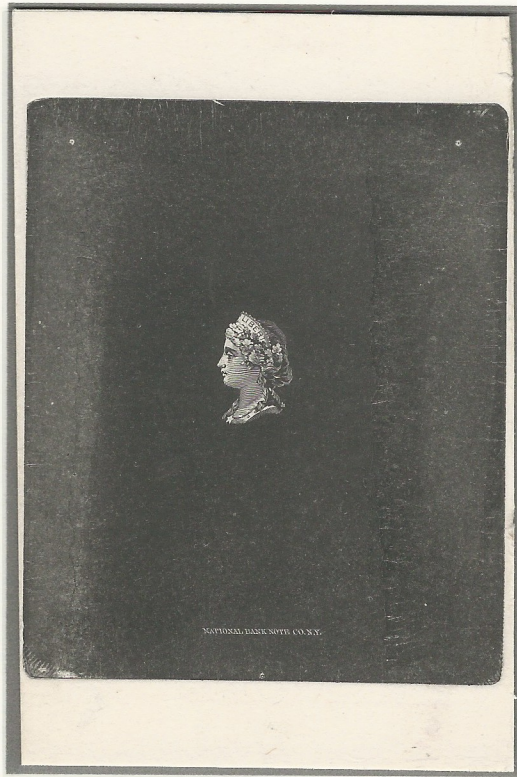


**Liberty Head essays on soft card**



*Bright blue*

*Black*



*Blue green*





The complete design: essays signed by the engravers, Jones and Ronaldson

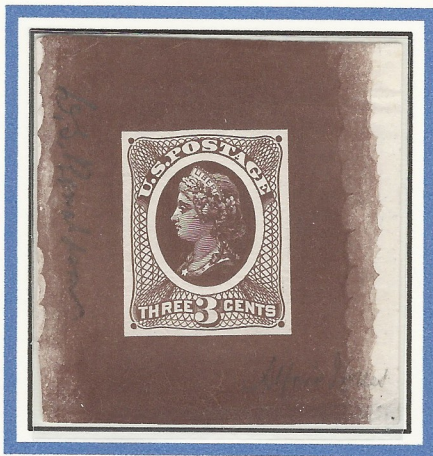
Each essay is the **only known example** signed



Die on transparent white wove paper  
*Pale blue purple*



Die on stiff yellowish card  
*Black*



Complete design: die on proof paper  
*Red brown, Carmine, Blue green*

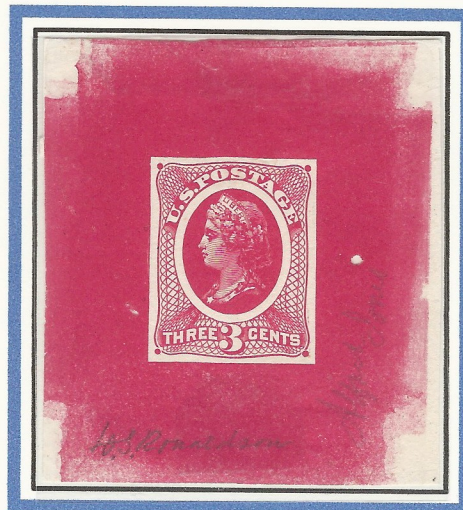




Plate experiments on stiff ivory paper, ungummed



Carmine



Dark blue green



Yellow



Rose violet



Block of 4 – no colour outside design

Carmine

Dark violet, orange, dark green, dull yellow green





On transparent white wove, imperf, ungummed



Pinkish Red



Four different colours: purple, pale gold, blue-green, dull green



Blue-green, Gold  
and Pale Gold

The Rainbow block of eight

Two recorded



Red violet –  
Deep violet  
Deep violet –  
Carmine

Dark violet – Blue  
green

Blue green – Dark  
violet red

Carmine – Yellow; Yellow - Carmine



Complete set of 'rainbow' colors on stiff yellowish wove: imperf



Dark brown to Orange



Blue green to Dull carmine



Deep blue to Dark brown



Brown olive to Brown red



Dull carmine to Deep blue



Dull carmine to Orange



Dull orange to Deep blue



Dull carmine to Yellow green



Complete set of 'rainbow' colors on white wove

Research: This complete set shows all the colors and true vertical pairs



Red-brown to Dark orange  
Dark orange to Brown-red



Brown-olive to Red-brown  
Red-brown to Yellow-green



Yellow-green to Dull carmine  
Dull carmine to Yellow-green



Blue-green to Dull carmine  
Dull carmine to Deep blue

Dull carmine to Brown-olive  
Brown-olive to Dull carmine



Dull-carmine to Orange  
Orange to Deep blue



Deep blue to Orange-brown  
Orange-brown to Dull orange

The Scott catalogue fails to list dull carmine to brown-olive. Brazer lists all the colors, but not in their correct vertical pairs.



