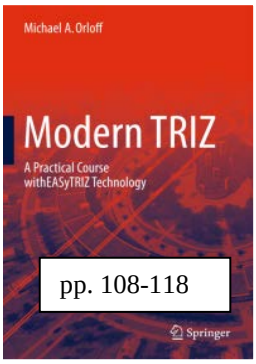
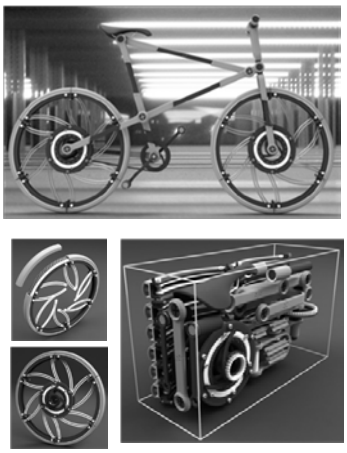


<table>
<tr><td rowspan="2">24 problem</td><td colspan="2">Standard contradiction</td></tr>
<tr><td>(+)-factor</td><td>(-)-factor</td></tr>
<tr><td>The bicycle is heavy and bulky, it is difficult to carry and store</td><td>Ease of transportation and storage</td><td>Large weight and overall dimensions</td></tr>
<tr><td>Time: 1978</td><td colspan="2" rowspan="3">  </td></tr>
<tr><td>Solution: continued development of folding bicycles in Germany</td></tr>
<tr><td>TRIZ: Segmentation, Dynamization, Local property, Copying</td></tr>
<tr><td>Time: 2008</td><td colspan="2" rowspan="3"> 
Contortionist by Dominic Hargreaves</td></tr>
<tr><td>Solution: the Contortionist model is a surprisingly simple realization of the Matryoshka principle – the entire construction is hidden between the wheels, and the folded bicycle is easy to roll!</td></tr>
<tr><td>TRIZ: Segmentation, Dynamization, Local property, Copying, Inverse action, Transition into another dimension, Matryoshka</td></tr>
<tr><td>Time: 2008</td><td colspan="2" rowspan="3"> 
Duncan Fitzsimmons</td></tr>
<tr><td>Solution: a graduate of the Royal College of Arts (RCA, London) designed something which is "apparently incredible" – a collapsible wheel!</td></tr>
<tr><td>TRIZ: Segmentation, Dynamization</td></tr>
<tr><td>Time: 2009</td><td colspan="2" rowspan="2"> 
Urban Bicycle designed by Victor M. Aleman</td></tr>
<tr><td>Solution: Mexican designer Victor Aleman proposed a bicycle where all components are disassembled into small parts and then turned into a "nested doll"!</td></tr>
<tr><td>TRIZ: Segmentation, Dynamization, Matryoshka</td><td colspan="2"></td></tr>
</table>

<table>
<tr><td rowspan="2">25 problem</td><td colspan="2">Standard contradiction</td></tr>
<tr><td>(+)-factor</td><td>(-)-factor</td></tr>
<tr><td>The bicycle is bulky, it is difficult to carry and store</td><td>Ease of transportation and storage</td><td>Large size</td></tr>
<tr><td>Time: 2008</td><td colspan="2" rowspan="2"> 
STRiDA by Mark Sanders</td></tr>
<tr><td>Solution: smaller wheels, radical modification of the traditional frame form

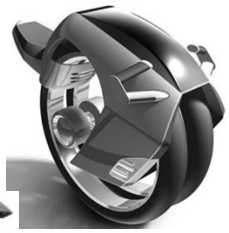
TRIZ: Segmentation, Dynamization, Local property, Copying, Inverse action, Transition into another dimension, Matryoshka</td></tr>
<tr><td>Time: 2008</td><td colspan="2" rowspan="2"> 
Mobiky MY16 CONFORT
 
Genius Rendezvous from Mobiky & Matra MS</td></tr>
<tr><td>Solution: further reduction of wheel size (the wheels are now almost as small as those of a scooter) + the Genius model is fitted with an electric motor

TRIZ: Segmentation, Dynamization, Local property, Copying, Inverse action, Replacement of mechanical matter</td></tr>
<tr><td>Time: 2009</td><td colspan="2" rowspan="2"> 
Grasshopper by David Gonçalves
  </td></tr>
<tr><td>Solution: this Grasshopper also shatters our familiar perceptions of design and functionality,

So – to paraphrase a famous maxim – the bicycle is as inexhaustible as … the atom!

