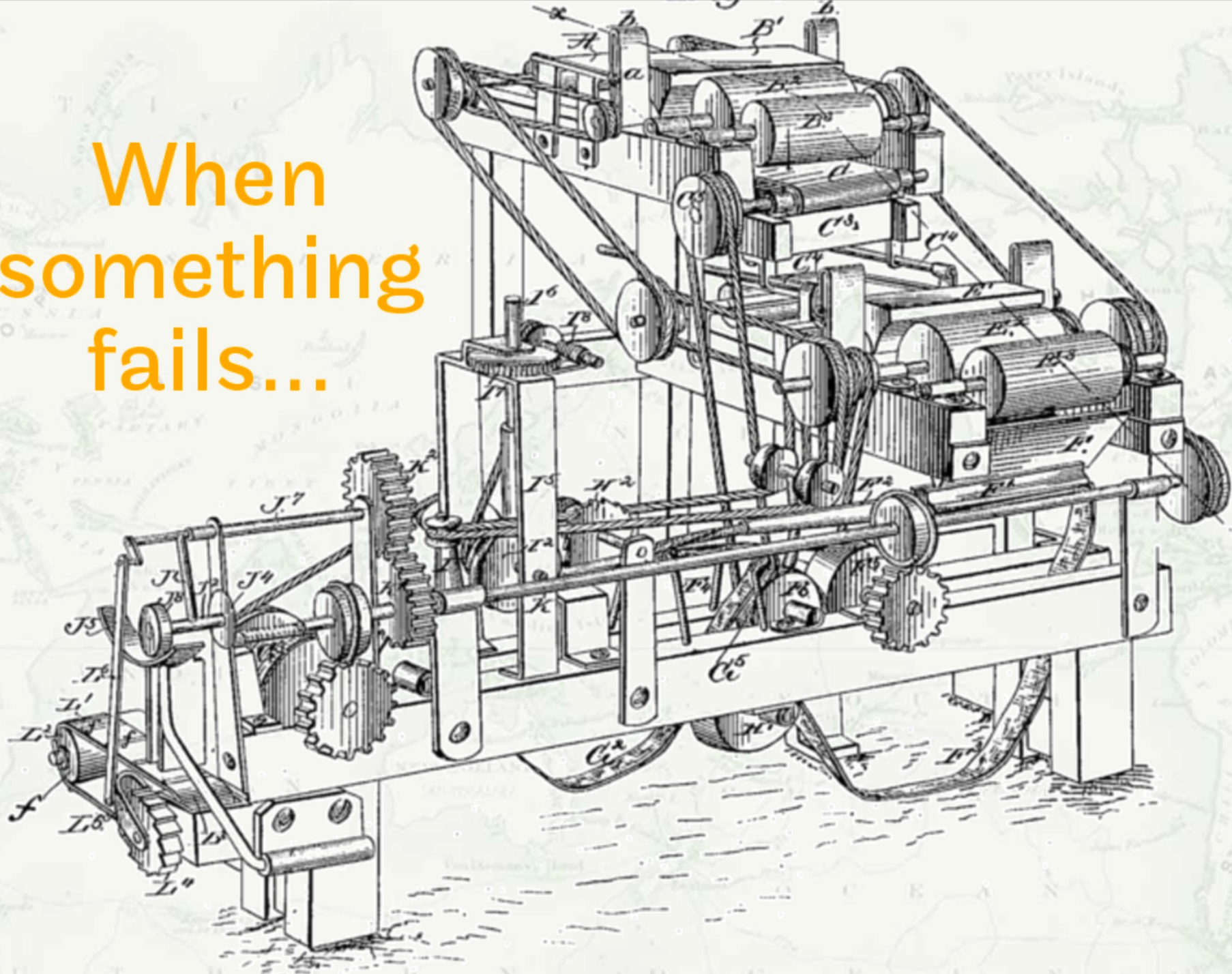




# Fundamentals of Cost of Poor Reliability

Fred Schenkelberg

When  
something  
fails...



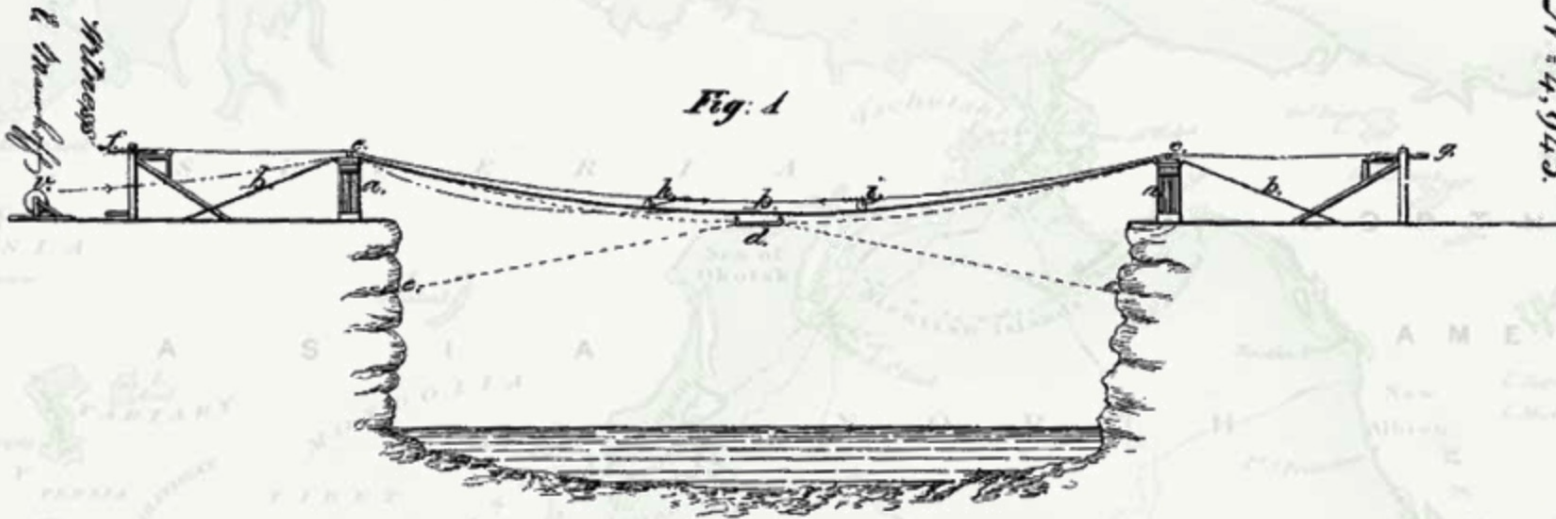


No. 4,945.

