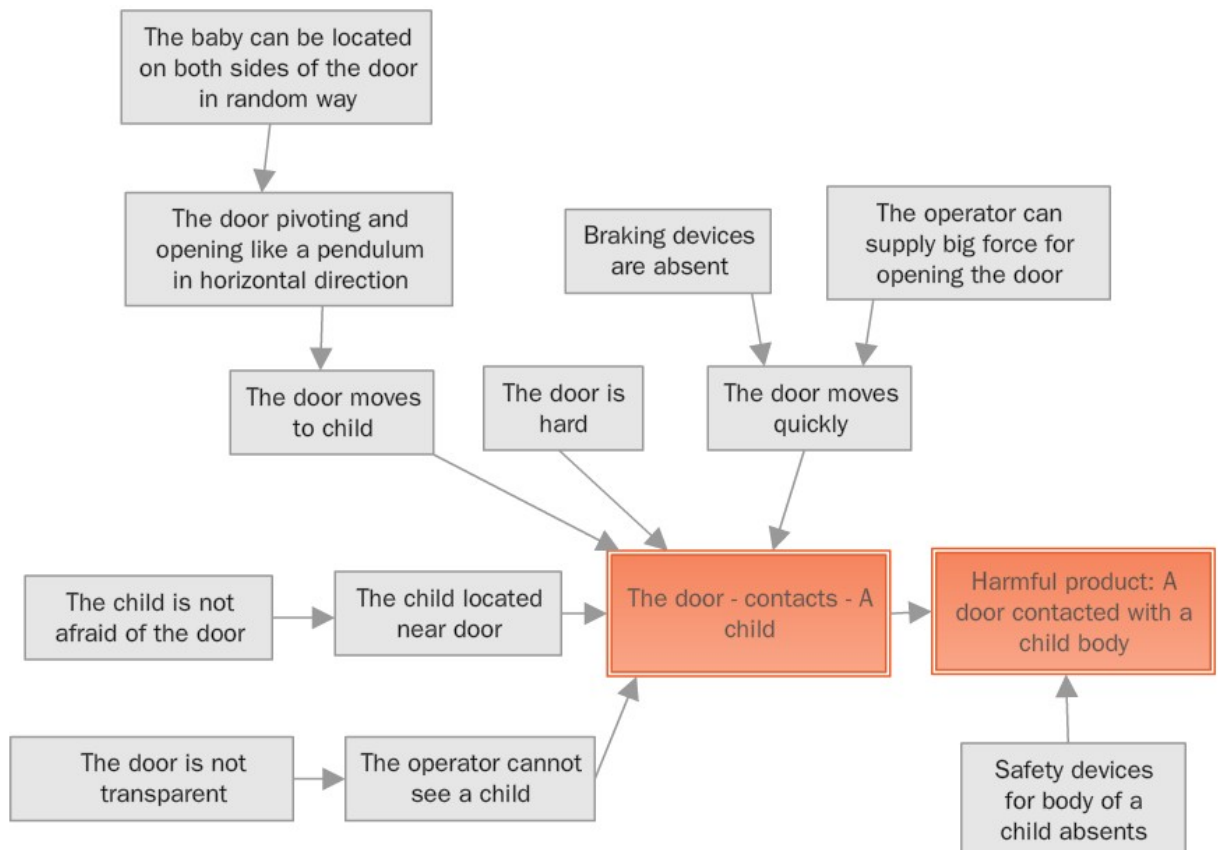


Conclusion:

The conflict is significant and should be eliminated.

Harmful system model:

Root cause scheme:



Main causes of the conflict:

The door pivoting and opening like a pendulum in horizontal direction

The baby can be located on both sides of the door in random way

The operator cannot see a child

The door is not transparent

The door is hard

The door moves quickly

Safety devices for body of a child absents

Suggesting conflict eliminating hypotheses

Problem solving

Hypothesis 1

Conflict can be eliminated if

the door would be opened in direction from place of location of the child

Formalized problem model (hyp. 1)

Short formulation:

There is a conflict in the machine "Door and operator" for producing "Opened door". The conflict essence is "The door - contacts - A child. Harmful product is A door contacted with a child body". Conflict can be eliminated if the door would be opened in direction from place of location of the child .