TRIZ: Segmentation, Dynamization, Spherical-shape</td></tr>
</table>

<table>
<tr><td rowspan="2">26 problem</td><td colspan="2">Standard contradiction</td></tr>
<tr><td>(+)-factor</td><td>(-)-factor</td></tr>
<tr><td>The chain is the most "obsolescent" system component of the bicycle!</td><td>It is necessary to improve gear efficiency</td><td>Transmission has too many links</td></tr>
<tr><td>Time: 1869</td><td colspan="2" rowspan="3"> 
Monowheel by Rousseau of Marseilles</td></tr>
<tr><td>Solution: invention which can only be described as a stroke of genius! Who knows, maybe the future of the bicycle is its "well forgotten" past?! – see below</td></tr>
<tr><td>TRIZ: ideal (in a fashion) TRIZ-Solution: the system is reduced to its operating element! + Copying, Inverse action, Local property, Matryoshka</td></tr>
<tr><td>Time: 2008</td><td colspan="2" rowspan="3"> 
 
Monowheel by Ben Wilson</td></tr>
<tr><td>Solution: history repeats itself at a new level of evolution!
This model does have a chain – although it is quite small!</td></tr>
<tr><td>TRIZ: ideal TRIZ-Solution: transmission is considerably reduced! + Copying, Local property, Matryoshka</td></tr>
<tr><td>Time: 2008</td><td colspan="2" rowspan="3"> 
Transformer by Sergio Garcia, USA
www.sergiotheg.com</td></tr>
<tr><td>Solution: this one has no chain, either! The wheels of this "bicycle" are joined by a flexible transformer frame which can assume bizarre shapes</td></tr>
<tr><td>TRIZ: Inverse action (very radical!), Local property, Dynamization – and simple sense of humor!</td></tr>
</table>

<table>
<tr><td rowspan="2">27 problem</td><td colspan="2">Standard contradiction</td></tr>
<tr><td>(+)-factor</td><td>(-)-factor</td></tr>
<tr><td>When going uphill, it is difficult to push the pedals even in low gears; people with weak health find it difficult to ride the bicycle for a long time</td><td>Negotiate steep hills; increase duration of the trip</td><td>There are no suitable gears; muscle power is insufficient</td></tr>
<tr><td colspan="3">Time: since the 1990-es</td></tr>
<tr><td colspan="3">Solution: invention of electric bicycles with storage batteries and electric motors</td></tr>
<tr><td colspan="3">TRIZ: Replacement of mechanical matter, Separation, Local property, Copying, Partial or excess effect, Discard and renewal of parts, Mediator, Unite</td></tr>
<tr><td colspan="3"> 
Modern Electrobike Pi</td></tr>
<tr><td colspan="3">Time: 2009</td></tr>
<tr><td colspan="3">Solution: the motor-wheel is designed by Carlo Ratti's MIT SENSEable City Lab</td></tr>
<tr><td colspan="3">TRIZ: trend – idealization and reduction!</td></tr>
<tr><td colspan="3">Copenhagen Wheel by Carlo Ratti – MIT SENSEable City Lab.
 
  </td></tr>
<tr><td colspan="3">Time: 2009</td></tr>
<tr><td colspan="3">Solution: reduce!
One of the authors was apparently incapable of letting go of one "redundant" wheel.
Well, at least the others did not stand on ceremony – and this is what we have as a result. I do not even know what to call these machines – light motorcycles or super-heavy bicycles…
As for the pedals, well, you cannot push them because they are not there.
To compensate for that, there are plenty gyroscopes and a powerful electronic brain…</td></tr>
<tr><td colspan="3">TRIZ: Reduction! + Replacement of mechanical matter, Inverse action, Matryoshka… and others</td></tr>
<tr><td colspan="3">NOAH by Andrei França
 
 

Bombardier EMBRIO
  </td></tr>
</table>

<table>
<tr><td rowspan="2">28 problem</td><td colspan="2">Standard contradiction</td></tr>
<tr><td>(+)-factor</td><td>(-)-factor</td></tr>
<tr><td>Use of composite materials makes the bicycle lighter – and more expensive</td><td>Weight of the moveable object</td><td>Complex construction consisting of many components</td></tr>
<tr><td>Time: 2008</td><td colspan="2" rowspan="3">Ultimate Wheel (1980-e)
 
Ciclotte by Luca Schieppati
  </td></tr>
<tr><td>Solution: in its laconic expression, this extraordinary idea is similar to the original marginal concept of a "bicycle" as a "wheel with pedals"!</td></tr>
<tr><td>TRIZ: Reduction + Inverse action, Matryoshka</td></tr>
<tr><td>Time: 2009</td><td colspan="2" rowspan="3"> 
Wheelskates by Michael Jenkins
  </td></tr>
<tr><td>Solution: Australian inventor Michael Jenkins invented another "foot-wheel" concept (basically, a scooter)</td></tr>
<tr><td>TRIZ: Reduction + Segmentation, Separation, Dynamization, Inverse action, Local property, Copying</td></tr>
<tr><td>Time: 2009</td><td colspan="2" rowspan="3"> 
 