*J. A. Roebling.  
Suspension Bridge.*

Patented Jan. 26, 1847.

*Fig. 1*



*Fig. 2*



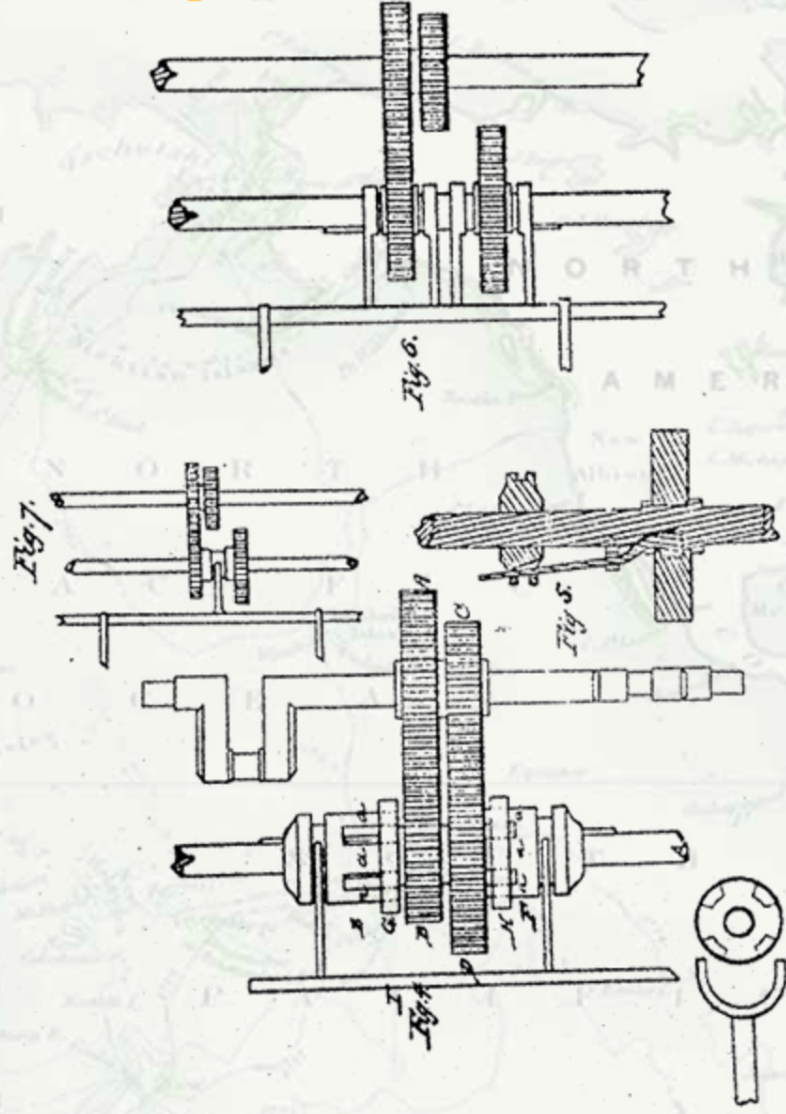
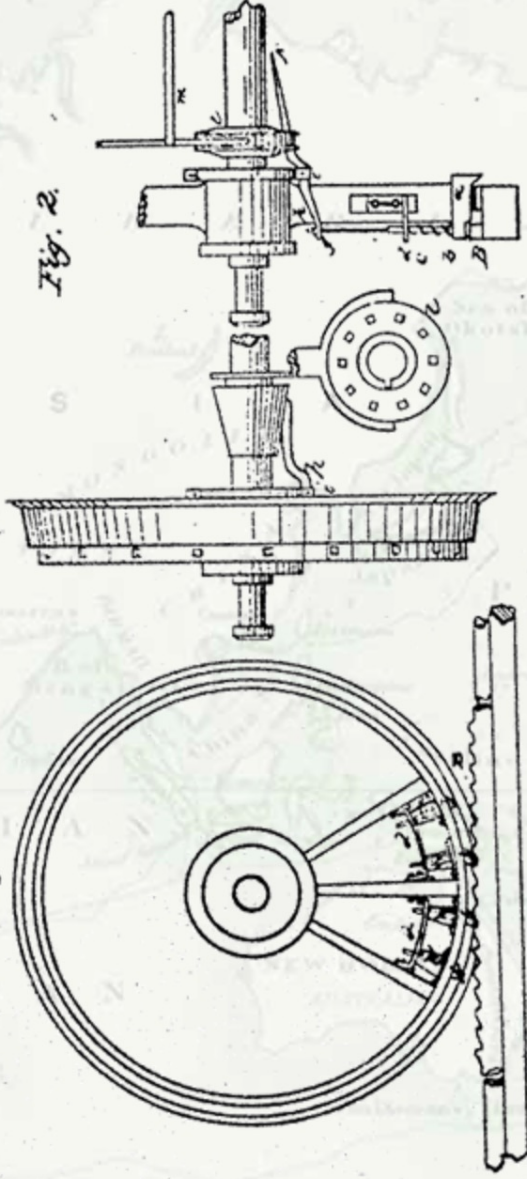
*Fig. 3*



We need to  
understand...