Goal:

Provide conditions indicated in the hypothesis <Conflict can be eliminated if
the door would be opened in direction from place of location of the child>

Operational zone:

A door and a child

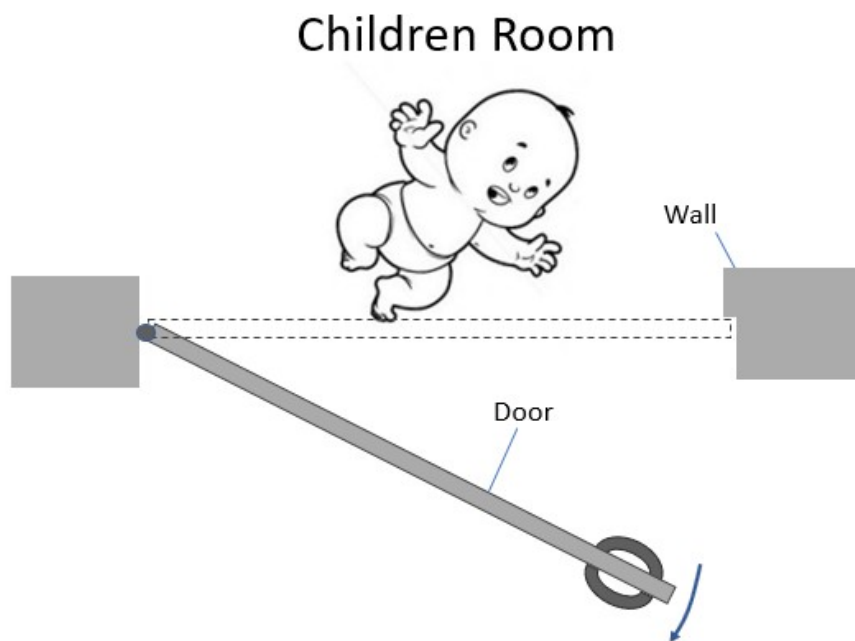
Available resources:

| Substances | Fields |
|------------------------------------|-----------------------|
| A door hinges doorway | mechanical electrical |
| Time | Space |
| Time of contact a door and a child | A door and a child |

Preliminary solution 1 for FPM1

Description:

Accurately identify the room for the child. Run the door so that it does not open in the nursery, but rather, outward.



Advantages:

The contact a door and a child is absent

Disadvantages:

The child could located from both place of the door in random way

Additional preliminary solutions

★ Preliminary solution GA1

Description:

Make the door opened into two directions. Use supports from double hinges.

To prevent injury to the child, the operator can always open the door for himself.

The screenshot shows the 'Generator of alternatives' software interface. It includes a browser window at the top, a list of alternative solutions on the right, and a main workspace on the left. The workspace contains a problem statement, a preliminary solution, and a diagram of the children's room.

Problem Statement: Conflict can be eliminated if the door would be opened in direction from place of location of the child

Preliminary solution 1 for FPM1: Accurately identify the room for the child. Run the door so that it does not open in the nursery, but rather, outward.

Children Room Diagram: The diagram shows a child in a room. A door is hinged to a wall. A dashed line indicates the door's path when closed, showing it would block the child's path.