Complete set of 'rainbow' colors on stamp paper: perf 12, gummed

Research: This complete set shows all the colors and true vertical pairs



*Blue-green to Dull carmine  
Dull carmine to Deep blue*



*Deep blue to Dark brown  
Dark brown to Dull orange*



*Dull carmine to Dull orange  
Dull orange to Deep blue*



*Yellow-green to Dull carmine  
Dull carmine to Yellow-green*



*Brown-red to Brown-olive  
Brown-olive to Brown-red*

Neither the Brazer nor the Scott catalogues list the *brown red to brown-olive* (paired on the bottom right with the listed *brown-olive to brown-red*)



1869: The Thorpe patent 95,624 – double-printing with two fugitive inks

Liberty head printed over various network designs: imperf, ungummed – six complete sets at most

Red horizontal diamonds



Black 'ONE' repeated

Red X repeated

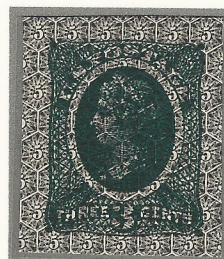


Reconstructed strip of three  
Red 3 in diamonds



Red 2 in ovals

Black 5 in hexagons



Red 2 in circular stars

Patent 95,624 involved what Thorpe called 'double-printing': 'The nature of my invention consists in the printing of... stamps with two kinds of ink... so different in their chemical composition that a solution of acid will destroy the one, while the other will be... destroyed by... a solution of alkali...'

From Thorpe's letters patent dated October 5, 1869



**Thorpe experiments:** design printed over a ground colour on white wove paper

**Research:** these stamps are **double printed** on a **ground color**. They therefore conform to Thorpe's patent.\*



Yellow-surfaced,  
ungummed.

The two items  
are a perfect fit.

143 x 82 mm

Uncatalogued  
Green-surfaced,  
ungummed.  
135 x 78 mm



\* Hofmeyr and Lee (2016), The Chronicle 68:2, May



**Thorpe experiment:** design printed over a ground color on white wove paper

Deep orange ground color



**Thorpe experiment:** printing the design twice, one on top of the other

**Research:** these essays fulfill the criteria for Thorpe's patent

The stamps below illustrate a third possible way in which Thorpe's 'double printing' could be achieved. In this case, two copies of the design have been printed – one directly on top of the other.