*Inventor  
John A. Roebling.*

*J. Ruggles.*  
*Traction Wheels.*  
*No 1. Patented Jul. 13 1836*



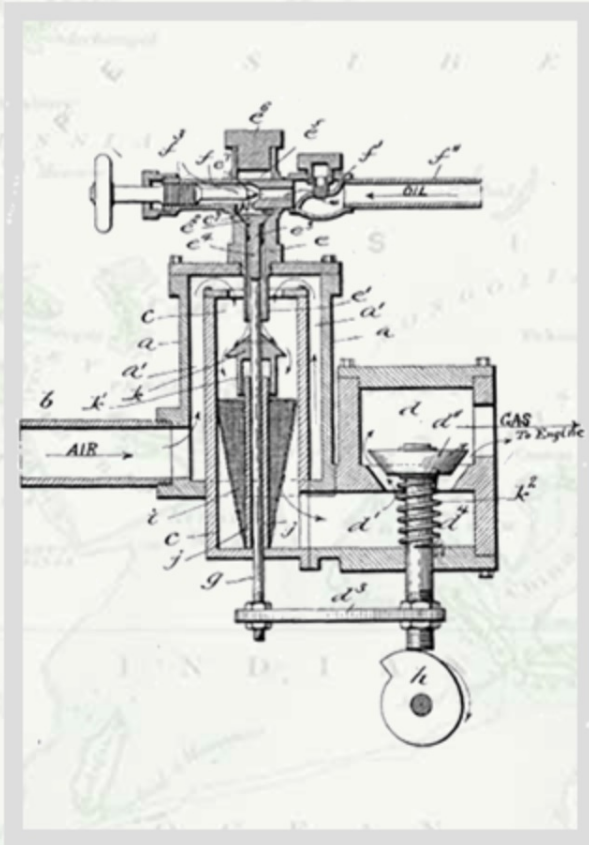
...the impact.

What is the largest  
source of poor

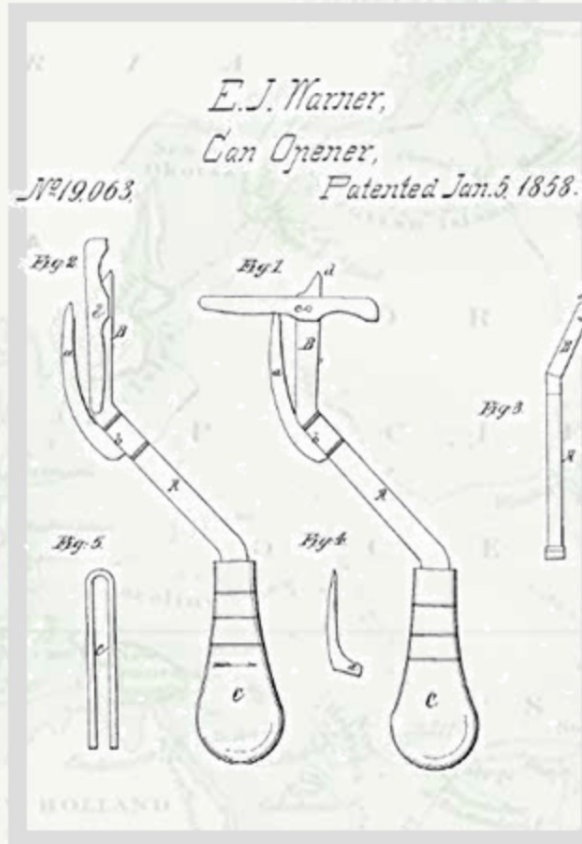
reliability  
expense?



