

E Howard Tower Clock Renovation

“By the very nature of their purpose, these timepieces draw attention to the building in which they are located and historically, without exception, become a landmark in the area. To choose to display the clockworks where its operation can be observed and enjoyed will serve not only as a timekeeper, inside and outside the building, but also as a functional work of art.” Balzer Family Clockworks



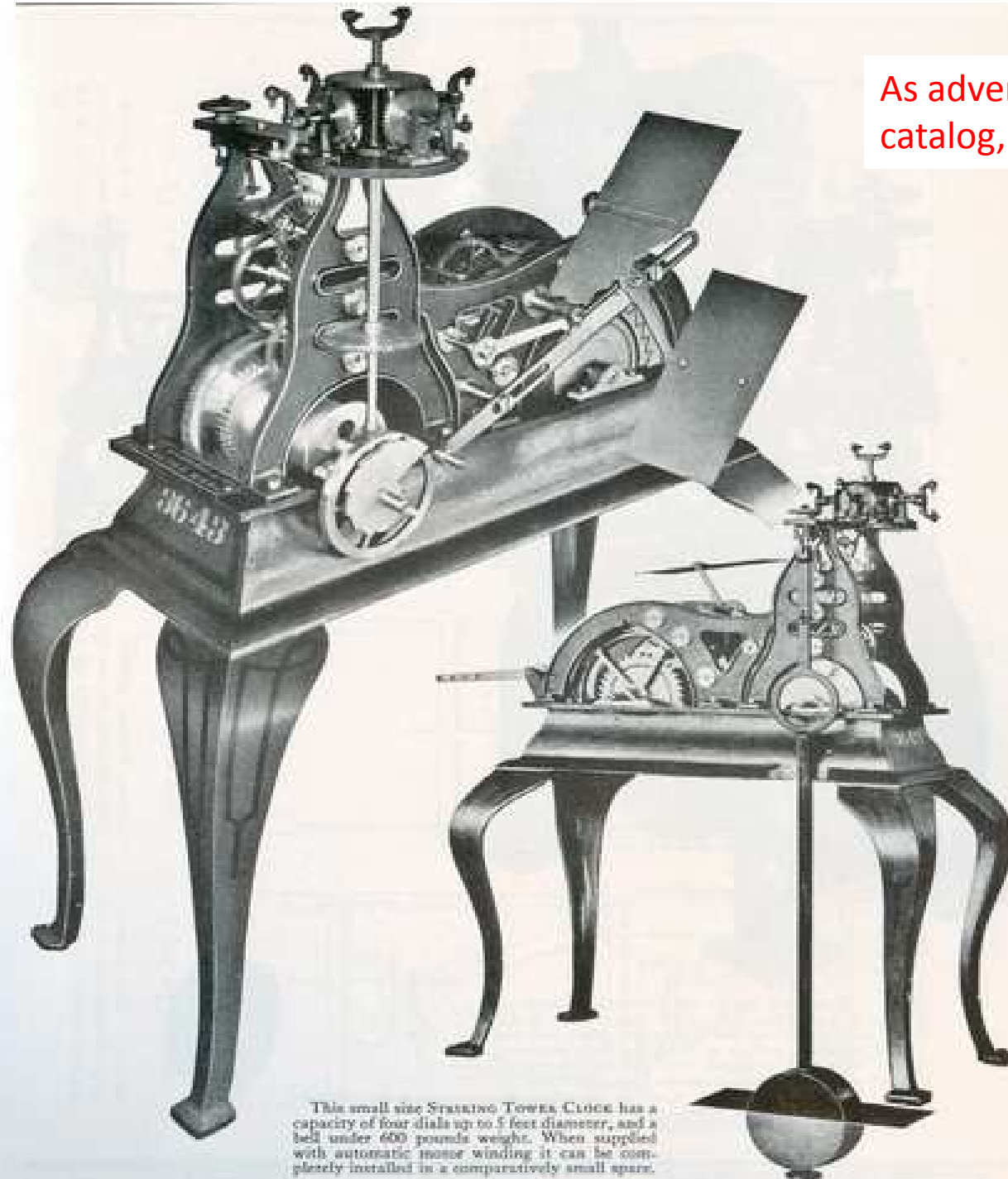
Ayer Mills Clock, Ayer Mass. Note the depth of the pigeon poo...Balzer photo

E Howard Tower Clock Renovation

Today's Discussion

- Where did I start?
- What was done?
- How was it done?
- What would I do differently now?
- Q&A's

As advertised in 1923
catalog, serial 3643



This small size Stratton-Towne Cotton has a capacity of four bales up to 5 feet diameter, and a bed under 600 pounds weight. When supplied with automatic motor winding it can be completely installed in a comparatively small space.