Winglet from Toyota</td></tr>
<tr><td>Solution: you can stand, and you can sit! Is this a bicycle, or is this a scooter?... Be that as it may, Dean Kamen's Segway has robbed many people of their sleep! And, naturally, there is a massive informational resource represented by multiple gyroscopes and processors – so that you don't even have to think!</td></tr>
<tr><td>TRIZ: reduction – to the operating elements, to the "last" wheel (well, it IS a dual wheel)!</td></tr>
<tr><td>Time: 2008</td><td colspan="2" rowspan="3"> 
COOL RIDER
  </td></tr>
<tr><td>Solution: a "tow car"! If you complete this scooter with a saddle, it will turn into a "bike" – with the pedals cut off…</td></tr>
<tr><td>TRIZ: Segmentation, Separation, Local property, Inverse action, Transition into another dimension, Mediator (!), Matryoshka</td></tr>
</table>

<table>
<tr><td rowspan="2">29 problem</td><td colspan="2">Standard contradiction</td></tr>
<tr><td>(+)-factor</td><td>(-)-factor</td></tr>
<tr><td>Modern bicycles are heavy and have poor power-to-weight ratios</td><td>Increase of storage battery capacity</td><td>Large weight</td></tr>
<tr><td colspan="3">Time: 2006</td></tr>
<tr><td colspan="3">Solution: and this is just a joke, not a bike but a scooter!
But in this case we can say that it is a "reduced" Comte de Sivrac bike! If only it had an electric motor!</td></tr>
<tr><td colspan="3">TRIZ: reduction – to the operating elements, to the "last" wheel!</td></tr>
<tr><td colspan="3">   Magic Wheel</td></tr>
<tr><td colspan="3">Time: since the 1990-es</td></tr>
<tr><td colspan="3">Solution: and this is a wonderful "hobby horse" of Trevor Blackwell, a very serious engineer and entrepreneur from the Silicon Valley. Only the pedals are missing!</td></tr>
<tr><td colspan="3">TRIZ: almost total reduction if the prototype is a real bike, or expansion if the prototype is a monocycle!</td></tr>
<tr><td colspan="3">   http://focusdesigns.com</td></tr>
<tr><td colspan="3">Time: 2009</td></tr>
<tr><td colspan="3">Solution: invention of an "almost" monocyclic bike with an electric drive – what a beauty! Animations are especially impressive!</td></tr>
<tr><td colspan="3">TRIZ: Trend – partial reduction to one operating wheel!</td></tr>
<tr><td colspan="3">   Скутер YikeBike</td></tr>
<tr><td colspan="3">Time: 2008</td></tr>
<tr><td colspan="3">Solution: something evocative of a "kamikaze in a torpedo" – this invention draws a lot of attention and causes bitter arguments</td></tr>
<tr><td colspan="3">TRIZ: Reduction + Inverse action, Transition into another dimension + fantasy.
My teacher Stanislaw Antonovich Baltsevich used to say: "There is no limit to both human fantasy and human stupidity!" He than went on to provide a suitable quote from the great Einstein.
(NB: the second part of my teacher's statement does not apply to this example.)</td></tr>
<tr><td colspan="3">  WheelU by Tomer Zer Kavod
Look, standing is bad, sitting is good, and lying is even better, that's why we have recumbent models! What else would you want?! So our idea is siple – look at the alternatives and… do what you think is best!</td></tr>
</table>

30 problem	**Standard contradiction**	
	(+)-factor	(-)-factor
It IS TRUE – it is difficult to learn to ride the bicycle, and it is equally difficult to ride it using just one wheel…	*Comfort, safety*	*Unreliability, instability*
Time: 2009	 Gyrobike with Gyrowheel	
Solution: This bike manufactured by Gyrobike, a company established by graduates of the Dartmouth College, USA, increases stability of the bicycle – which is quite useful when you are teaching your kid to ride it!	 	
TRIZ: *Replacement of mechanical matter, Separation, Copying, Matryoshka*		
Time: 2009	   Honda U3-X	
Solution: Due to inbuilt gyroscopes, this bike/scooter can stand "by itself", while the ingenious construction of its wheel endows it with an ability to move in "all directions"!		
TRIZ: *Reduction! + Segmentation, Self-servicing, Feedback, Universality*		
Time: since the 1990-es	 Carnegie Mellon University's Robotics Institute www.ri.cmu.edu	
Solution: Inventor Thomas Gordon sees such robots exploring the Mars and the Moon. It rolls BY ITSELF (apparently obeying TRIZ laws). But will it be able to stand up BY ITSELF if it falls?		
TRIZ: *Replacement of mechan. matter, Separation, Local property, Copying*		