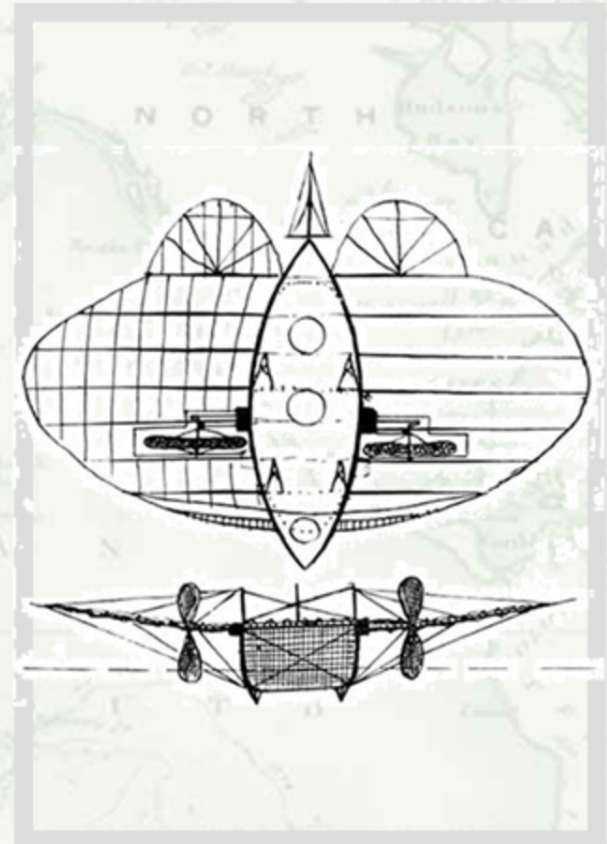
# Costs to Different Stakeholders



The Engineer

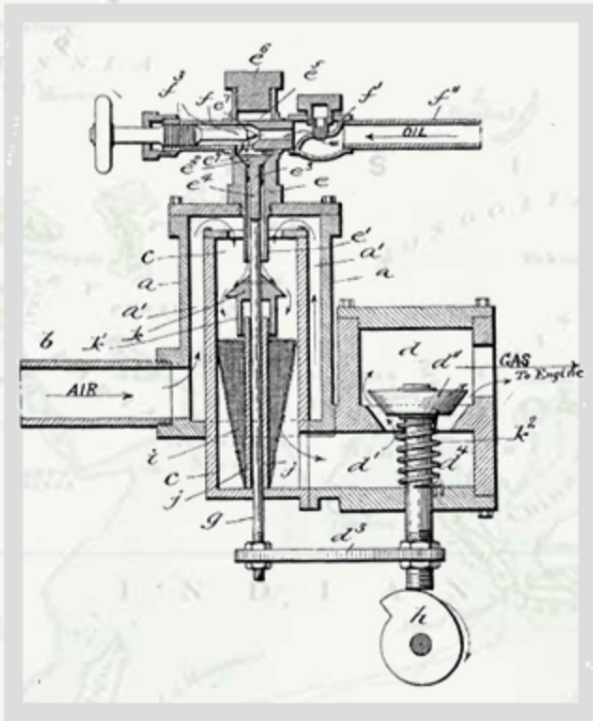


The Organization



The Customer

# The Engineer



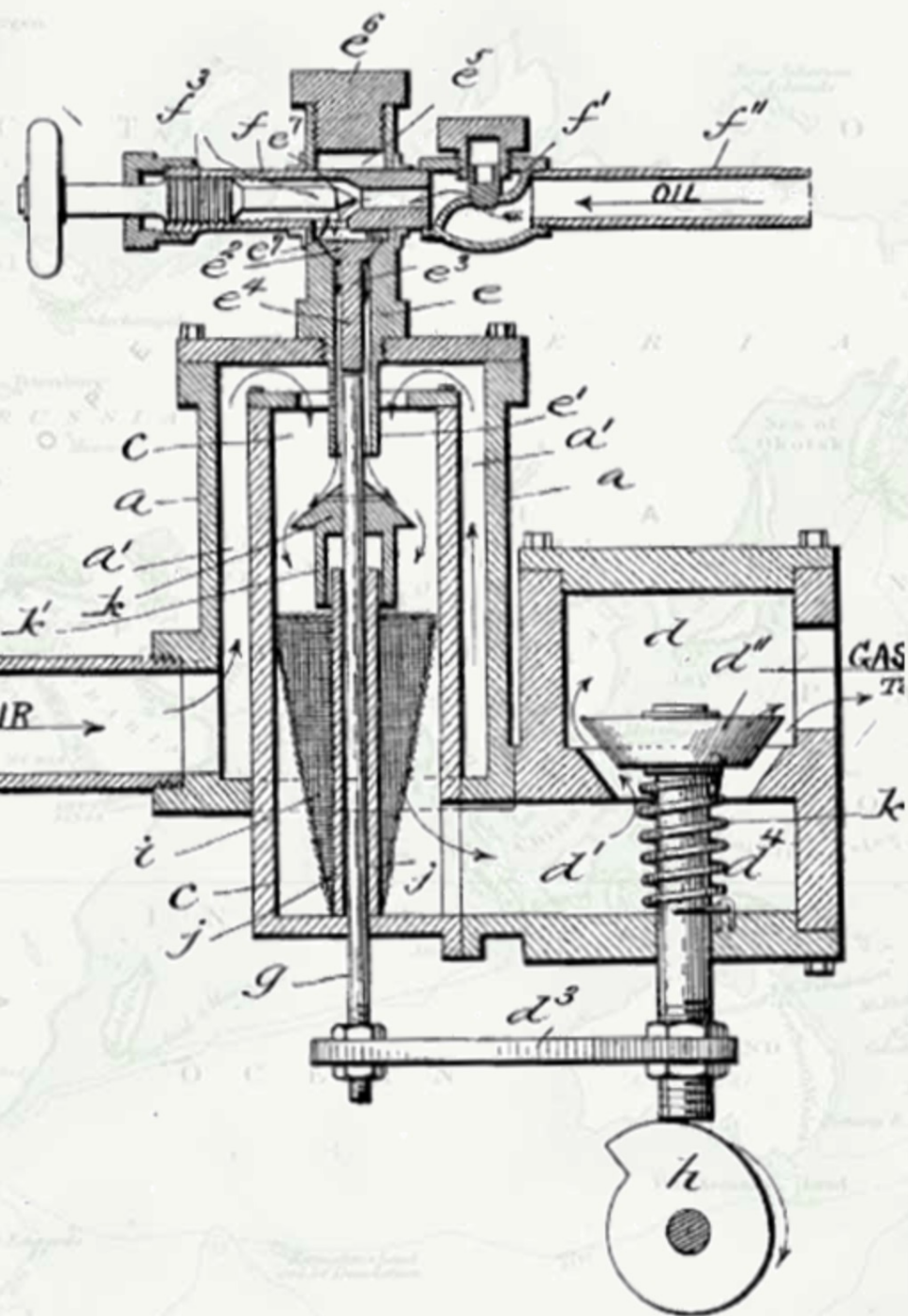
Did I make a mistake?

Will this delay the program?

Is it my fault?

Now we have to change the design.

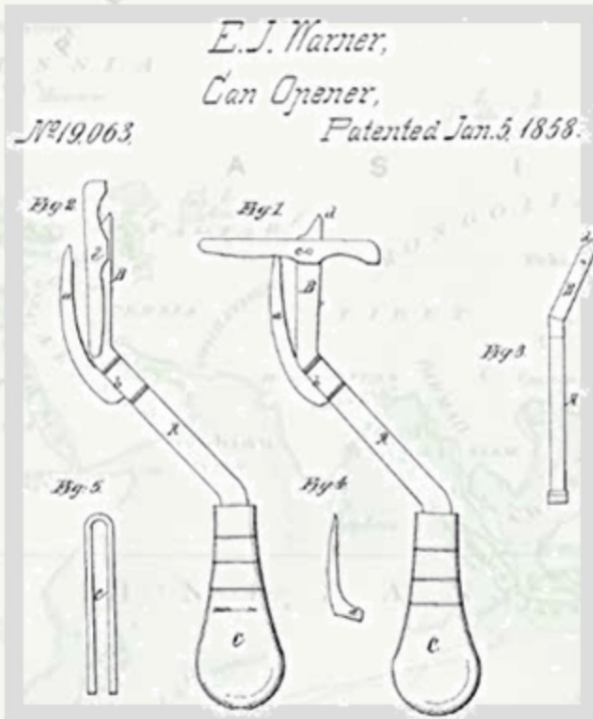
It will take time to fix this



**What other  
costs to the  
engineer  
exist?**



# The Organization



Recall?