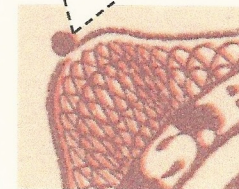
Black on **Scarlet**



Discovery copies: **Brown on Scarlet**



*Scans shows the color differences and the effects of double printing*





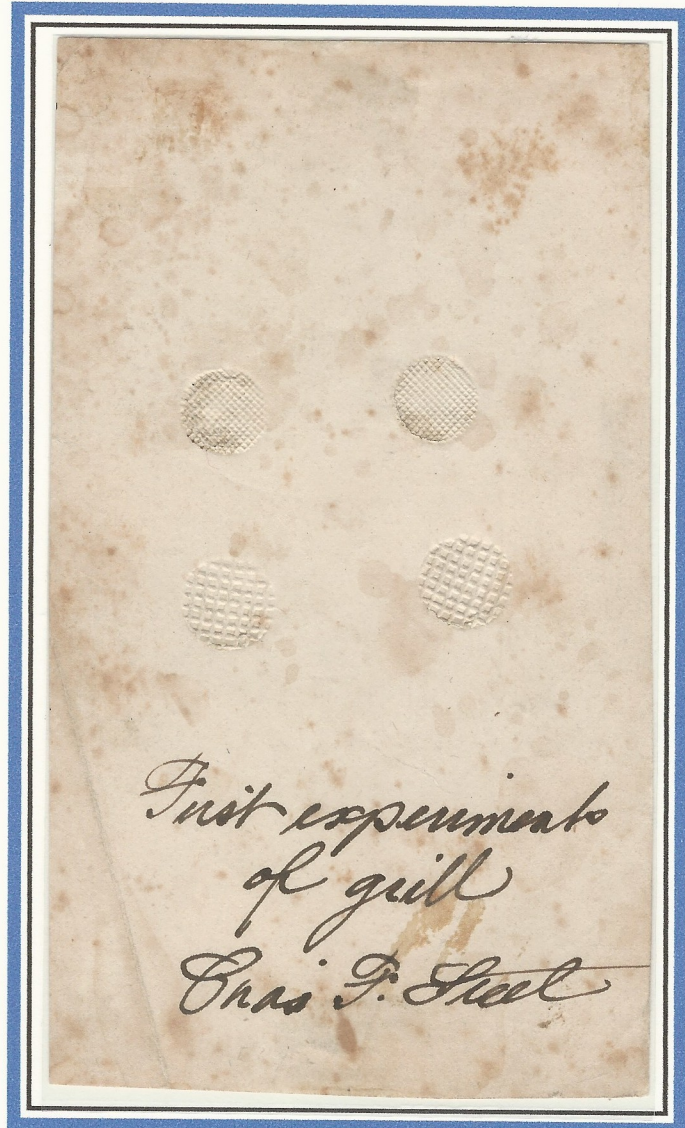
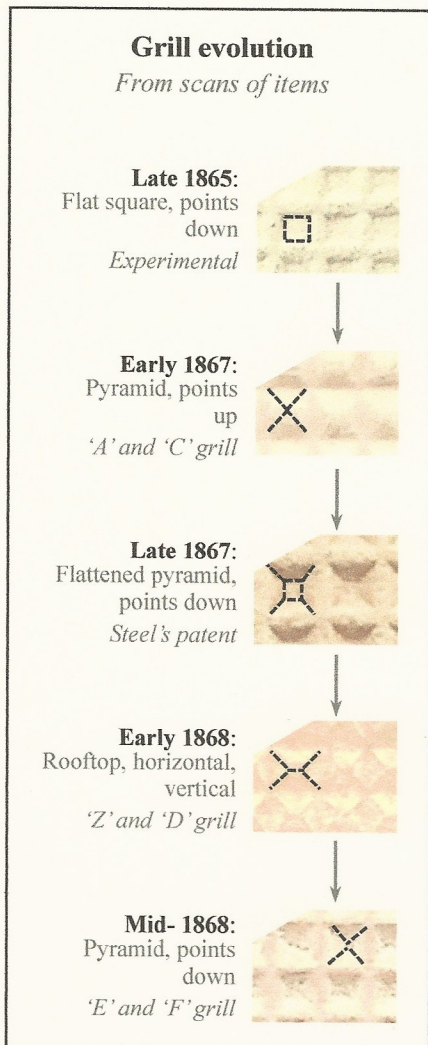
## Chapter 7: The development and adoption of the 'grill'

After a lengthy experimental process that began in 1865, the USPO decided to adopt **Steel's** 'embossed stamp' (the so-called 'grill') to prevent reuse. 'Grill' stamps went into full production in 1868. This chapter shows:

- Steel's experimental essays and unadopted designs
- The evolution from the all-over A-grill through to the small F-grill

### 1865: Steel's 'first experiments'

Three recorded.



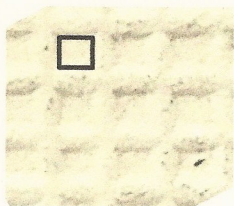
Charles Steel was in charge of the N.B.N.C.'s US Postage Stamp Department. A letter from Anthony Zevely (3<sup>rd</sup> Assistant Postmaster General) to Steel on 20<sup>th</sup> December, 1865 proves that Steel's first grill samples date to 1865.



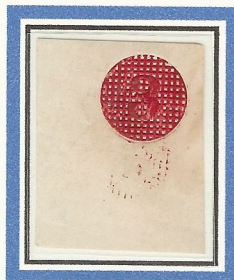
1865: The earliest grills have a flat square shape

