Patent illustrations:
from arts to engineering

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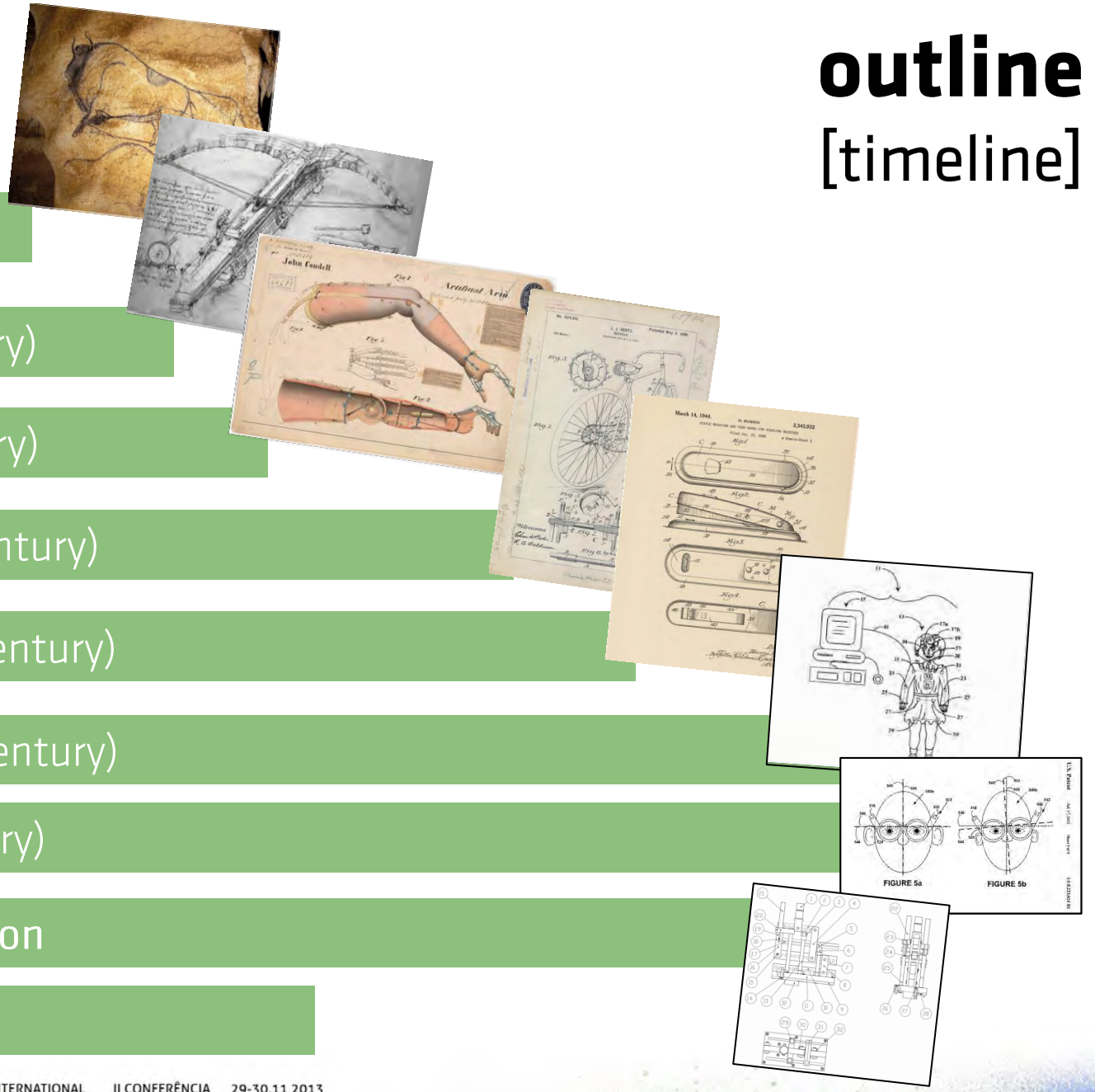
outline
[timeline]

- introduction
- 40,000 BC
- 1500's (XVIth century)
- 1800's (XIXth century)
- 1899 (late XIXth century)
- 1950's (mid XXth century)
- 1990's (late XXth century)
- 2000's (XXIst century)
- author's contribution
- conclusions



Patents are documents that have the need for an extensive and full description of mechanisms, functions and ideas.

As patentes são documentos que devem apresentar uma descrição extensa e exaustiva de mecanismos, funções e ideias.

Drawings, schemes, graphs and infographics as illustrations are used to help in this effort to communicate the invention which incorporates the patent.

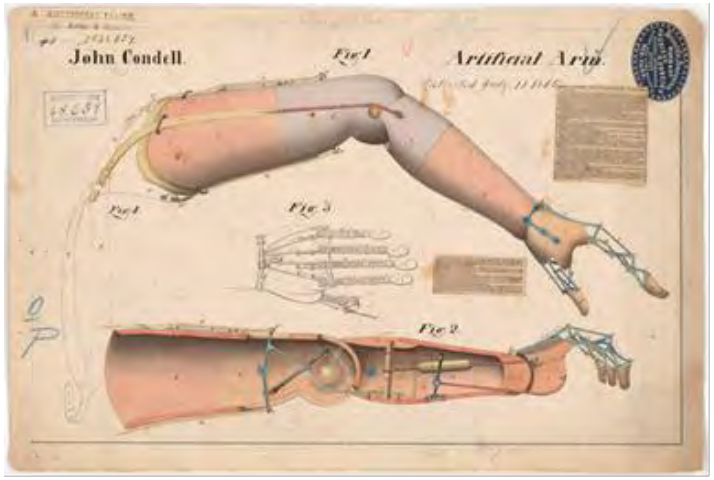
Ilustrações como desenhos, esquemas, gráficos e infografias são utilizados para ajudar neste esforço de comunicar a invenção que incorpora a patente.

these illustrations are mandatory since the United States Patent & Trade Office opened in 1790

as ilustrações são obrigatórias desde que o Gabinete de Patentes e Comércio dos EUA abriu em 1790

XIXth and mid XXth centuries

artistic techniques like shading, multiple perspectives and texture showing a craftsman quality were common



US National Archives image 4516086 (Patent 48,659) relative to an Artificial Arm from 1865.