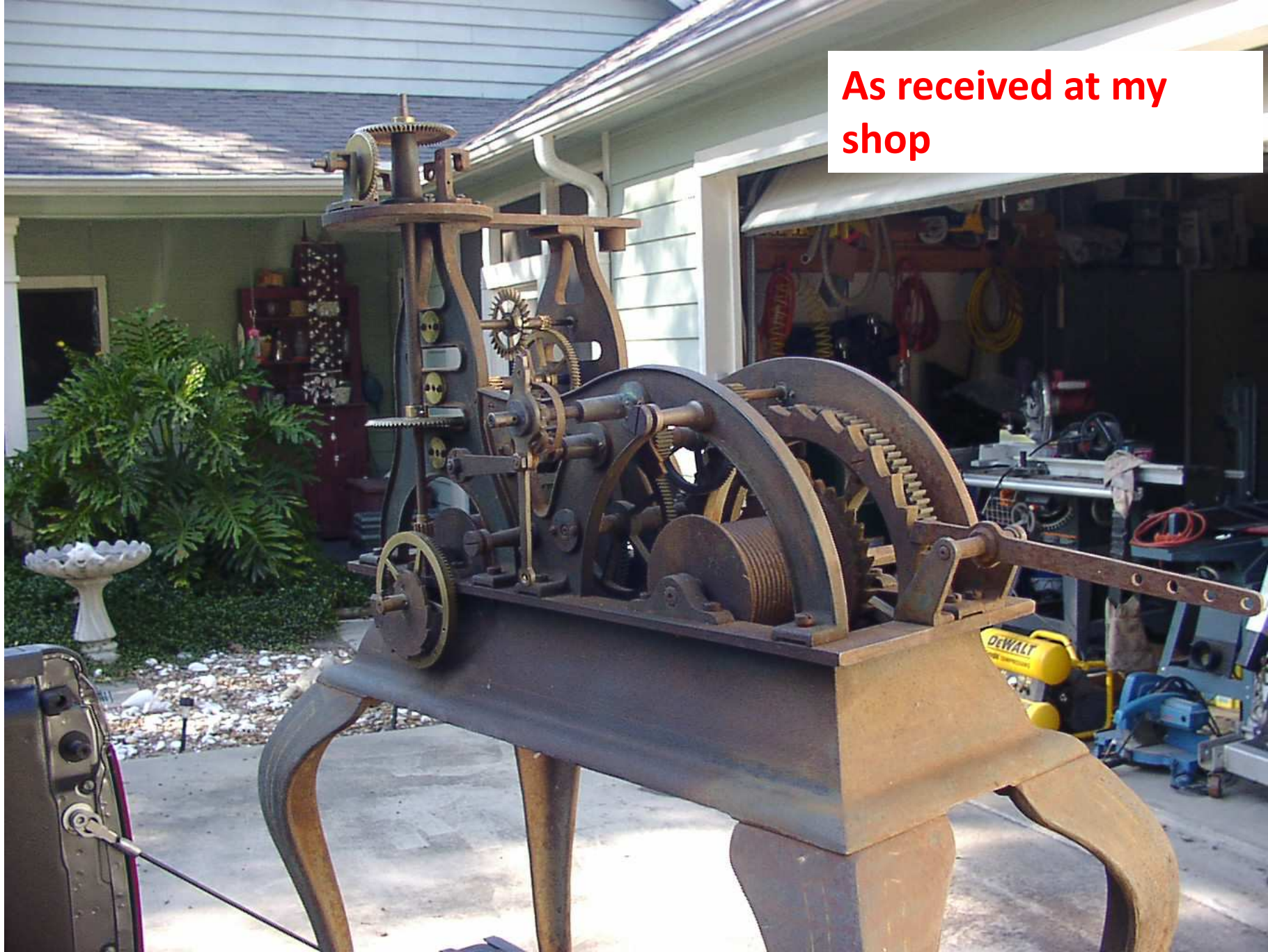


As received at my shop

FULLER
100 CARTRIDGES, 2000
ELECTRIC FRAMED
IN M1442 LINKS
(A654)
FUNCTIONAL
LOT LC L1-273
5-1976



**As received at my
shop**

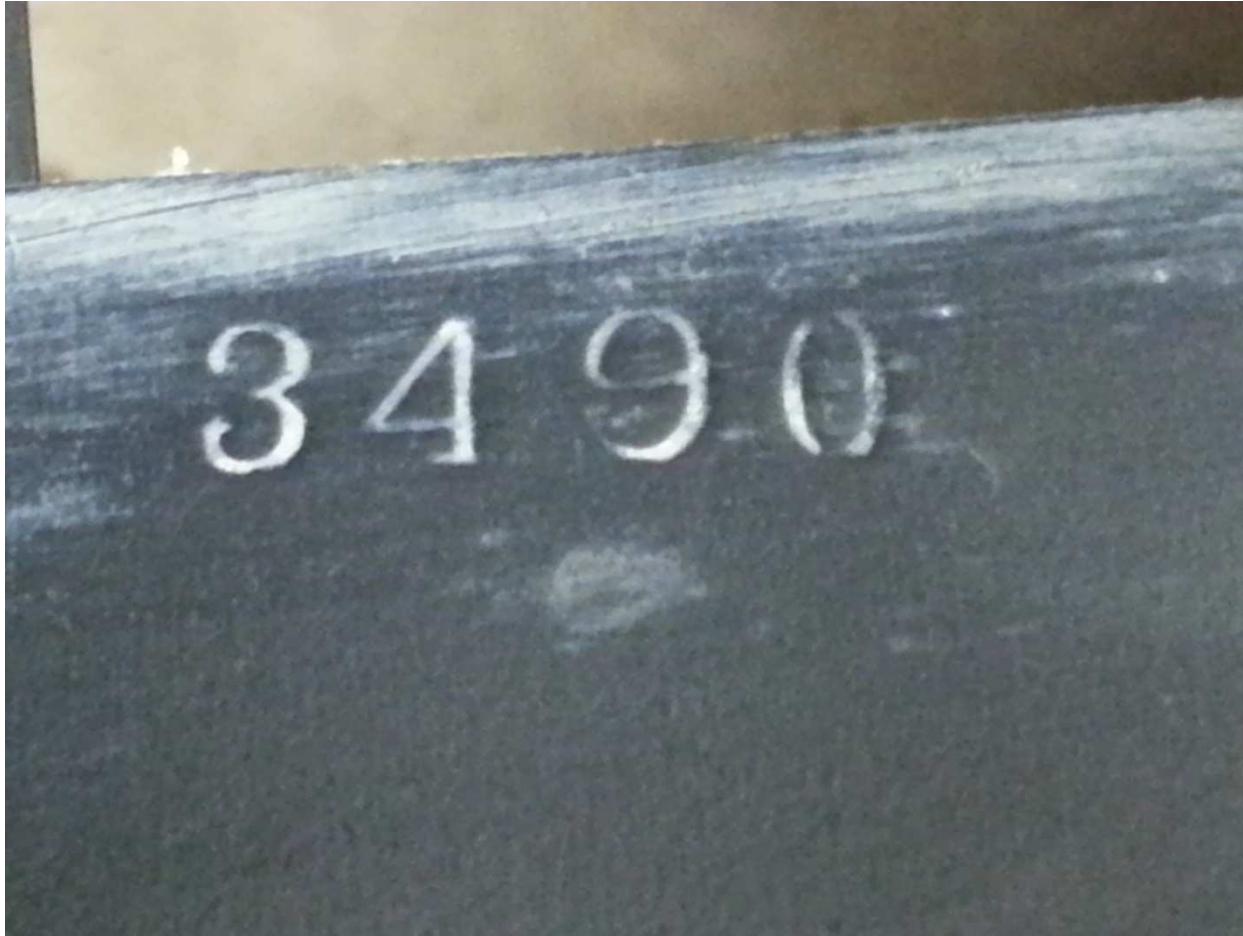


As received at my shop



**Original serial number painted on
frame 3490**





**Serial number stamped on
frame under brass plaque**

Results of disassembly and missing parts needed.