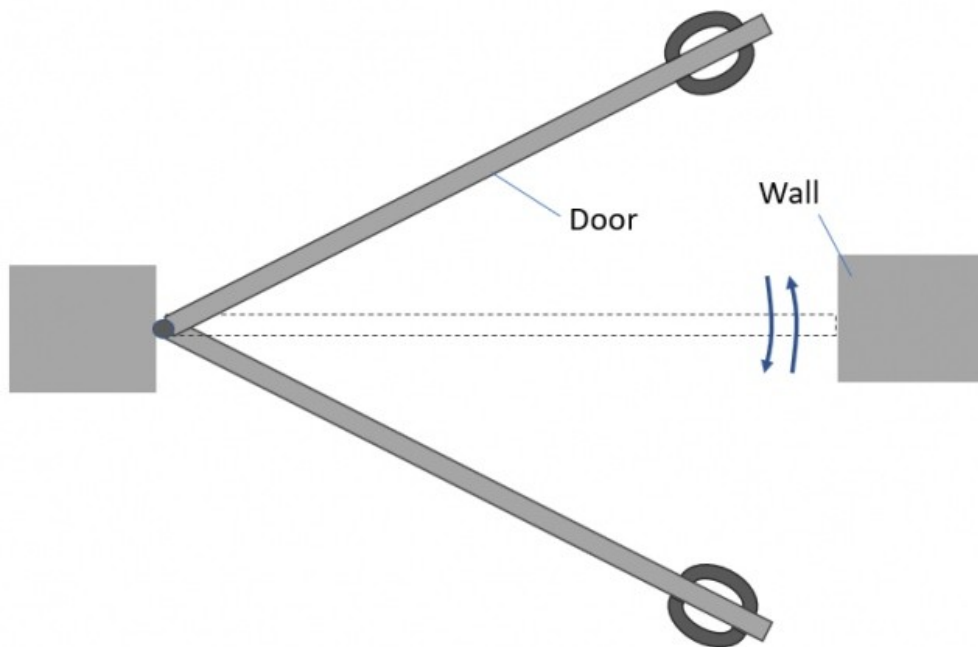
Alternative Solutions:

- Mono-bi-poly
- Trimming
- Segmentation
- Evolution of surface properties
- Internal structure evolution
- "Point - Line - Surface - Volume" transition
- Geometrical evolution of linear components
- Geometrical evolution of surfaces
- Geometrical evolution of volumetric components

Dynamization:

- Rigid system
- One direction moving
- Several moving components
- Increasing degrees of freedom

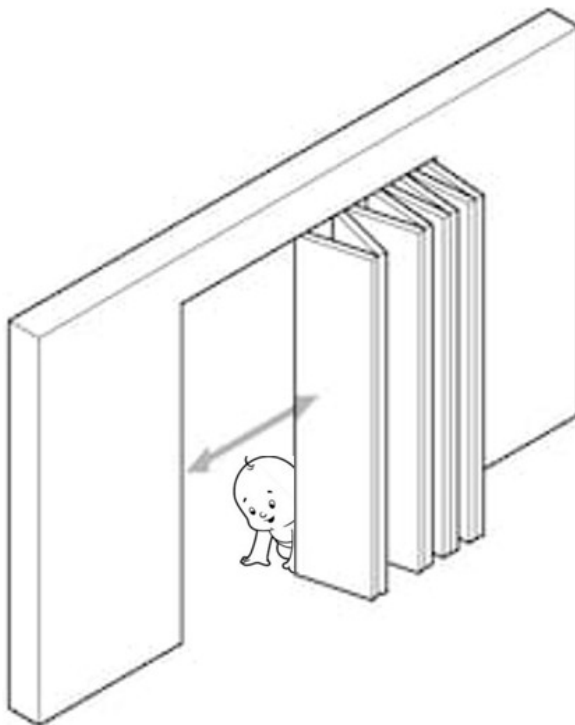
Bottom Bar: Description of machine | Description of useful system | Conflict



★ Preliminary solution GA2

Description:

Make the door like accordione.



Accordion door

★ Preliminary solution GA3

Description:

Use a roll-up door.