XXth and XXIst centuries

these illustrations have been simplified, losing the artistic quality and nowadays patent drawings are simple sketches very different from the early years

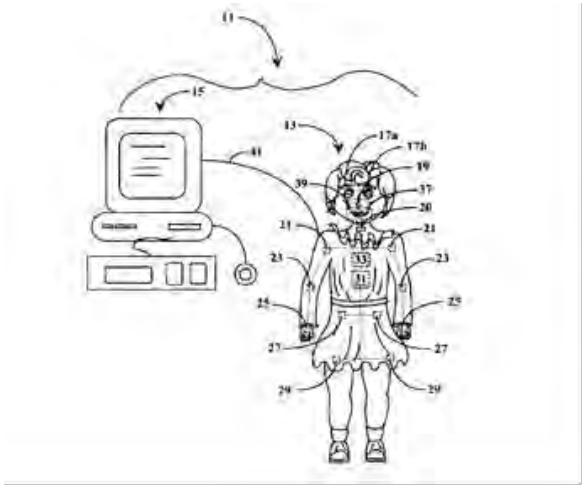


Illustration relative to the PC peripheral interactive doll from 1998 (Patent 6,319,010).

inventive drive is a determinant characteristic of humans, and has been a factor of success for humankind development

cave paintings from early eras such as the Aurignacian period, approximately 40,000 years ago show animals and humans in hunting scenes

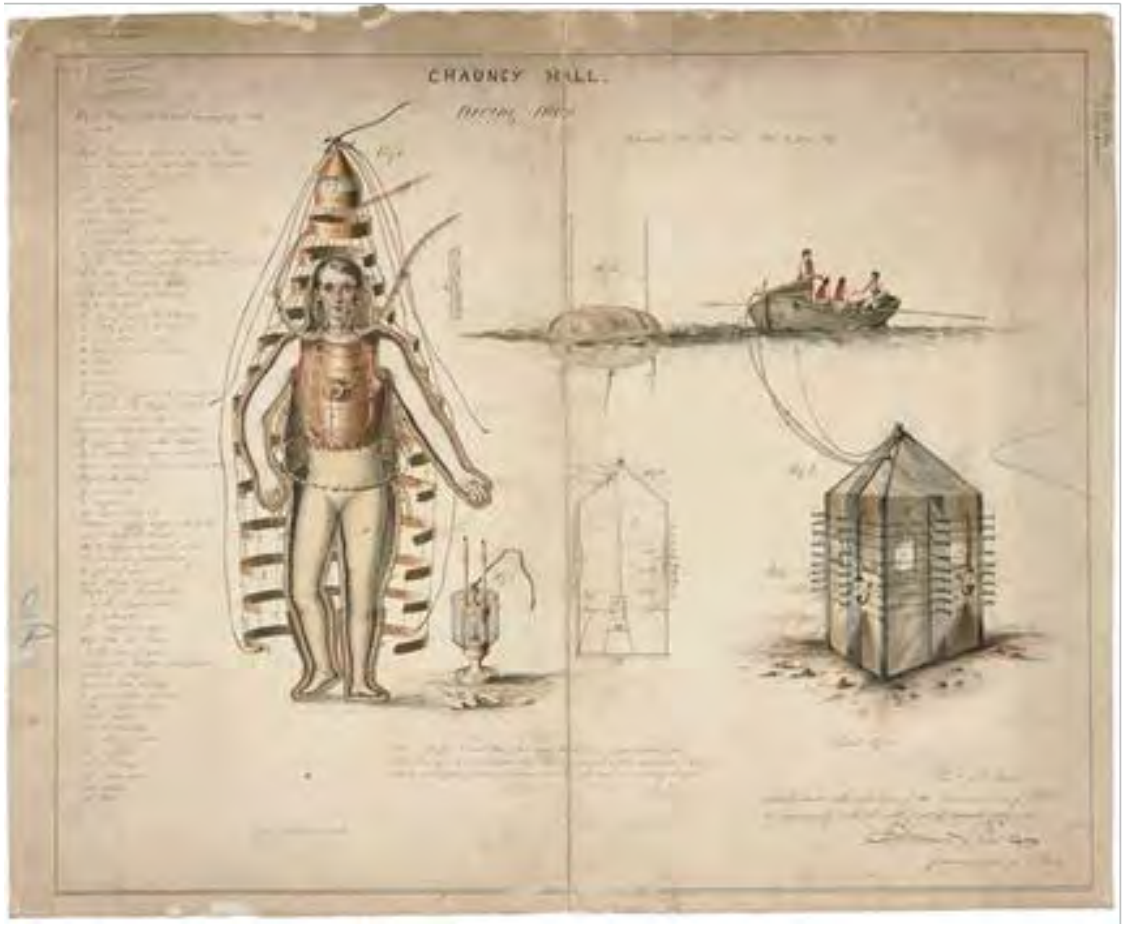
this was probably the first artistic expression to illustrate a technological development and help to explain how to use hunting tools and techniques

Bull painting from Chauvet cave (Ardèche) dating from 30,340 years ago

evolving from the bi dimensional cave paintings to three dimensional and perspective views, Leonardo's da Vinci illustrations shows comments alongside with sketches