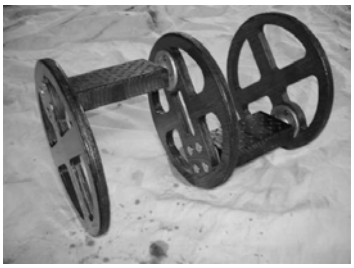
31 problem	**Standard contradiction**	
	(+)-factor	(-)-factor
Bicycle ergonomics, efficiency and design will continue to improve. How?	*Comfort, safety, ease of use*	*Weight, dimensions*
Time: 2009	 Chris Boardman & SkySports Design concept	
Solution: design-concept of this hybrid was suggested by a 1992 Olympic champion (there is little left to add: miniature storage battery and electric motor + pedal gear)		
TRIZ: *trend – idealization!*		

Finally, to prove that the bicycle is as inexhaustible as the atom, I will give you several examples of more obscure ideas which have not gained such popularity. However, these examples have considerable cognitive and esthetic value, and to leave them out of this book would mean to detract from the knowledge and impressions of my respectable readers.

I am not commenting on these examples. Instead, I exhort you (if you like them, that is) to use them to hone your extracting and reinventing skills.

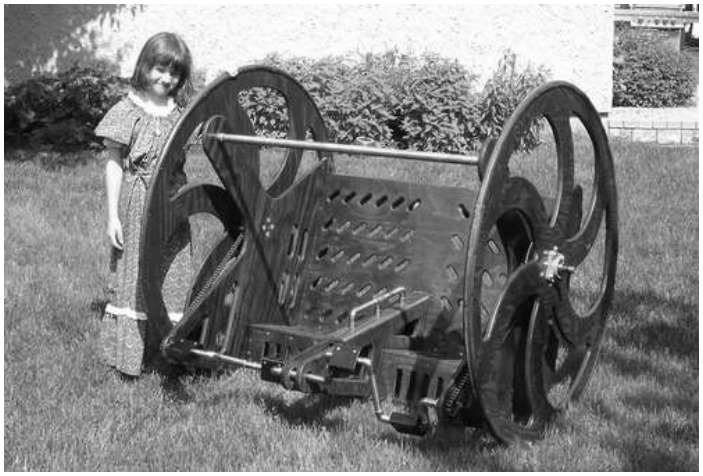
Also, I would like to draw your attention to the fact that some of these illustrations can be classified as belonging to *steampunk*[*], a branch of fantastic and visual arts which I believe is imbued with nostalgia for *lost generations* producing numerous engineering and social failures. Naturally, not all of these things would have been found useful, and not all of them are likeable. Still, they all leave a lot of room for the imagination…

www.buildlog.net



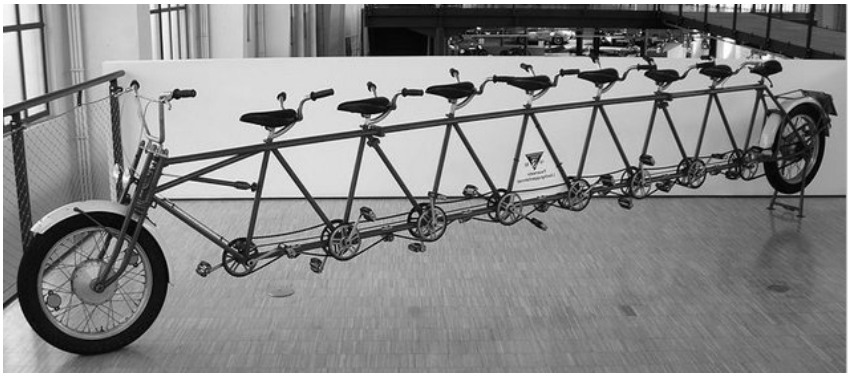
www.instructables.com

www.instructables.com



[*] http://en.wikipedia.org/wiki/Steampunk

Main problem – do not fall asleep!



Pity you cannot make it any longer – it will be too difficult to turn!

All according to TRIZ: if you cannot make it longer, make it rounder

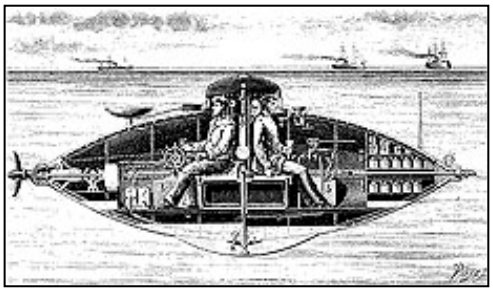
By air!

By water!

http://www.eons.com/groups/topic/2573825-July-28

Under water!

See Example 13.19 to compare!



http://www.bluespace.ru/about.html

By land or by water!

www.shuttlebike.com

By land and by water!

Almost a car!

Well, if you are still not impressed, maybe this fruit of an active imagination will give you positive emotions – and you will be surprised, if not amazed?

www.gizmag.com