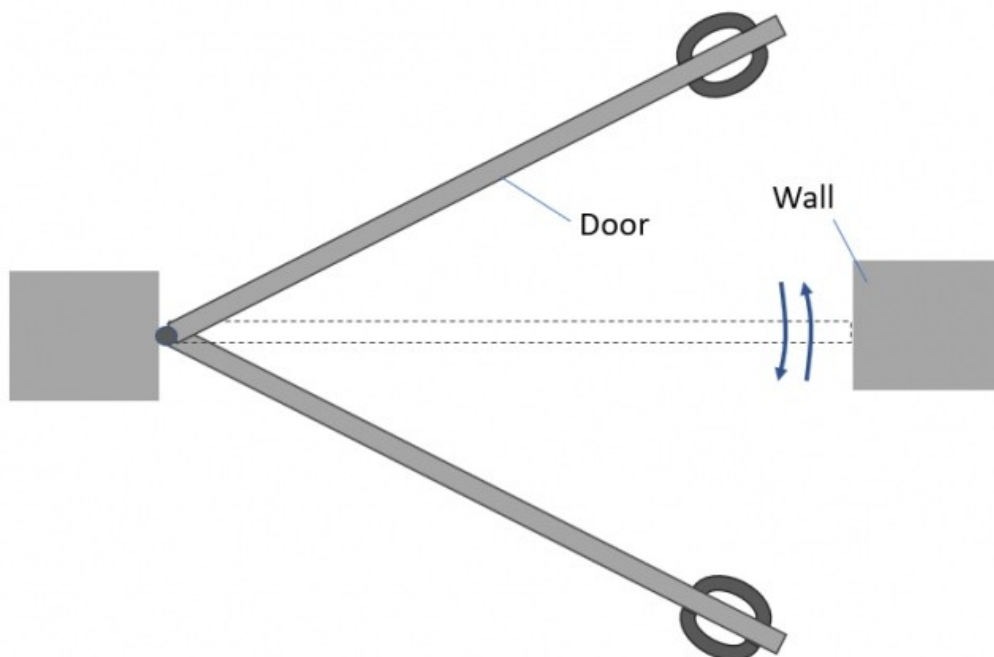
★ **Final solution (hyp. 1)**

Description:

Proposed idea:

Make the door opened into two directions. Use supports from double hinges.

To prevent injury to the child, the operator can always open the door for himself.





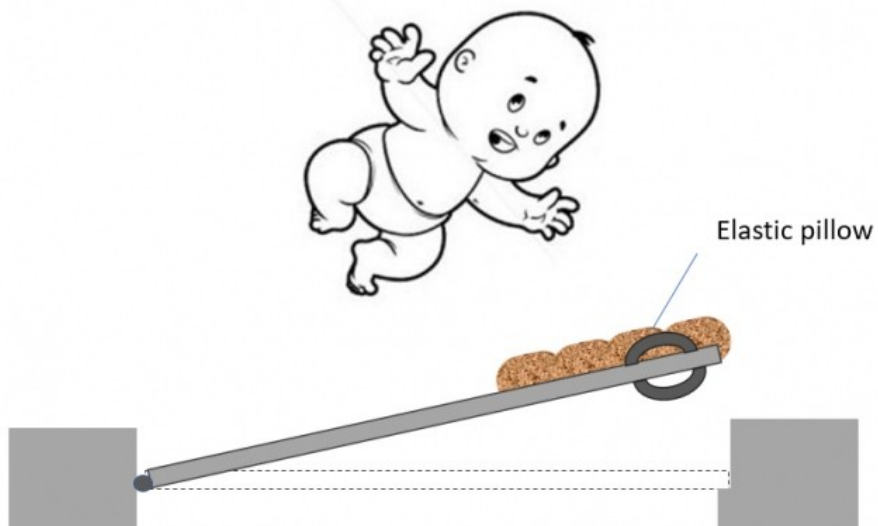
Hypothesis 2

Conflict can be eliminated if the door would be soft and elastic

★ Final solution (hyp. 2)

Description:

Make the door soft and elastic. Place on the door a pillow from soft material.



Hypothesis 3

Conflict can be eliminated if an operator would be understand the child is located behind the door during opening

🔍 Formalized problem model (hyp. 3)

Short formulation:

There is a conflict in the machine "Door and operator" for producing "Opened door". The conflict essence is "The door - contacts - A child. Harmful product is A door contacted with a child body". Conflict can be eliminated if an operator would be understanding the child is located behind the door during opening.

Goal:

Provide conditions indicated in the hypothesis <Conflict can be eliminated if an operator would be understand the child is located behind the door during opening>

Operational zone:

A door and a child

Available resources:

| Substances | Fields |
|------------------------------------|--------------------------|
| A door hinges doorway | Mechanical Electrical |
| Time | Space |
| Time of contact a door and a child | A door and a child |



Solution model 1 for FPM1

What and how should be done:

Provide a property Ability to observe place behind a door for operator in a system by means of a component which exhibits this property.