Extensive rust removal required, shafting pitted, pivots in generally decent condition

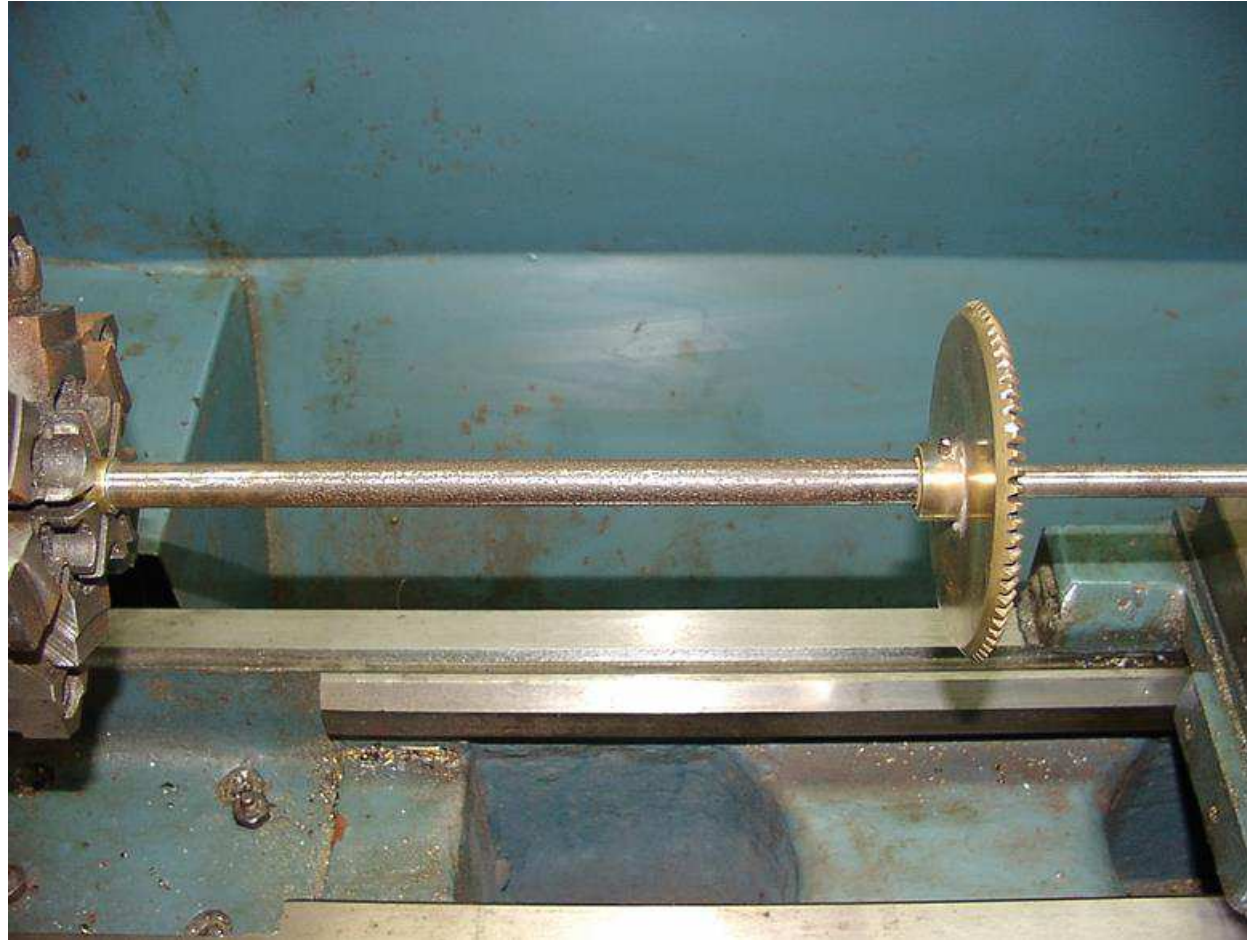
- Escape wheel pinion and 3rd wheel pinion very badly worn, both require replacement
- Fly bushing out board end (cobbled) requires replacement
- Frame requires rust removal to preserve remaining paint
- Legs, same, lower 10-12" missing paint, rusty, still has soil on backsides
- Missing one leg of fly assembly
- Missing fan blades and brackets to hold them
- Missing entire pendulum assembly, rating nut, keystone, mounting bolt, etc.
Missing all suspension spring pieces, as well as rating nut, cheeks, and sliding bolt for rating
- Missing crutch
- Missing verge
- Missing chocks to hold verge shaft and crutch
- Missing setting dial, hands, drive bevel gear, mounting brackets, and motion works
- Bent winding shaft on strike drum
- Missing rack
- Handle missing for winding crank



Traces of original paint



Traces of original paint



Cleaning is a combination of chemicals, files, emery paper, wire brushing etc.