i). *White wove paper experiments* – points down

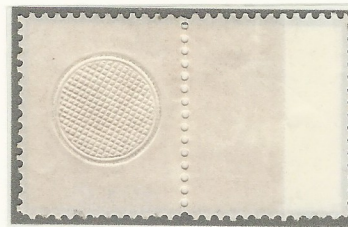
Magnified scan of the earliest grill



One recorded



Imperf, ungummed.  
Red '3' in circle tests printing on an embossed surface



Plain circle.  
Perf 12, gummed

ii). *Plate proof* – points down, using the 1861 3c stamp, rose

Mint unhinged



iii). *Cancellation experiments* – points down



Mint pair, gummed. Tests a **Pen** and **ink** cancellation

12-15 examples are known



e: PF

Used pair. Tests the **New York segmented diamond**, in use in July 1867



Experiments with the flat square grill: surface printing and points up

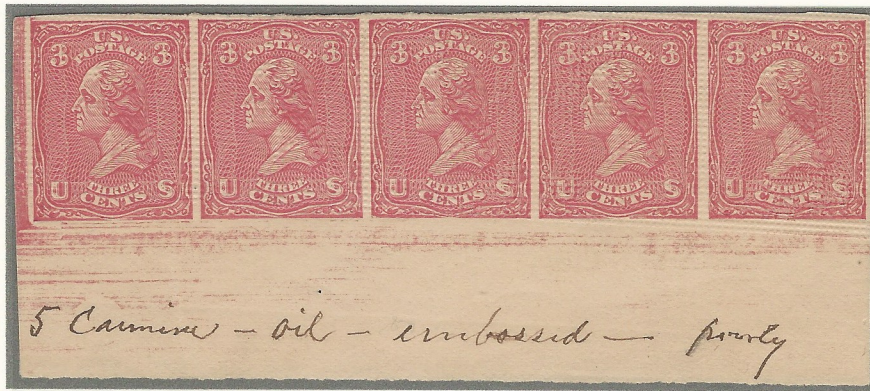
i). Surface printing experiment

These plates for **typographic** printing were prepared from the engraved plates of the 1861 3c



In his letters patent **70,147** of October 22<sup>nd</sup> 1867, **Steel** argued that the 'embossed' method to prevent reuse should be combined with **surface printing** to cut costs.

This is the only essay known to combine the early **flat square grill** with **surface printing**.



Carmine, points down  
Annotated left corner strip of five

ii). Plate proofs - points up

Mint pair, gummed. Tests a **pen** and **ink** cancel on points down grill



Ruled lines

'No 2'



Perfed stamp essays



Mint imprint block  
Perf 12, gummed

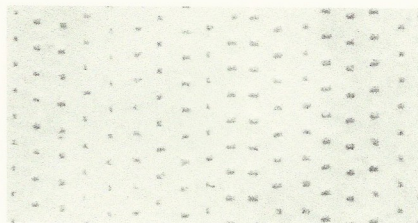
Black





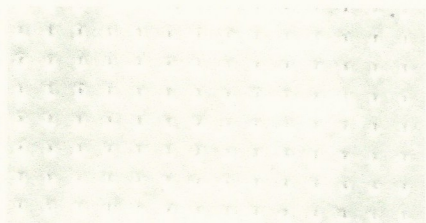
Unknown date: 'Music box' grill essays on the 3c stamp: perf 12, gummed