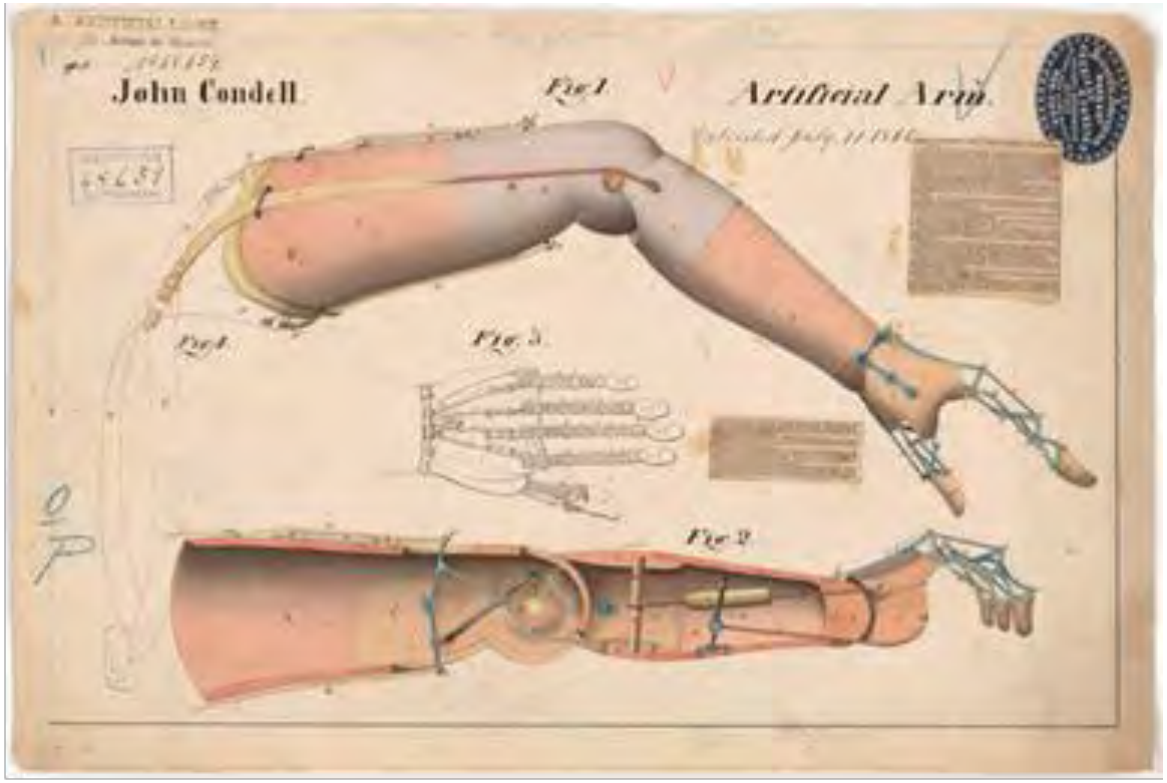
Leonardo's giant crossbow sketch design (1486).

despite some evidences that ancient Greek cities suggested something like the usage of patents and the fact that "letters patent" were issued as royal grants in England circa 1331, it is interesting to note that **the history of patents and patent law is considered to start contemporaneously to Leonardo da Vinci, with the Venetian Statue of 1474 issued by the Republic of Venice**



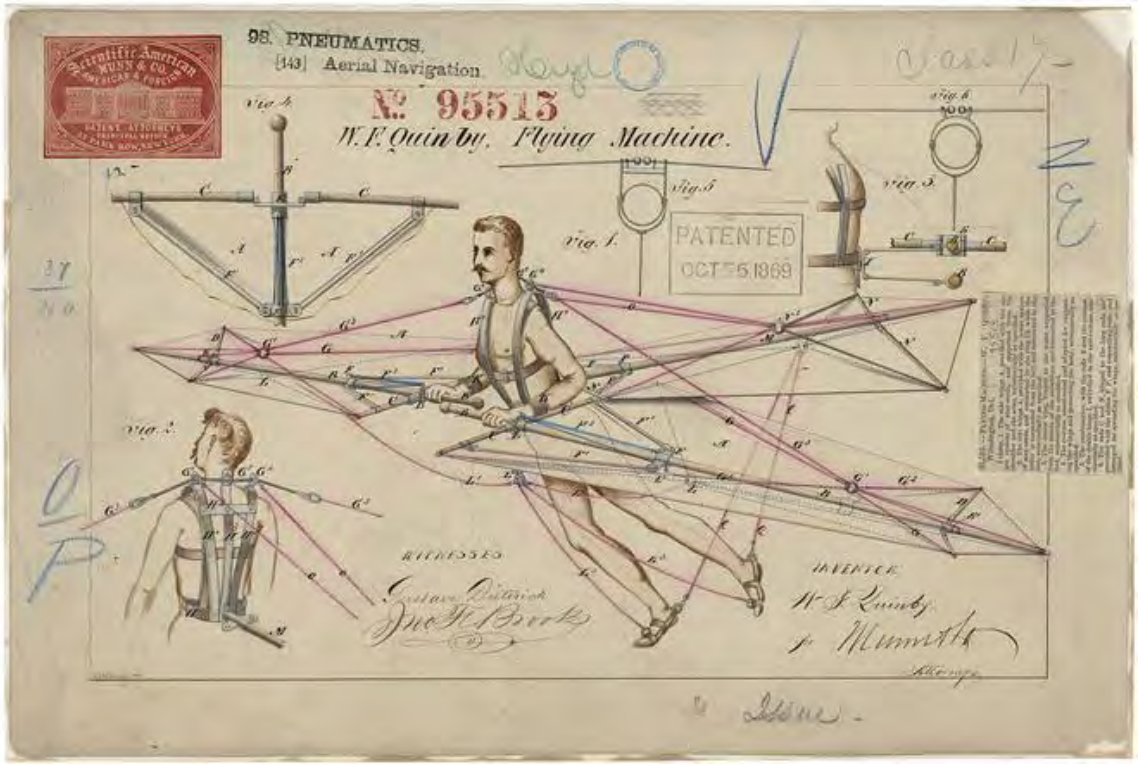
US National Archives image 594916 (241 Patent 1405X) relative to a Diving Dress filed in 1810 by C. Hall

the body and face of the user was drawn in impressive detail



US National Archives image 4516086 (Patent 48,659) relative to an Artificial Arm from 1865.