Worn pinion, requires replacement

**Bottom leg as received,
upper leg after worst rust
removed from lower portion**





Rusty drum before cleaning



Drum chemically cleaned and wire brushed



Ready for installation in frame



Center shaft as received



**Center shaft
assembly after
cleaning and paint**



Rust abounds



Rust abounds

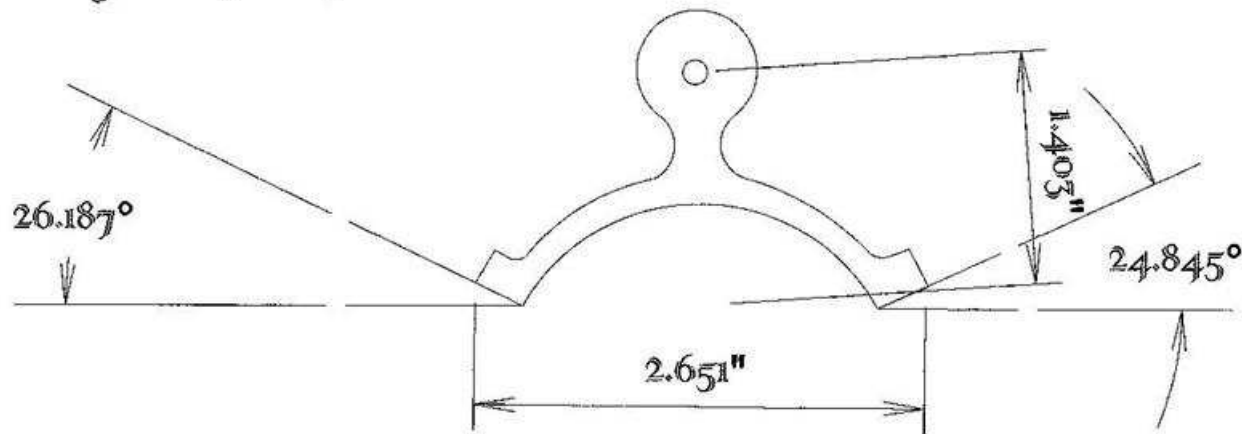


Ready for re-installation



**Pattern, rough drawing, measurements,
and resultant verge**

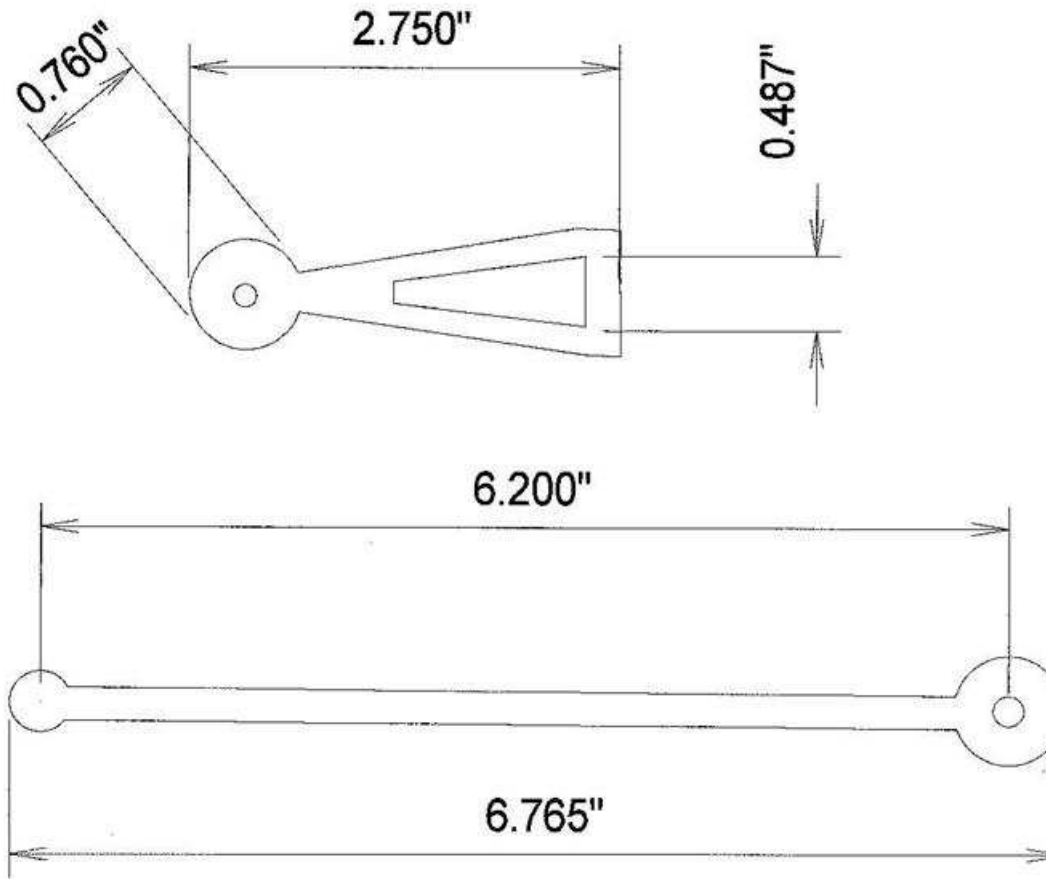
E Howard Street Clock
Verge Assy. 1/4" brass



Verge details and measurements, I highly recommend computer aided drafting, this drawing was translated into machine code and the verge blank was cut on CNC mill

E. Howard Street Clock Assemblies
Crutch

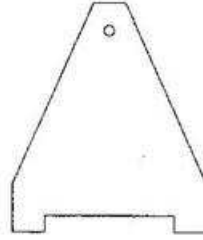
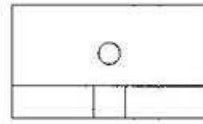
1/4" brass



**Also made crutch and blank for crutch
adjustment on CNC mill**

**E Howard Street Clock
verge brackets, make 2
brass, pin two places as
required**

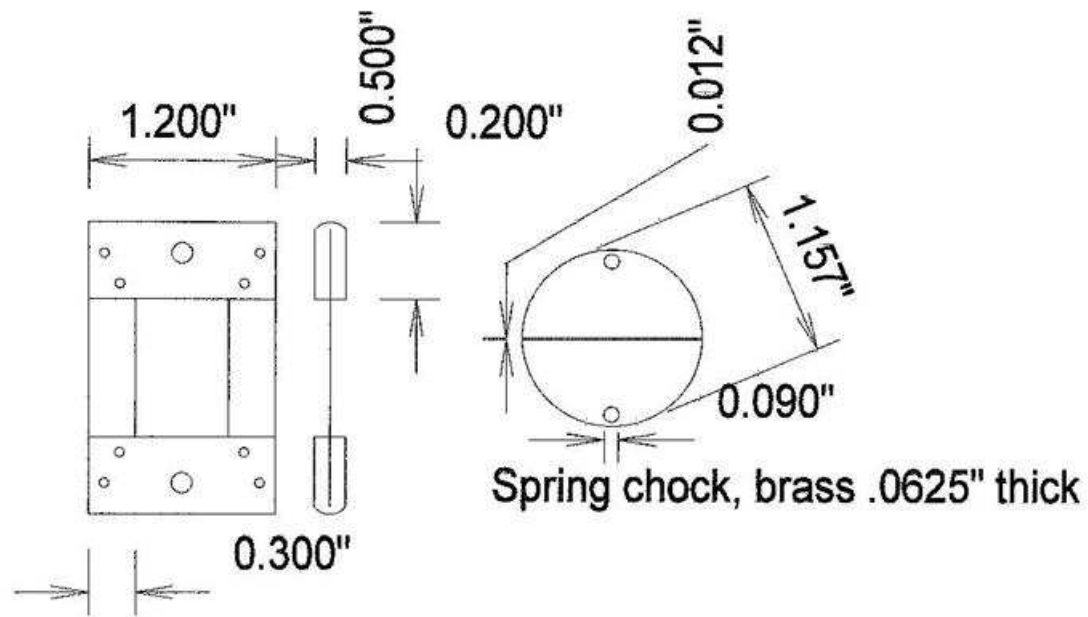
drill and tap 8X32"