Rose  
Points up



Back scan shows irregular pattern

Back scan shows regular pattern



Back scan shows irregular pattern



e: PF  
Rose, points down  
Regular pattern



Rose  
Points down



e: PF  
Rose, points down  
Irregular pattern



Rose  
Points down

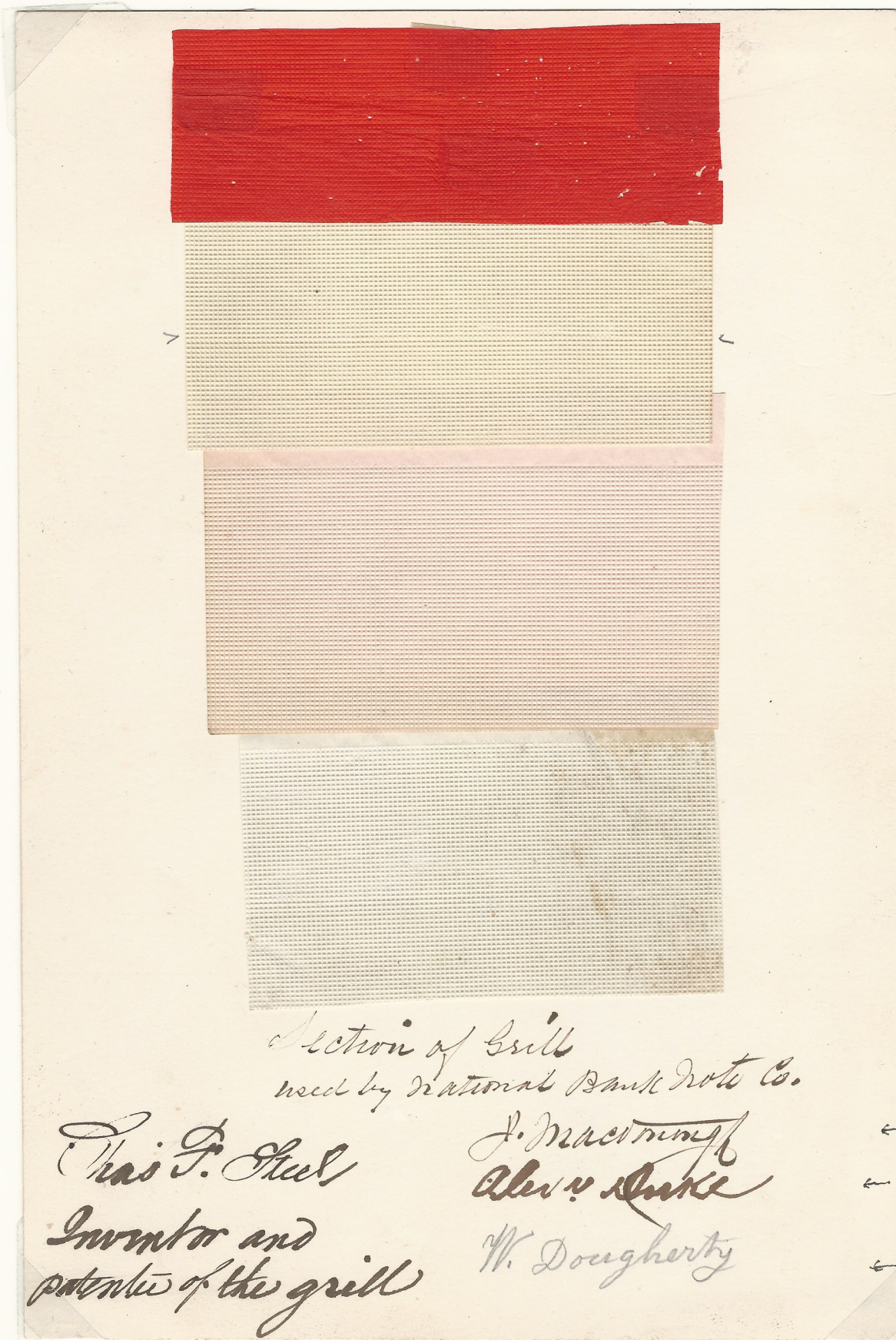
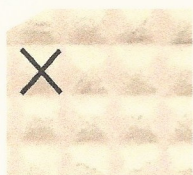




1867: This important pyramid (or 'biscuit grill') essay recognizes Steel's rights as the inventor

i). White wove paper experiments – points down

1867: Pyramid grill scan



Various colored papers  
Ungummed.

Signed by officers of the  
N.B.N.C.

James Macdonough was the  
GM.

Alexander Duke was a  
machine operator.

Section of Grill  
used by National Bank Note Co.

Chas F. Steel  
Inventor and  
patentee of the grill

J. Macdonough  
Alex. Duke  
W. Dougherty

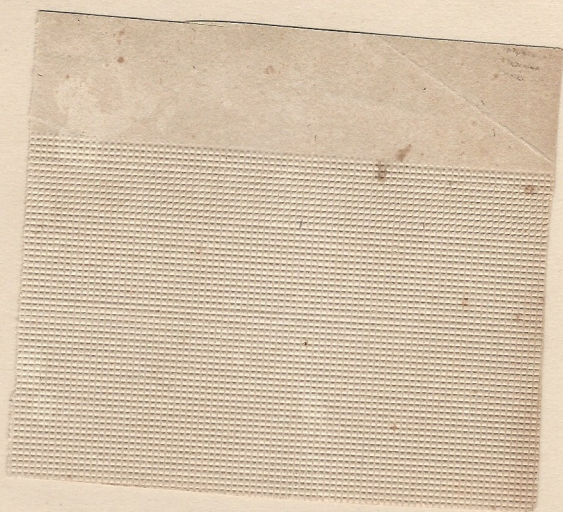


'Biscuit grill' essay with a personal connection to Charles Steel

ORIGINAL GRILL  
TO PREVENT REMOVAL OF INK

\$900

PLEASE DO NOT HANDLE



e: PF

Pyramid (biscuit) grill on white wove paper (70 x 44 mm). Ungummed.

Similar to Scott 79-E14b.

The original owner claims to have been given it while staying at the home of Steel's son in the summer of 1904/5.

Sample Grill from the first griller  
used by Chas. F. Steele



I lived at home of this man's  
son, in Beaconhurst NY  
in summer of 1904 (or '05) ?

THIS  
AND W  
THE