cross section with three dimensional view is extremely detailed showing the hidden mechanisms rendered with colors and shades shows the quality of the Artificial Arm patent illustrations



US National Archives image 594412 (Patent 95,513) relative to a Flying Machine from 1869.

shows some details in the user's hair and mustache and uses "flying colors" to distinguish different materials

this colorful drawings were troublesome when trying to reproduce in order to obtain and distribute copies of the patents

in the late 1800s the United States Patent Office enforced a rule that **patent drawings should be done with black ink**

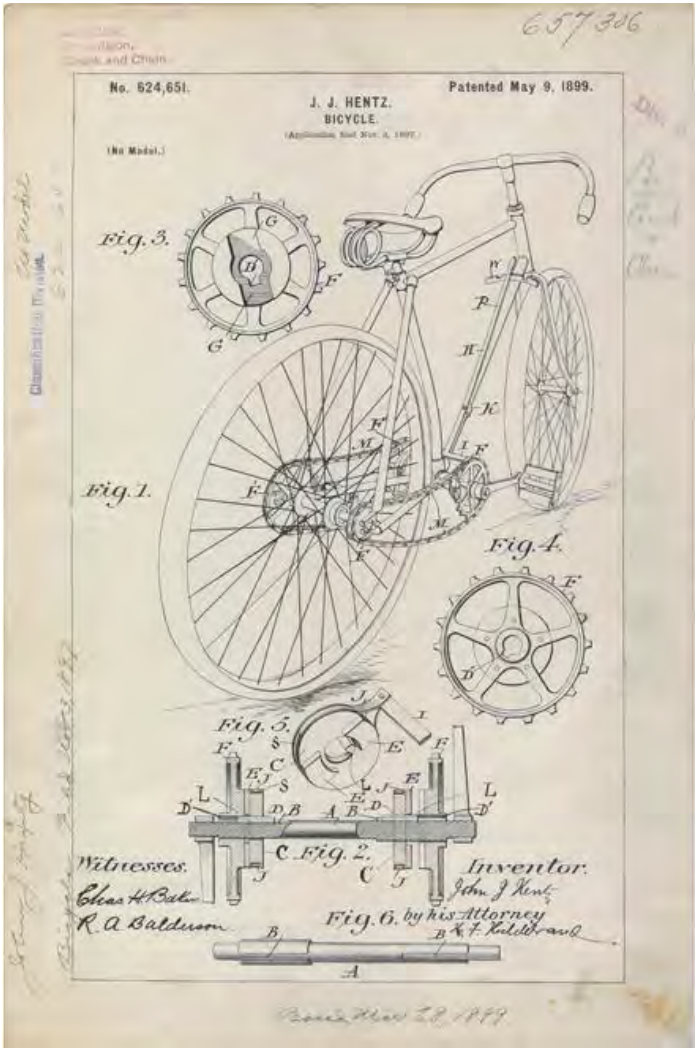
still, it is possible to submit a color illustration but is mandatory to fill a petition and pay an extra fee

even though the color was devalued, **details remained very important**

calligraphy allowed to label figures and be used as **signatures for draftsman recognition**

detailed mechanical transmission showed also in a cross-section, a chain gear and an axle

the illustrator did not forgot to shade the ground beneath the wheels



US National Archives image 657306 (Patent 624,651) relative to the Hentz Bicycle from 1899.

working with black ink on white paper, the illustrator represented three dimensionality using line shading