Cost hit to warranty?

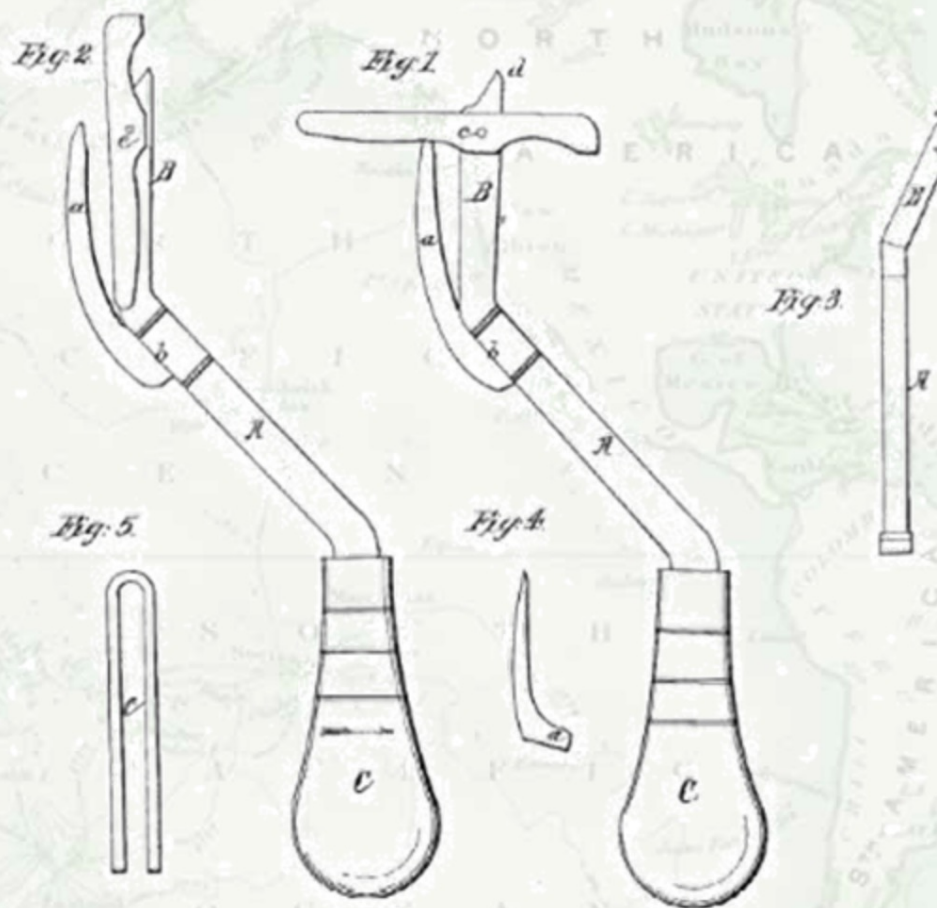
Do we need to set up a screen?

Cost of future testing?

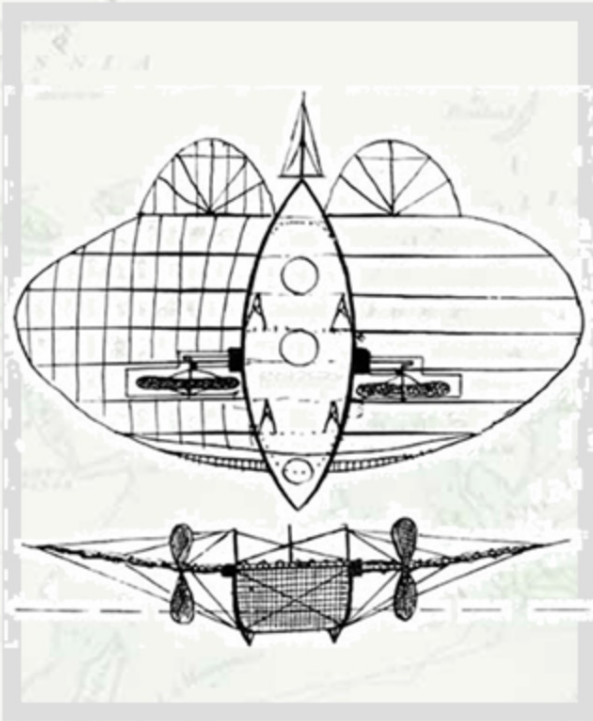
Are we going to profitable?

**What other  
costs to the  
organization  
exist?**

*E.J. Warner,  
Can Opener,  
Nº19,063,  
Patented Jan.5, 1858.*



# The Customer



This is not solving the  
problem

Why did we buy this solution?