www.mechassis.com

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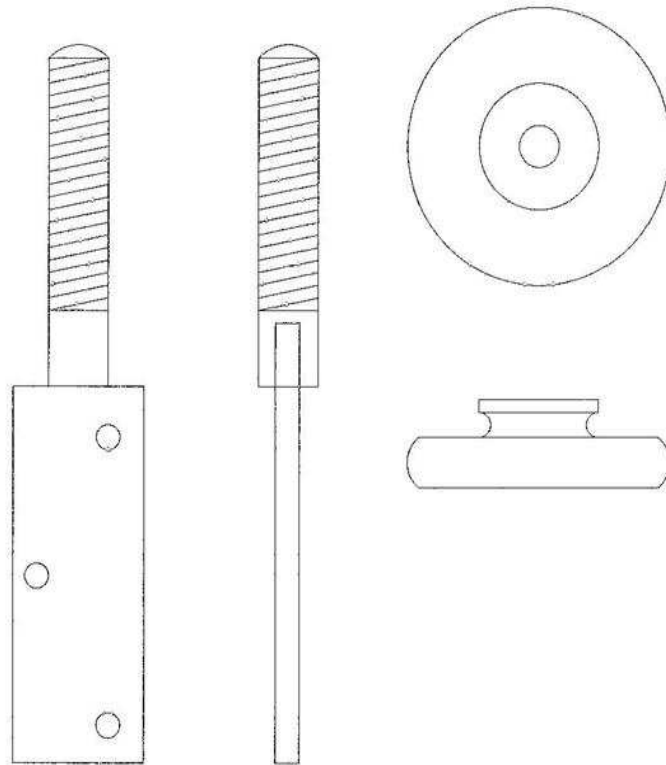
E Howard Suspension spring
Brass end blocks, .015" steel
spring



Suspension spring and chock needed to be made, pretty much a hand process that takes more time than one might think

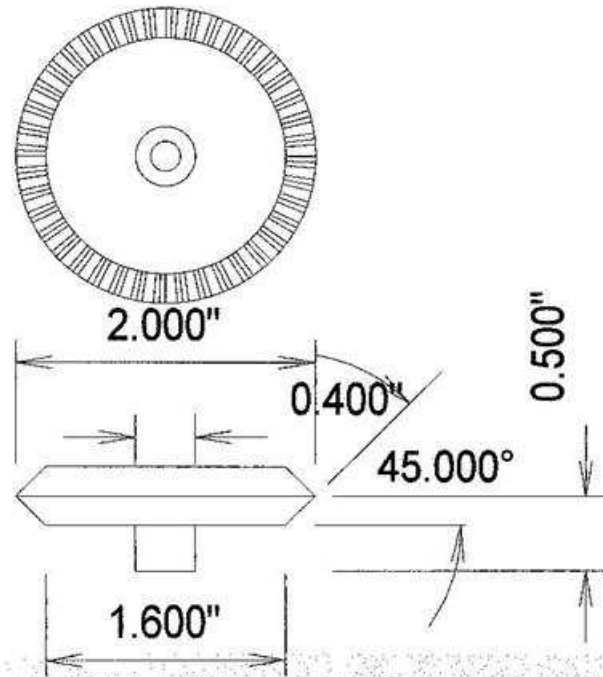
E Howard Pendulum Spur & Rating nut
thread .375X20. Steel .200" thick, weld
on threaded rod

Rating nut cast iron, drill & tap
as required, paint black



No CNC for this, all lathe work and hand assembly

E Howard Street Clock
top drive unit, bevel gear
take off. make 2 per movement
brass, 60 teeth



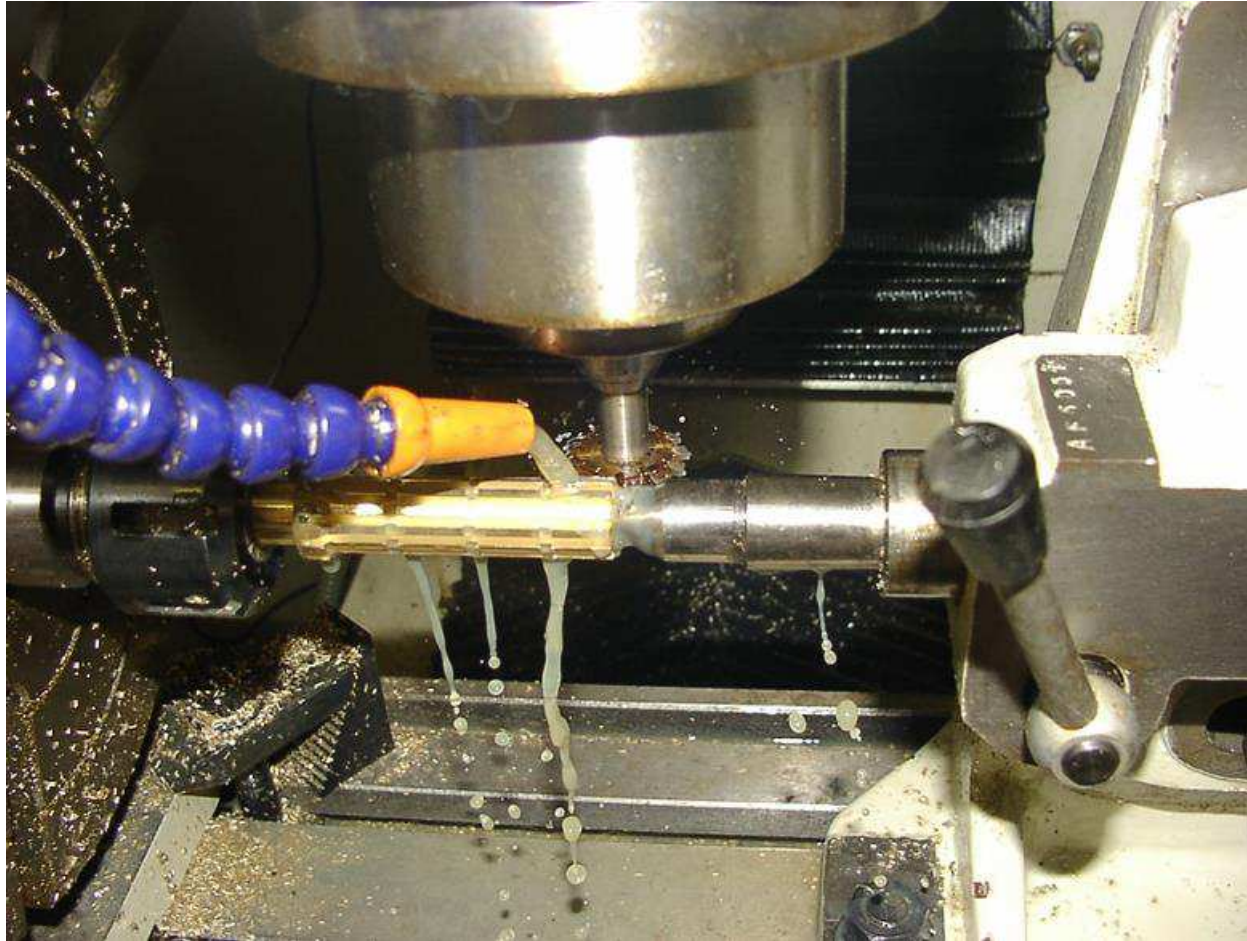
Rough details of bevel gears used in these clocks