Resource (component) requirements

| | |
|---|--|
| what is it making in the system, where and when | to provide the operator with surveillance of the space behind the door |
| size | coordinate with size of the door |
| shape | coordinate with shape of the door |
| internal space | should to be evacuated in the center of the door to provide the void |
| material | transparent material (glass) |
| ability of control | handly |

IFR:

the door itself provides the operator with surveillance of the space behind the door



Preliminary solution 1 for FPM1 by SM1

Description:

Computer's description of an idea:

Provide a property Ability to observe place behind a door for operator by means of the system component A door. Use resource:

with size coordinated with size of the door

with shape coordinated with shape of the door

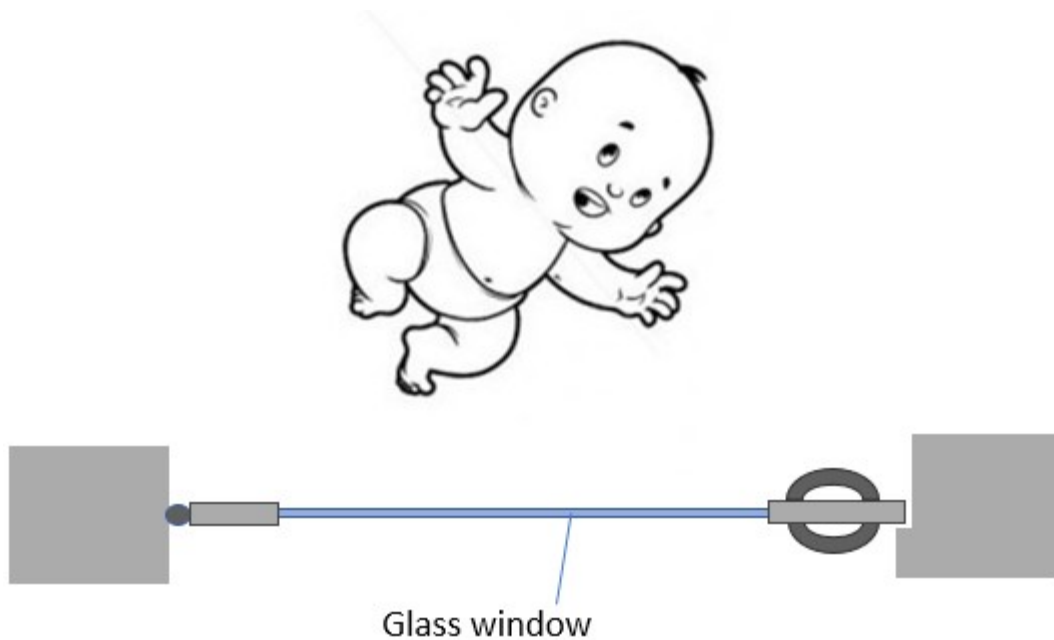
with internal space evacuated in the center of the door to provide the void

with material transparent material (glass)

with control handly

Translated description of an idea:

Make a door with transparent glass incert.



Advantages:

We obtain desired result

The design of the door is simple

Disadvantages:

no signal

Additional preliminary solutions

★ Preliminary solution GA4

Description:

Use a signal based on field principles: motion detektor and signal lamp.

★★★ Generator of alternatives

with size coordinated with size of the door
with shape coordinated with shape of the door
with internal space evacuated in the center of the door to provide the void
with material transparent material (glass)
with control handy

Translated description of an idea:
Make a door with transparent glass insert.

Baby 6.png Sketcher

preliminary solution GA4

Description: *

Use a signal based on field principles: motion detektor and signal lamp.