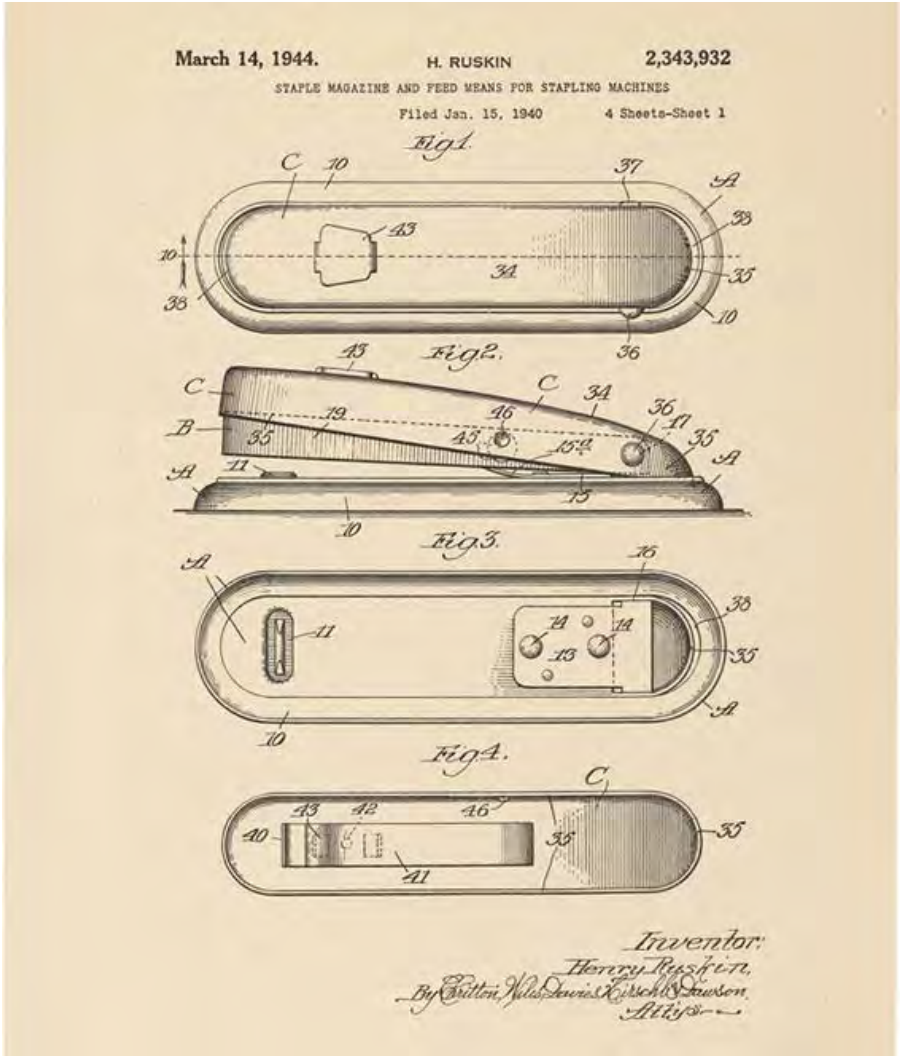


Illustration relative to the Ruskin stapling machine from 1944 (Patent 2,343,932).

stippling (shading with dots) visible in the helmet and user face adds a realistic element to this patent illustration

calligraphy for labels recurring to fonts that are well defined and closer to type machine styles

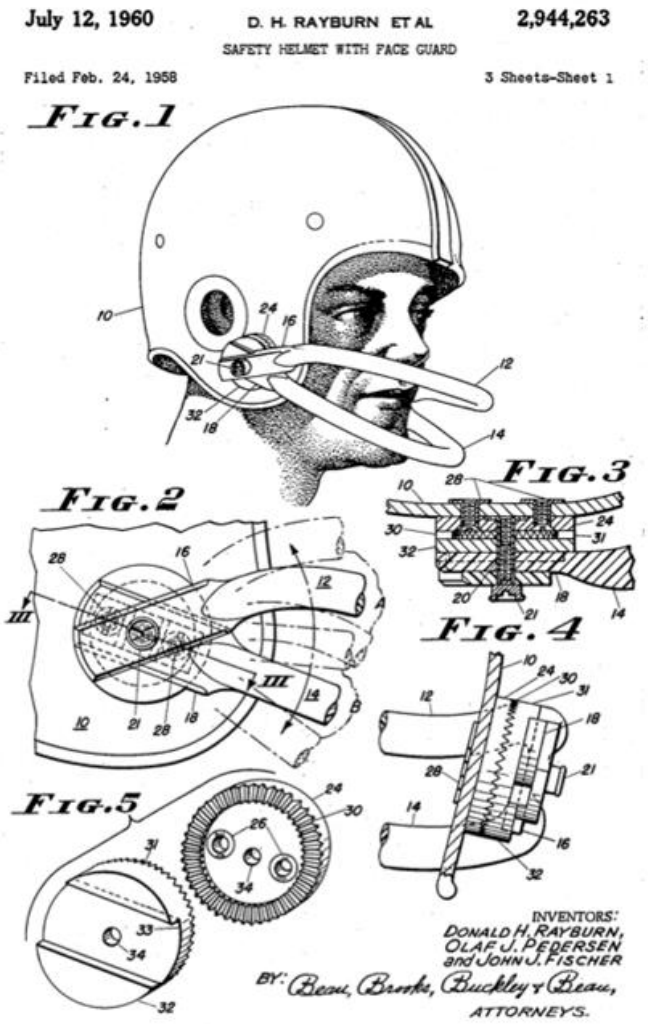

July 12, 1960 D. H. RAYBURN ET AL 2,944,263
SAFETY HELMET WITH FACE GUARD
Filed Feb. 24, 1958 3 Sheets-Sheet 1
FIG. 1
FIG. 2
FIG. 3
FIG. 4
FIG. 5
INVENTORS:
DONALD H. RAYBURN,
OLAF J. PEDERSEN
and JOHN J. FISCHER
BY: Beau, Brooks, Buckley & Beau,
ATTORNEYS.

Illustration relative to the Safety helmet with face guard 1960 (Patent 2,944,263).

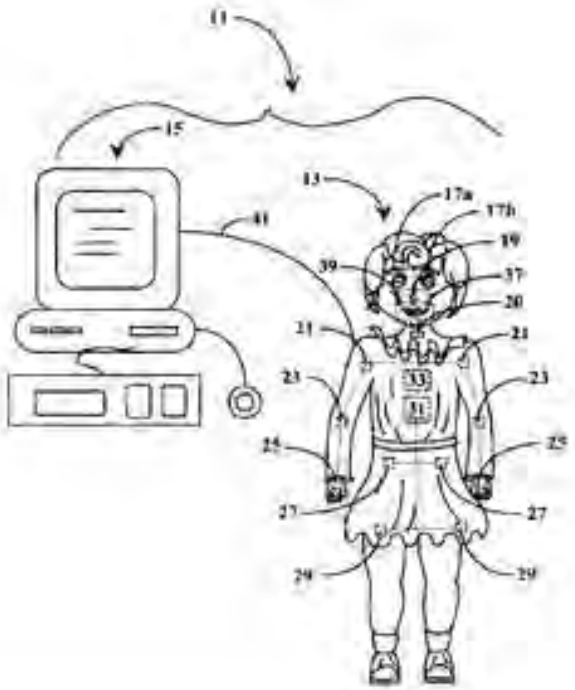


Illustration relative to the PC peripheral interactive doll from 1998 (Patent 6,319,010).

eighties and nineties of the twentieth century observed a dramatic evolution in technologies like personal computing, allowing to obtain digital drawings with **simpler presentations and less details**

saving both money and time was possible with this new graphic tools, and **the draftsman quality was reduced and in some cases even lost**

this occurred after the patent office relaxed its drawing rules, **allowing inventors to focus much more on patent claims, rather than the drawing**