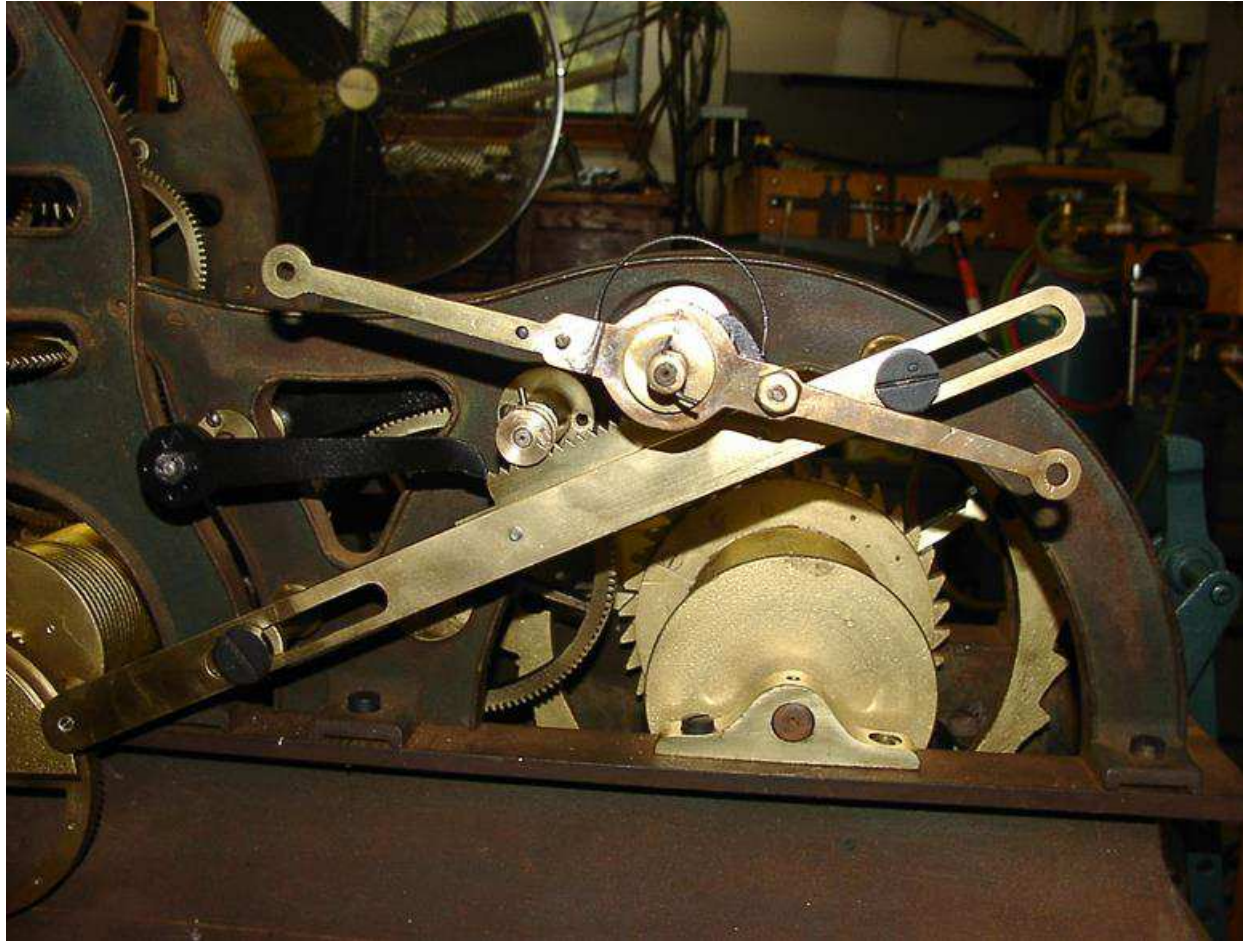
Testing of depthing, required making sliding depthing tool to properly fit. .010" between escaping and not escaping.....