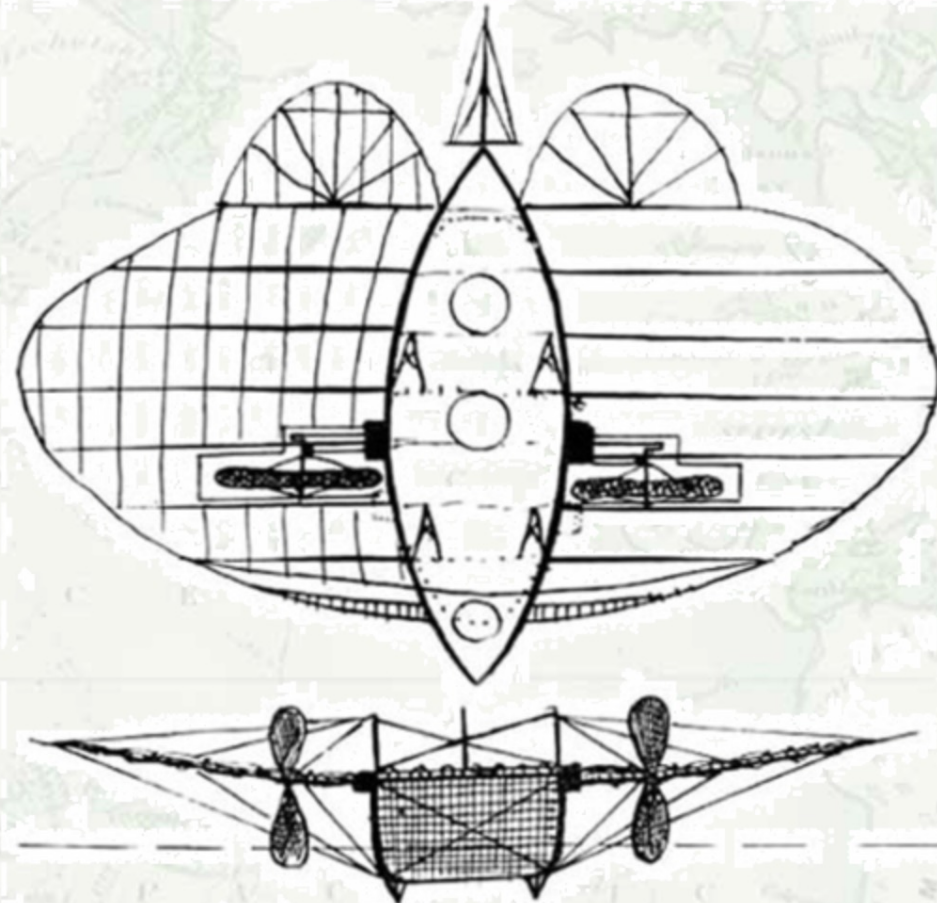
Now we have to get a replacement

Now we have to use a slower solution

This isn't what we expected

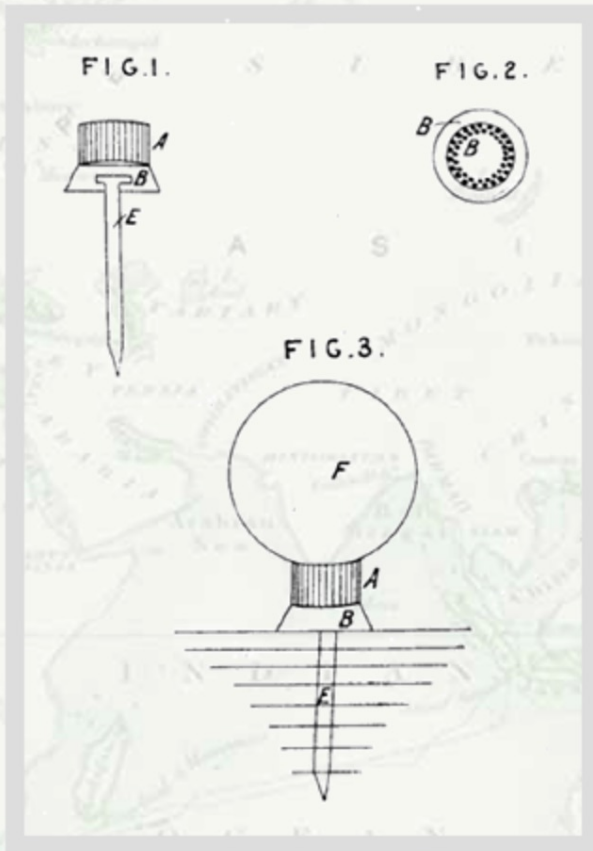


**What other  
costs to the  
customer  
exist?**

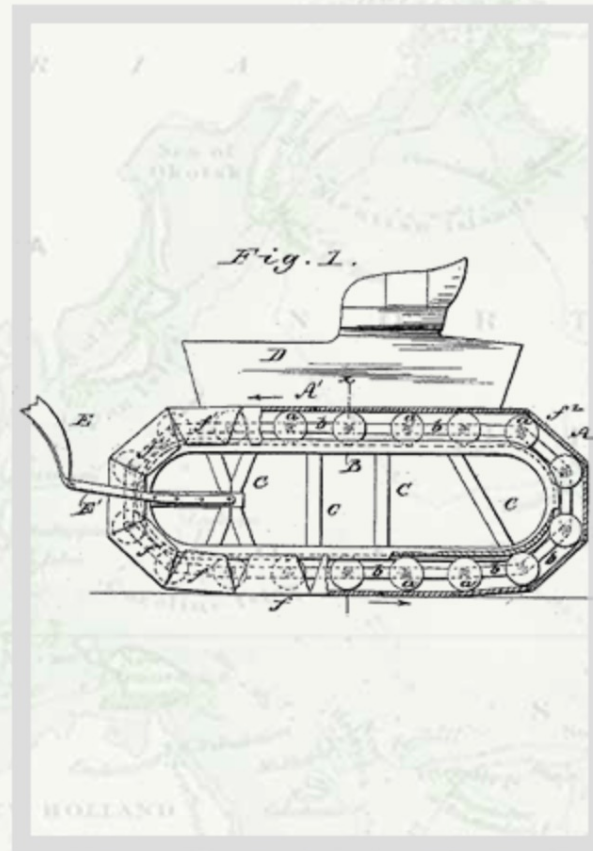


What other impact  
might a failure have?