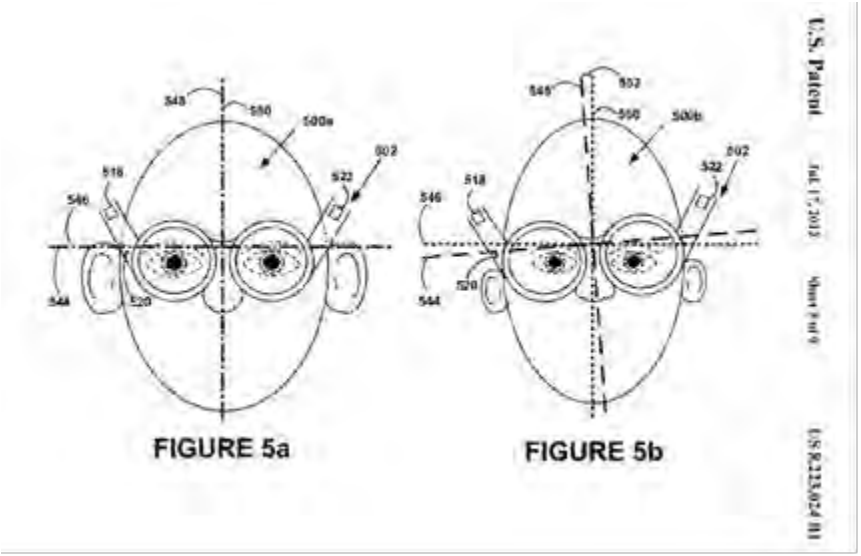


Illustration relative to the 2012 Google Glass Anti-Theft Mechanism (Patent 8,223,024) .

the Google Glass Anti-Theft Mechanism patent filed in 2012 represents **the actual trend for simplification and digital illustrations**

completely different from the 1800s illustrations with user faces presenting skin color and detailed features closer to figure paintings