**Make pendulum per
original photos**

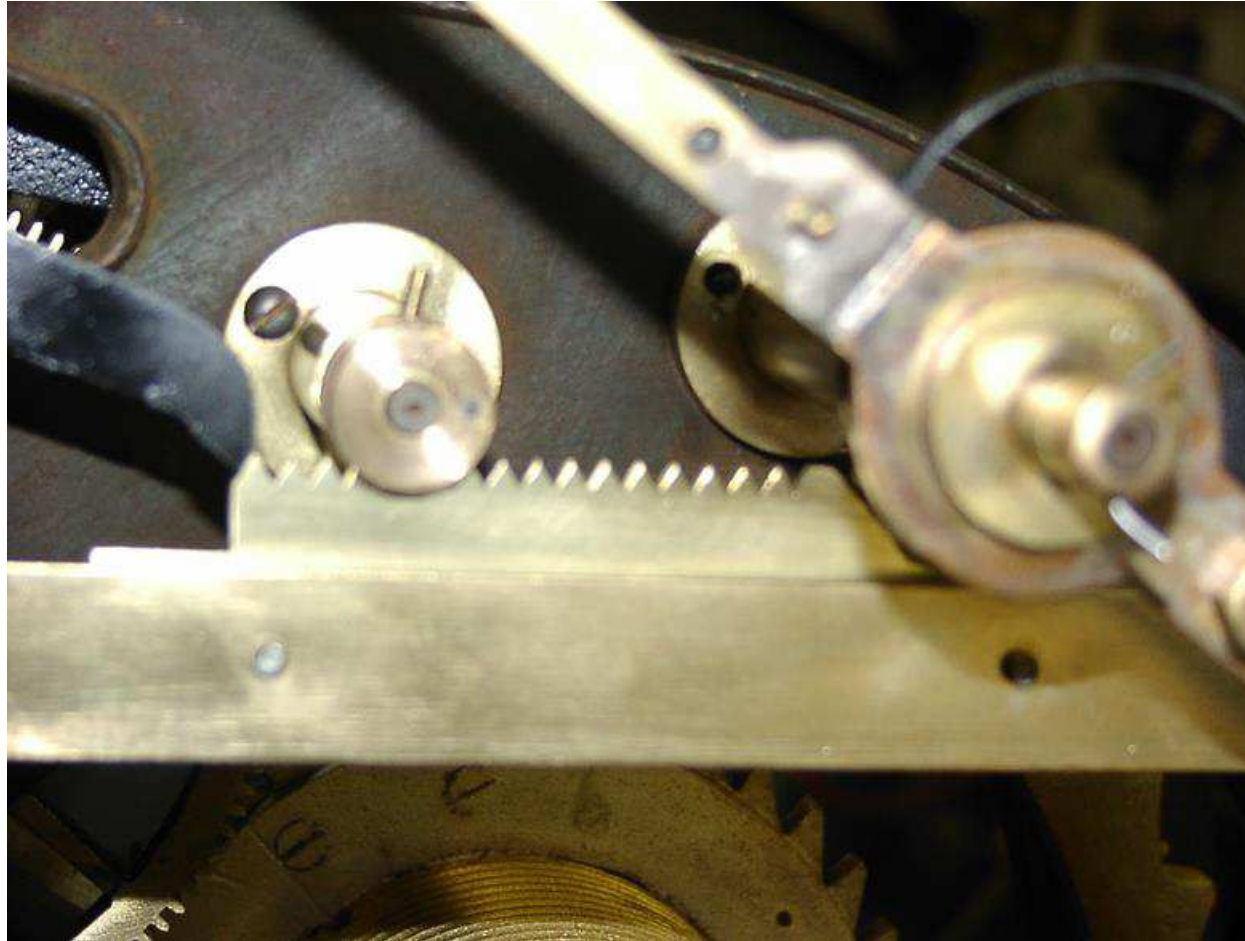




Cutting multiple pinion gears



Fan arm details as well as sliding rack frame



Make rack and rack bracket



**Test racks to test
measurements and
function (they didn't)**



**CNC milling of
bevel gears**

Drive weight for time side, originally cast as pendulum bob for very large E Howard tower clock but also used as the time side drive weight.....



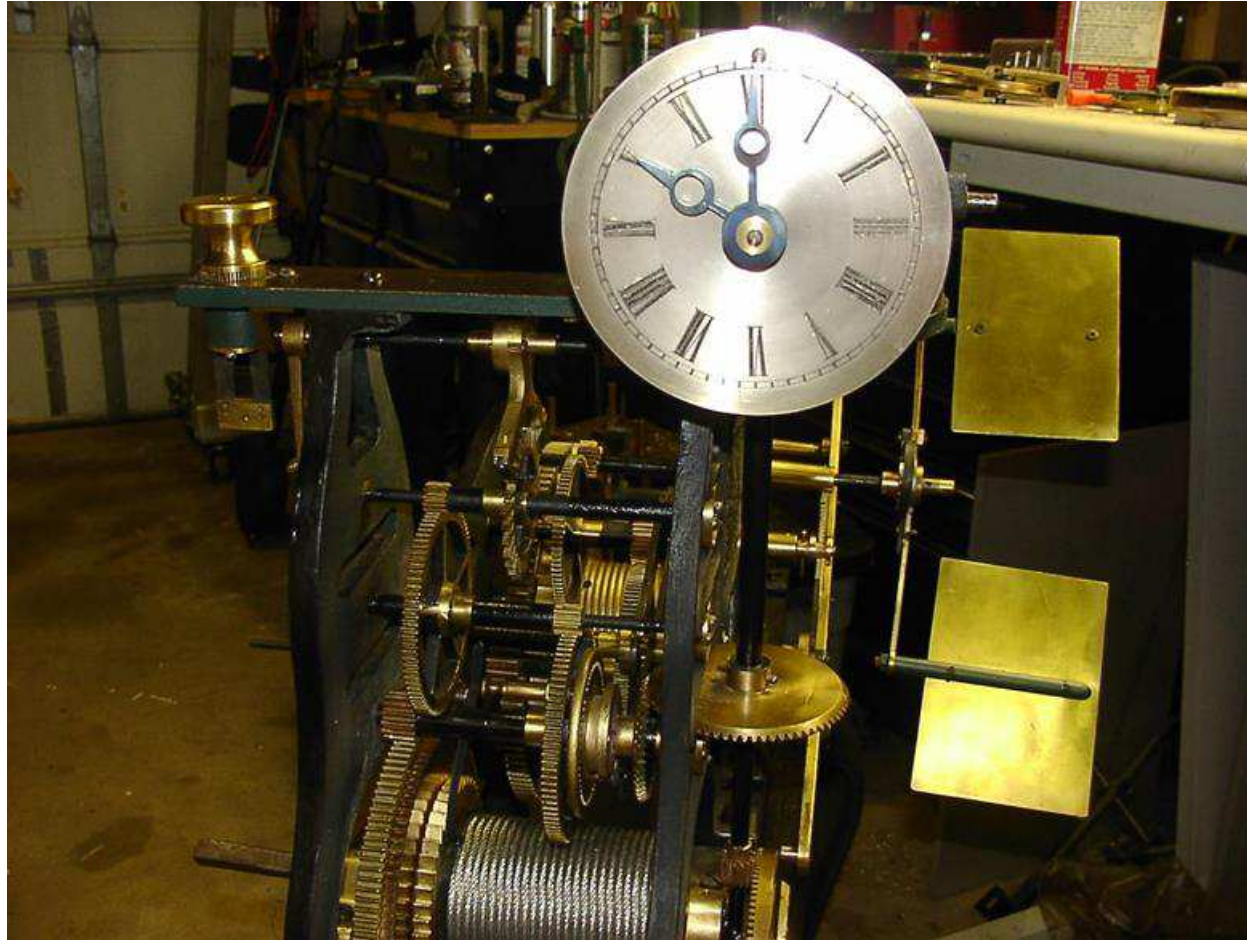


Make suspension spring, cheeks, regulator nut, and mechanism



Make verge, crutch, verge adjustable assembly





Make dial, hands, motion works, support bracket as well as fan blades and arm for fan