Insert image Sketcher

Description of machine Description of useful system Conflict

Mono-bi-poly

Trimming

Segmentation

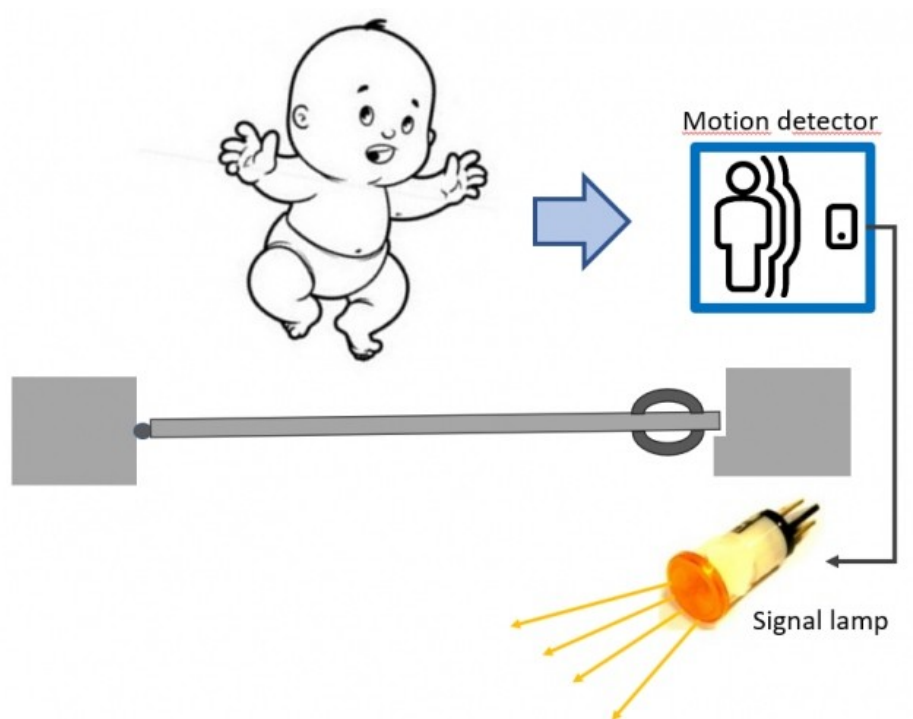
| | | | | |
|-----------------|-----------|------------|--------------------------|--------|
| Solid component | Two parts | Many parts | Granules | Powder |
| Pastes and gels | Liquid | Foam | Drop structures and mist | Gas |
| Plasma | Field | Vacuum | | |

PS:GA4
Use a signal based on field...

Evolution of surface properties

Internal structure evolution

"Point - Line - Surface - Volume" transition



★ **Final solution (hyp. 3)**

Description:

Make a door with transparent glass insert.



Hypothesis 4

Conflict can be eliminated if the door would be move slowly during opening

? Structural problem model (hyp. 4)

Short formulation:

There is a conflict in the machine "Door and operator" for producing "Opened door". The conflict essence is "The door - contacts - A child. Harmful product is A door contacted with a child body". Conflict can be eliminated if the door would be move slowly during opening.

Goal:

Improve the performance of the action <operator> - <pushes> - <door>;

Operational zone:

A door and a child

Available resources:

| Substances | Fields |
|------------------------------------|--------------------------|
| A door hinges doorway | mechanical electrical |
| Time | Space |
| Time of contact a door and a child | A door and a child |

! Solution model 1 for SPM1

What and how should be done:

Weaken the action by introducing into the system a protective component.

The screenshot displays the TI transformer software interface. On the left, a sidebar contains the problem formulation, goal, operational zone, and available resources. The main workspace is divided into two panels. The left panel, titled 'Indicate the tool:', 'Indicate the action:', and 'Indicate the work object:', contains the following text: 'operator', 'pushes', and 'door'. Below this, the 'What should be improved?' section lists five options, with 'Surplus useful action' selected. The 'Select the transformation method:' section lists three options, with 'Introduce into a system a protective component to shield zones for which strong action is undesirable' selected. The right panel, titled 'Introduce into a system a protective component to shield zones for which strong action is undesirable.', contains the following text: 'Optical tweezers', 'Light pressure is often used in optical laser tweezers for capture of microparticles. Trying to apply this method to nano-sized viruses shows that the energy of the weakest laser beam is too high. Engineers from the University of Victoria managed to reduce the energy directed at a virus by hundred times. They passed light through small holes in a metal film. The hole diameter was only a few times larger than the size of the particles being examined. The attenuated beam allows working with 50-nanometer particles.' Below the text is a small image of a laser beam passing through a hole in a metal film.