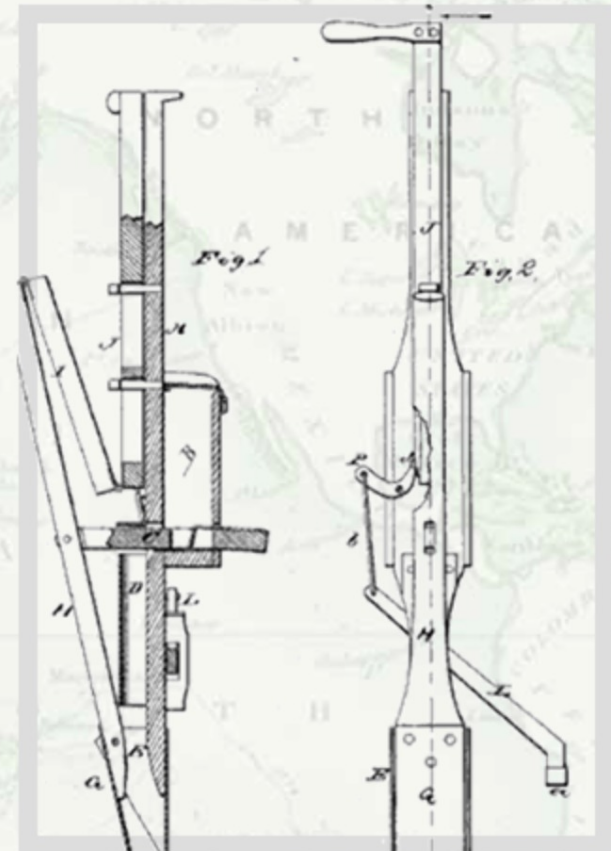
# Even Bigger Costs of Poor Reliability



to the Brand



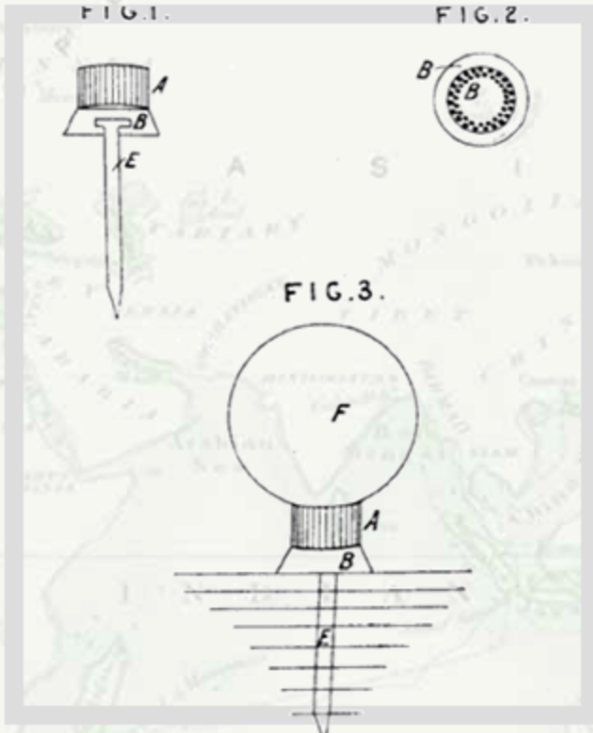
to the Industry



to Society



# to the Brand



Can we trust this  
company?

I'm never buy one of their's again

Word of mouth hit

Cost to acquire new customers

# to the Industry



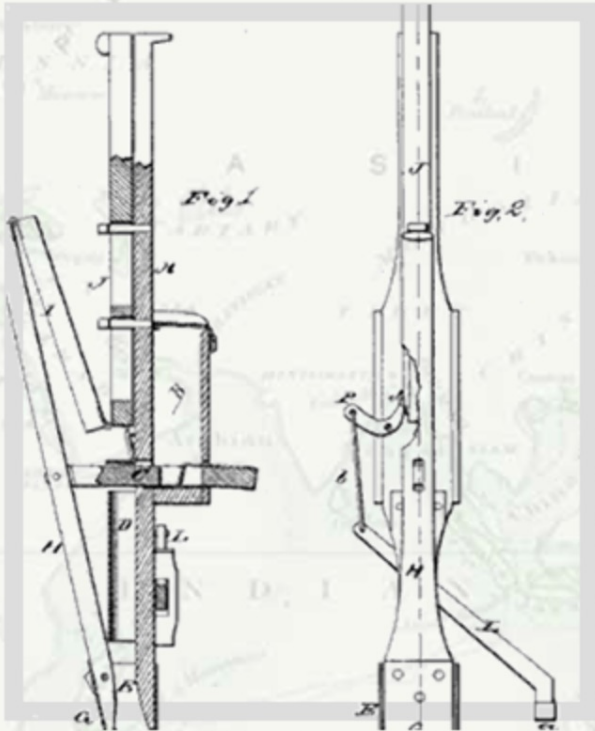
Let's not have THAT failure here

Market acceptance will take longer

This might kill the market

Maybe this tech is wrong

# to Society



We all lose

Wasted resources  
Lost opportunity  
Squandered talent



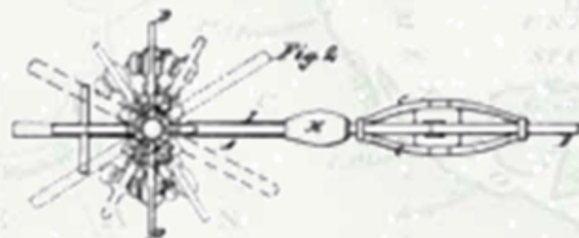
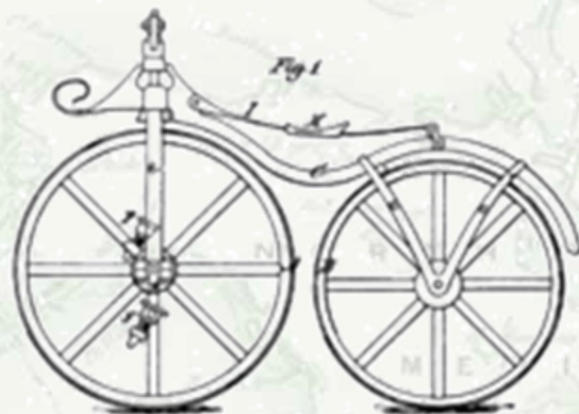
What can you do with  
this information?