**Motion work and drive (bevel) gear,
backside of dial also made for this clock**

After a great deal of cleaning, rework, and repaint

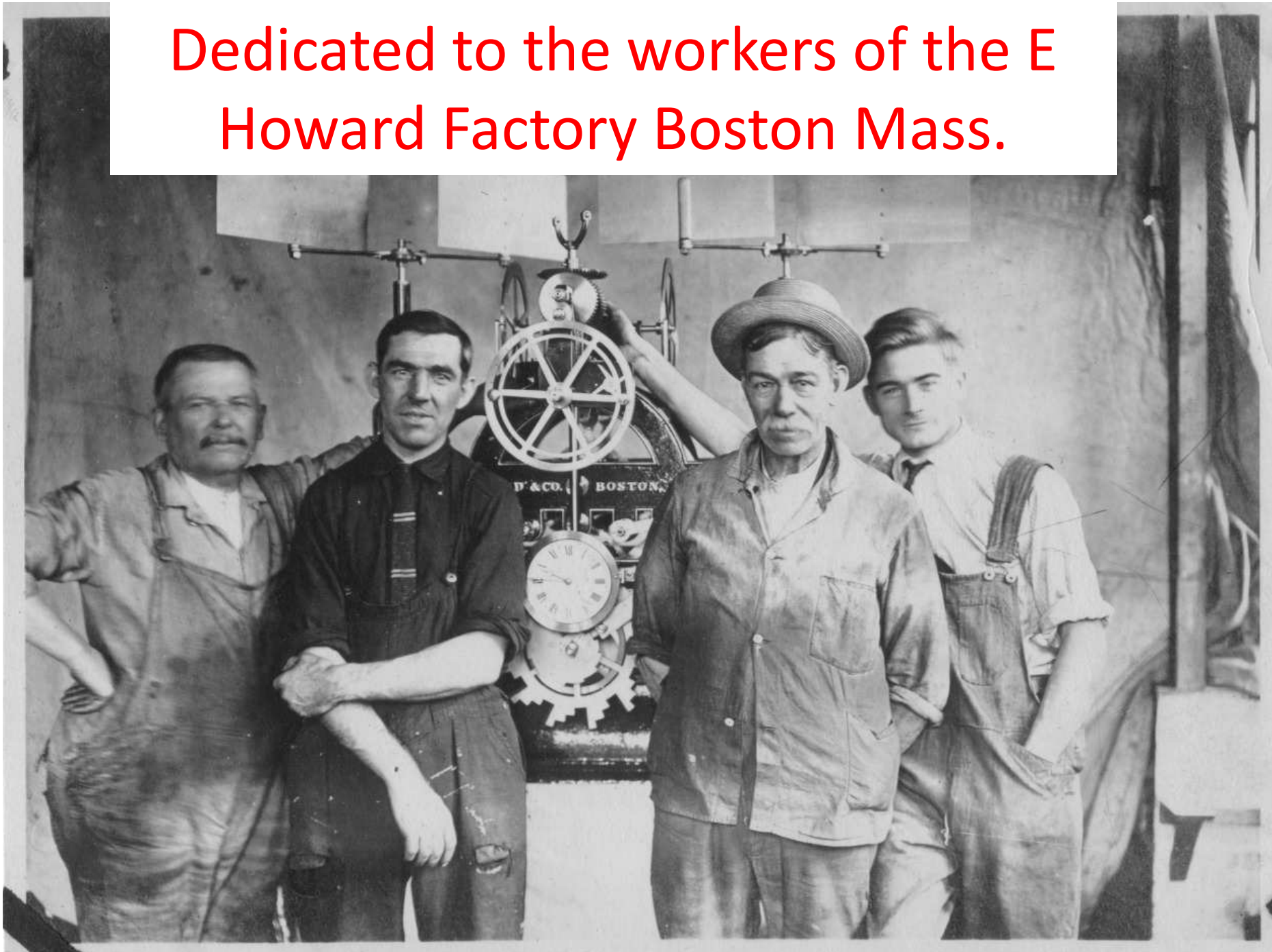


Ready for running



And in conclusion; there is generally the question “how hard is tower clock repair REALLY?” The real answer is, not hard, mostly just real work in the concept of the word work, but it is also like eating an elephant...take it a bite at a time and ultimately the job will get done.....

Dedicated to the workers of the E
Howard Factory Boston Mass.

















E Howard Tower Clock Renovation

The subject clock was missing a fair number of parts and the entire strike train had not run in many years. It was rusted up solid in addition to missing its rack, both fan blades, and one arm of the fan assembly. Inspection of the mechanism suggests the clock sat outside for a long time, its feet had sunk into the ground by a foot or so, or may have been in a tower with bird droppings. Rust was rampant but some degree of original paint could still be seen under the wash of rust.

A word of caution when climbing about in towers, safety concerns come first. One thing that may not occur to all of us is the possibility of encountering histoplasmosis from bird droppings.....

E Howard Tower Clock Renovation

The subject of this monograph is the smallest sized E Howard time and strike tower clock made. A local collector/dealer purchased it at the 2012 NAWCC Texas regional in Houston. It changed hands to a second party and 3 months later found its way to my shop. The owner asked

- return it to running condition
- preserve what could be saved of the original surfaces.

It was in pretty sad condition as seen in following photos;

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The serial number is painted on the frame, very difficult to read, but reads 3490. The number is also stamped on the frame under the brass name plate. While there are many records of E Howard production and installation locations, this clock is slightly later production than the files we have. I believe its serial number suggests it was made about 1920 or 1921. In the normal E Howard fashion most of the parts of the clock are stamped with the last digit of the serial number, in this case a "0". Replacement parts I made I also stamped with a 0.

After completing the preliminary inspection, disassembly was completed. The process of rust removal was lengthy and involved chemical rust removal, electro chemical rust removal, several forms of mechanical rust removal, and a whole lot of sweat. Shafts and steel parts were generally rust pitted. It was decided to leave the pits as removal would sacrifice too much original material. It was decided to do a “running restoration” not a “display” or “museum quality restoration”. Rust removal and general clean up took perhaps 80-100 hours of shop time.

Some very good news had to do with findings under the rust. It appeared as if the strike train had never been dissembled, its screws, nuts, bolts, and other parts were “unmarked” by the usual poor repair practices seen in many tower clocks. Original paint was found on several parts including the wheel spokes, the backside of the winding drums etc. The restoration used these same paints as completed. Examples follow in which the strike side winding drum clearly showing the original gold paint.