Google Inc. Sergey Brin wearing Google Glasses

problem

problem definition

problem components

data collection

data analysis

creativity

materials & technology

experimenting

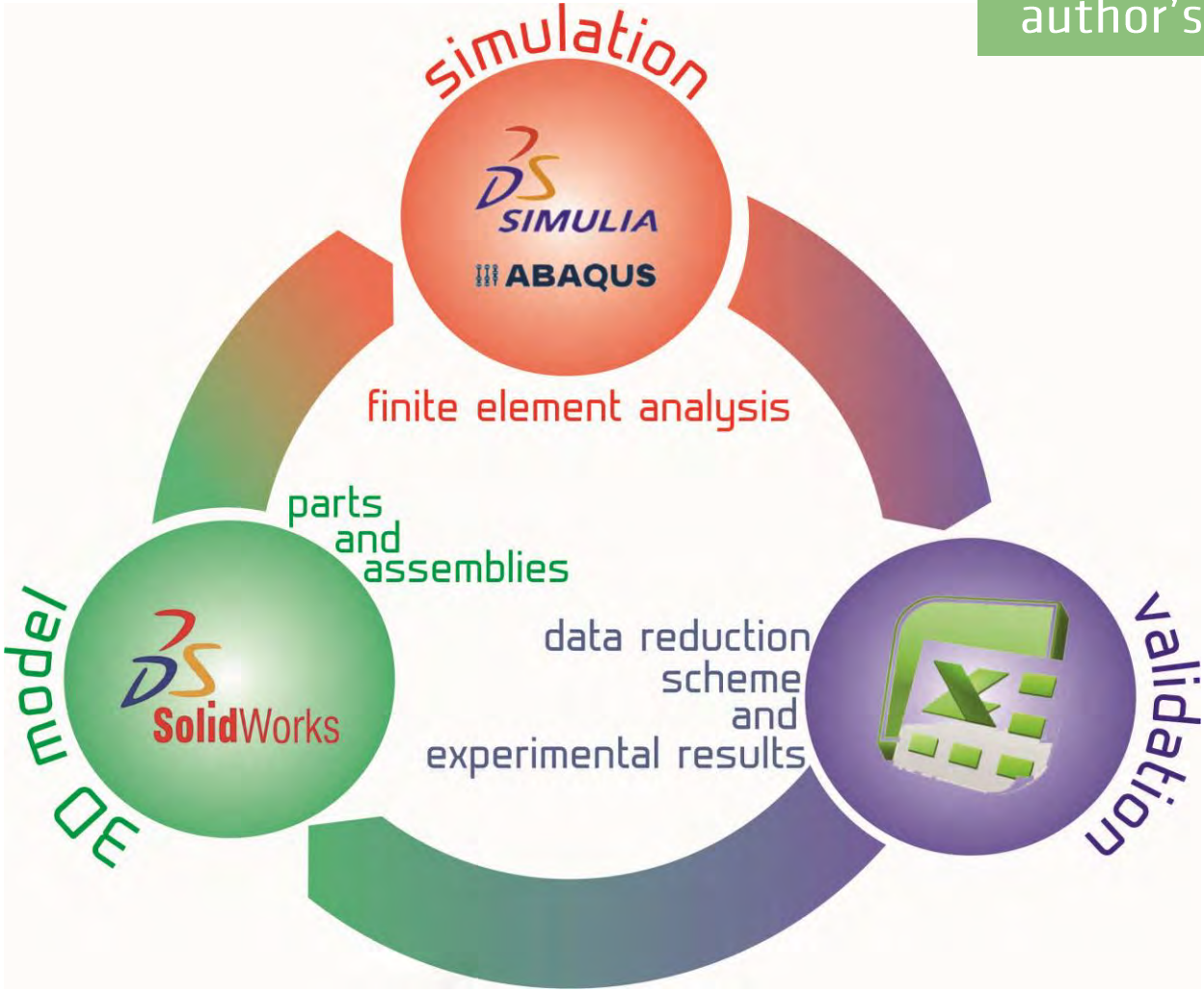
model

verification

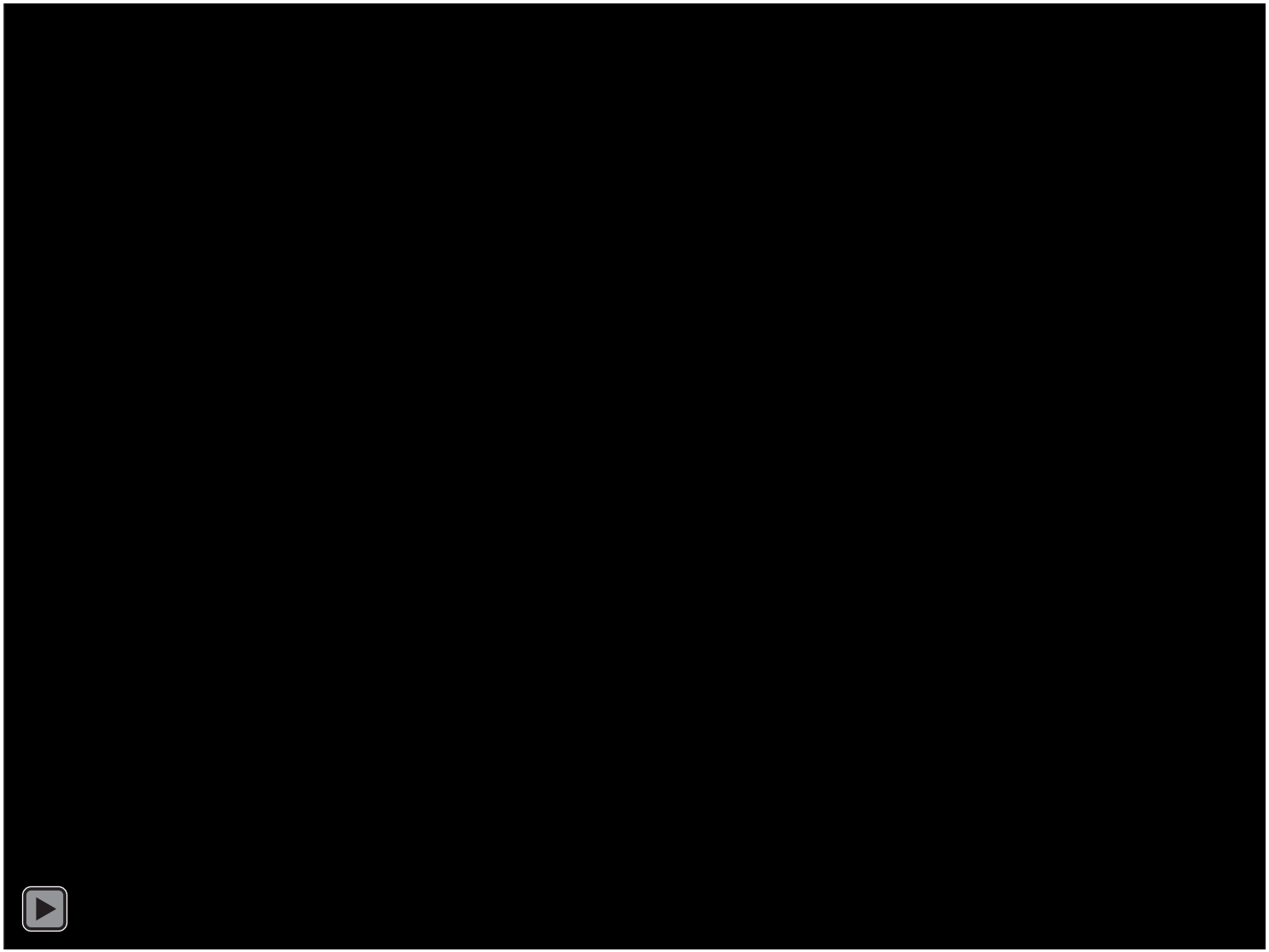
technical drawing

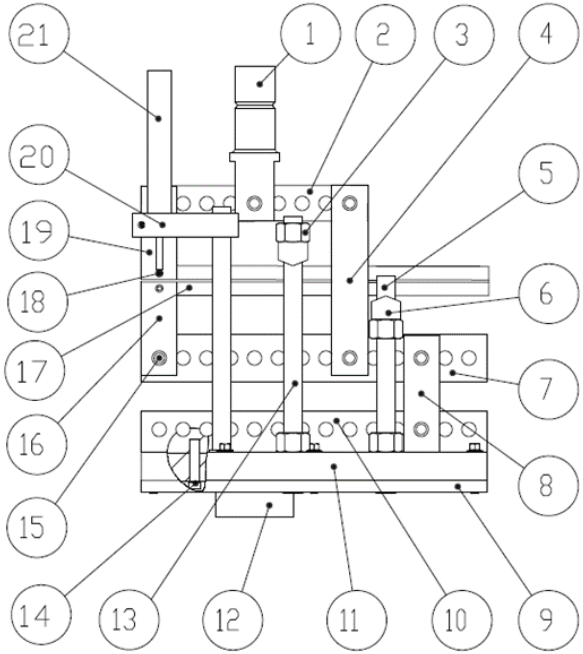
solution

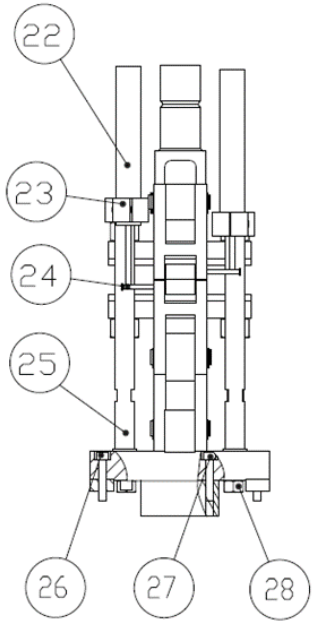
motivation - author's contribution

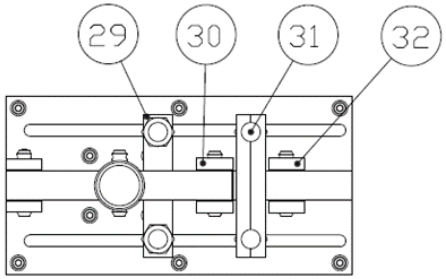


Filipe J.P. Chaves et al.
Engineering Fracture Mechanics 107 (2013) 38–47









illustrations for the proposed mechanism patent were obtained directly from the modelling software (Solidworks)