X Resource (component) requirements

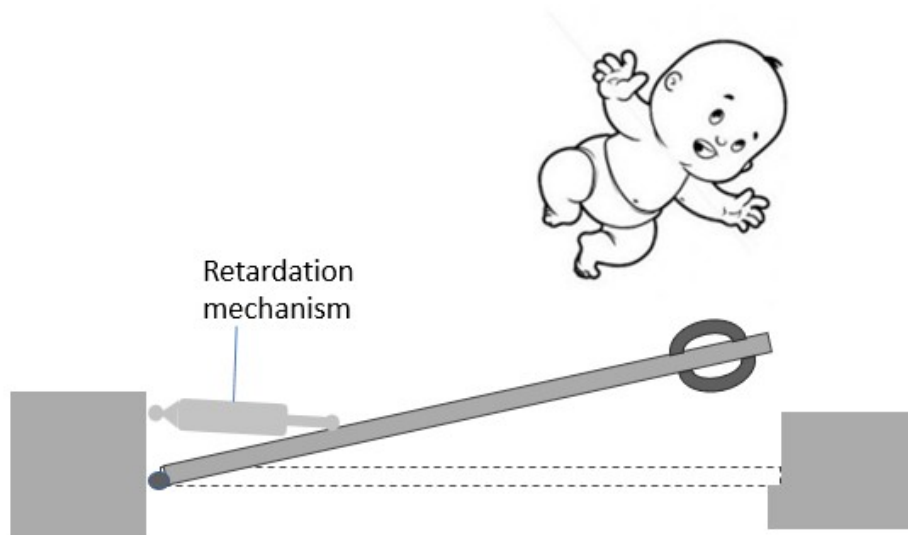
★ Preliminary solution 1 for SPM1 by SM1

Description:

Weaken the action by introducing into the system a protective component.

The introduced component is: a brake.

The place and position of the component in the system is: between a doorway and a door.



Analysis of situation improving

Composing technical proposal

Estimating conflict elimination

Draft of patent claims

Please note that the patent claim is automatically generated based on your texts. It is necessary to check whether the texts fit the patent application rules.

Claim 1. A device (equipment) for Provide a niche in a wall and close it, comprising:

A door, hinges, doorway

wherein

proposed idea:

Make the door opened into two directions. Use supports from double hinges.

To prevent injury to the child, the operator can always open the door for himself.

Claim 2. A device (equipment) in accordance with claim 1
wherein
accurately identify the room for the child. Run the door so that it does not open in the nursery, but rather,
outward.

Claim 3. A device (equipment) in accordance with claims 1, 2
wherein
make the door opened into two directions. Use supports from double hinges.
To prevent injury to the child, the operator can always open the door for himself.

Claim 4. A device (equipment) in accordance with claims 1, 2, 3
wherein
make the door like accordion.

Claim 5. A device (equipment) in accordance with claims 1, 2, 3, 4
wherein
use a roll-up door.

Claim 6. A device (equipment) in accordance with claims 1, 2, 3, 4, 5
wherein
computer's description of an idea:
Provide a property Ability to observe place behind a door for operator by means of the system component
A door. Use resource:
with size coordinated with size of the door
with shape coordinated with shape of the door
with internal space evacuated in the center of the door to provide the void
with material transparent material (glass)
with control handy

Translated description of an idea:
Make a door with transparent glass insert.

Claim 7. A device (equipment) in accordance with claims 1, 2, 3, 4, 5, 6
wherein
use a signal based on field principles: motion detector and signal lamp.

Claim 8. A device (equipment) in accordance with claims 1, 2, 3, 4, 5, 6, 7
wherein
weaken the action by introducing into the system a protective component.
The introduced component is: a brake.

The place and position of the component in the system is: between a doorway and a door.