# Create Reliable and Robust Products

P. LALLEMENT.  
VELOCIPÈDE.

No. 59,915.

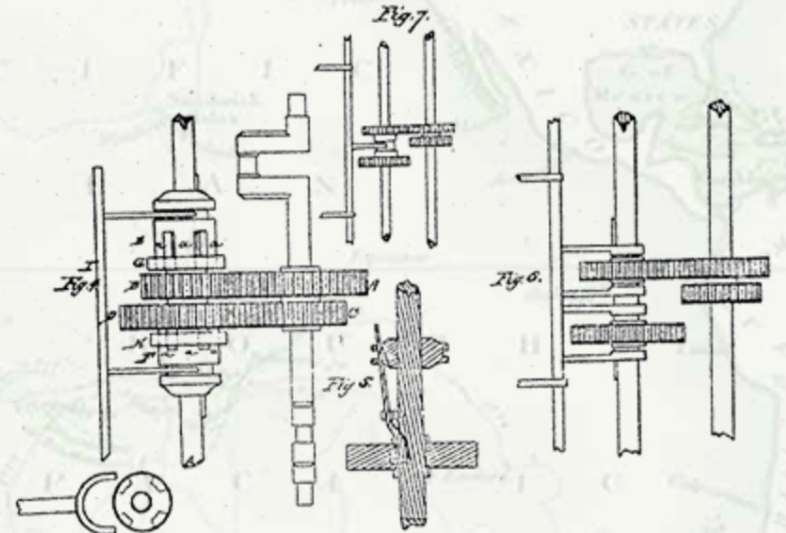
Patented Nov. 20, 1866.



Witnesses  
at this of Letters  
John C. Shumway

Inventor  
P. Lallement  
John E. Cook

# Estimate impact



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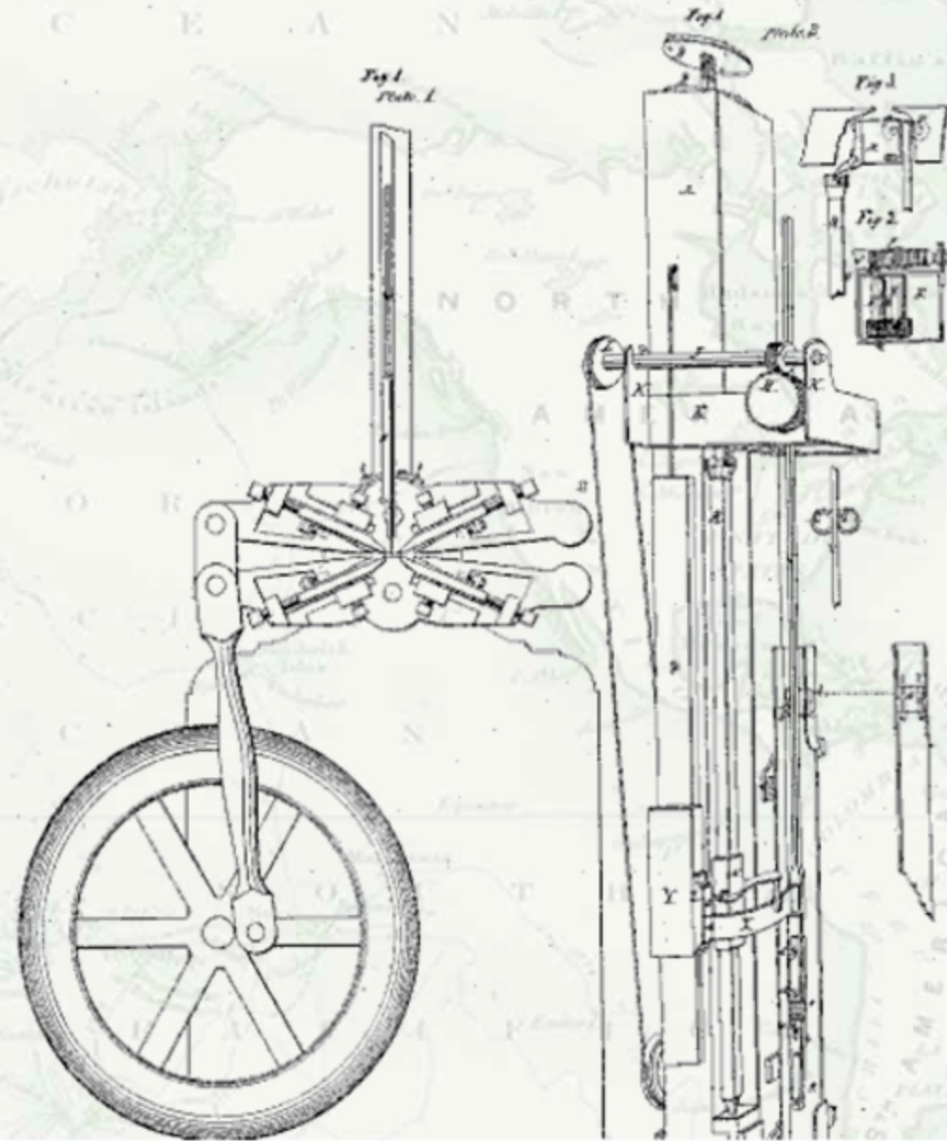


*Making Out Nails,*

*N<sup>o</sup> 3,305.*

*Patented Oct. 12, 1843.*

Calculate and  
record the  
Impact



What is your next  
step?

# In Summary

Failures will occur

Did you anticipate

Implement Due Diligence

Learn and Move Forward



# More Information

Visit [AccendoReliability.com](https://AccendoReliability.com)

Let me know if you have any questions.

Check out the reliability engineering podcast network at [Reliability.FM](https://Reliability.FM)

Continue to explore your reliability performance measures and make improvements.