inpi instituto nacional da propriedade industrial

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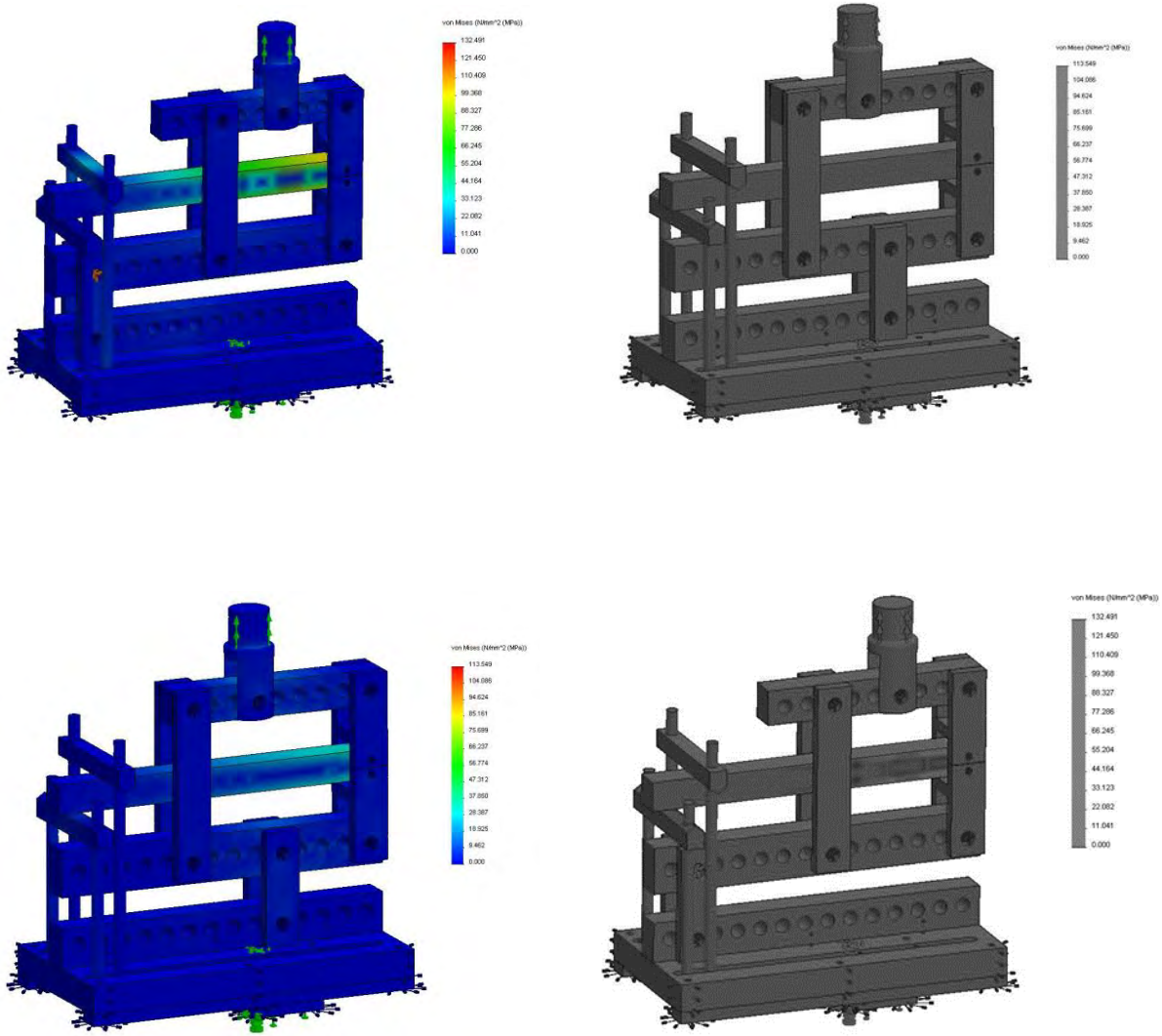
Illustration relative to the 2013 Fracture Mechanics for Adhesive Joints Mechanism (Portuguese Patent 20131000070010) .



despite allowing to obtain a three dimensional representation (right), **colors would give a better perception of the stress simulation results** (left)

Illustration relative to the 2013 Fracture Mechanics for Adhesive Joints Mechanism (Portuguese Patent 20131000070010) .

Since the primary cave paintings to the modern three dimensional computer models, man tried to represent, explain and archive ideas, strategies and devices for cultural, academic, commercial or personal purposes

The natural evolution of art contaminated patent illustration with beautiful and detailed representation of inventions until the twentieth century, when color was considered a problem to produce copies and disseminate patents

Focus on cost cutting depreciated the quality of drawings and nowadays patent illustrations are very poor in details and fail to represent objects and users with realistic features

New tools, such as CAD software and graphic design techniques should help to improve the quality of patent illustration

Furthermore the digital media is growing into substituting physical media allowing to overcome the problems associated with replication and distribution of colored illustrations

The benefits from this improvement will bring new opportunities for inventors, users, illustrators and entrepreneurs

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thank you