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MANUFACTURE OF COPPER PLATES FOR PROCESS PRINTING.

APPLICATION FILED MAR. 15, 1920.

1,362,082.

Patented Dec. 14, 1920.

3 SHEETS—SHEET 1.

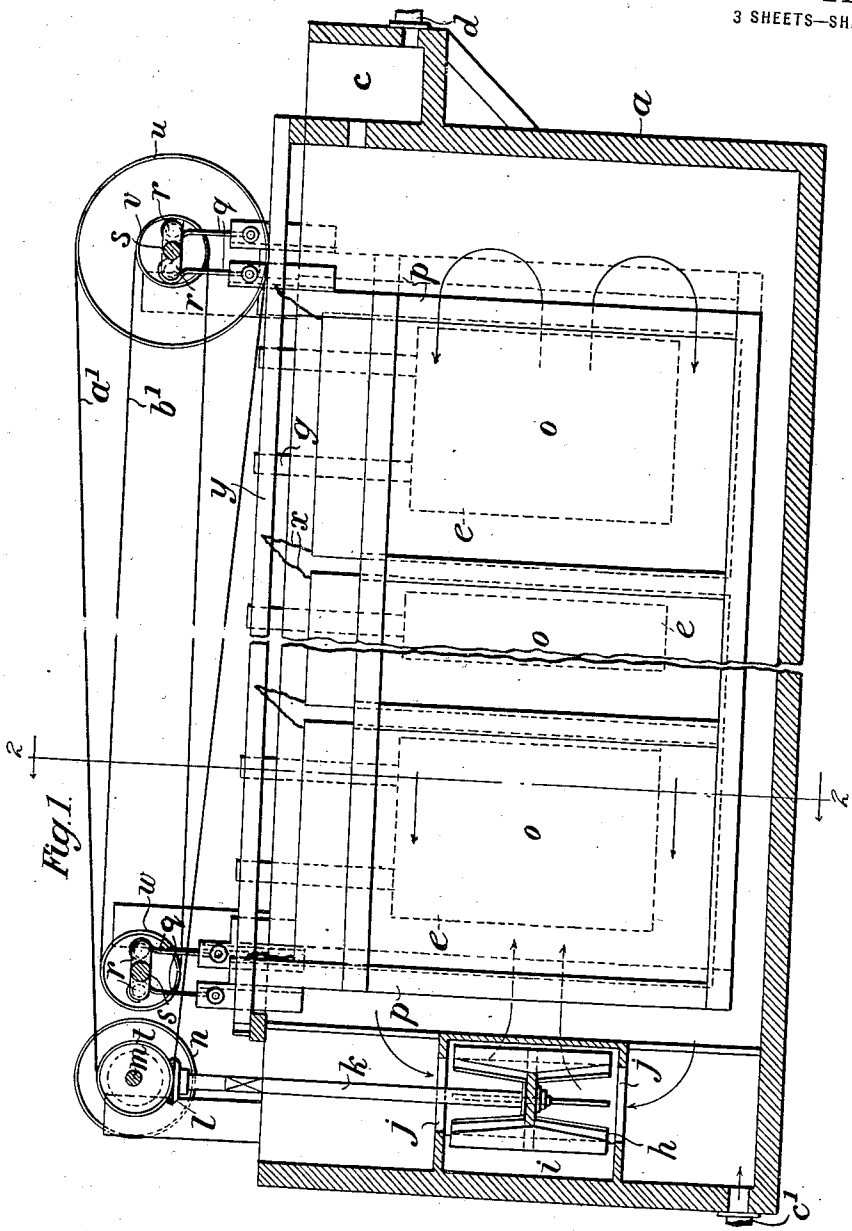



Fig. 1.

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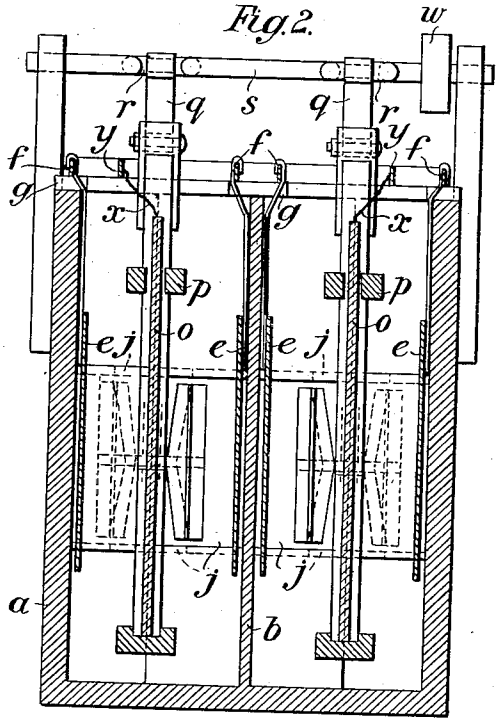
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3 SHEETS—SHEET 2.

Fig. 2.




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3 SHEETS—SHEET 3.

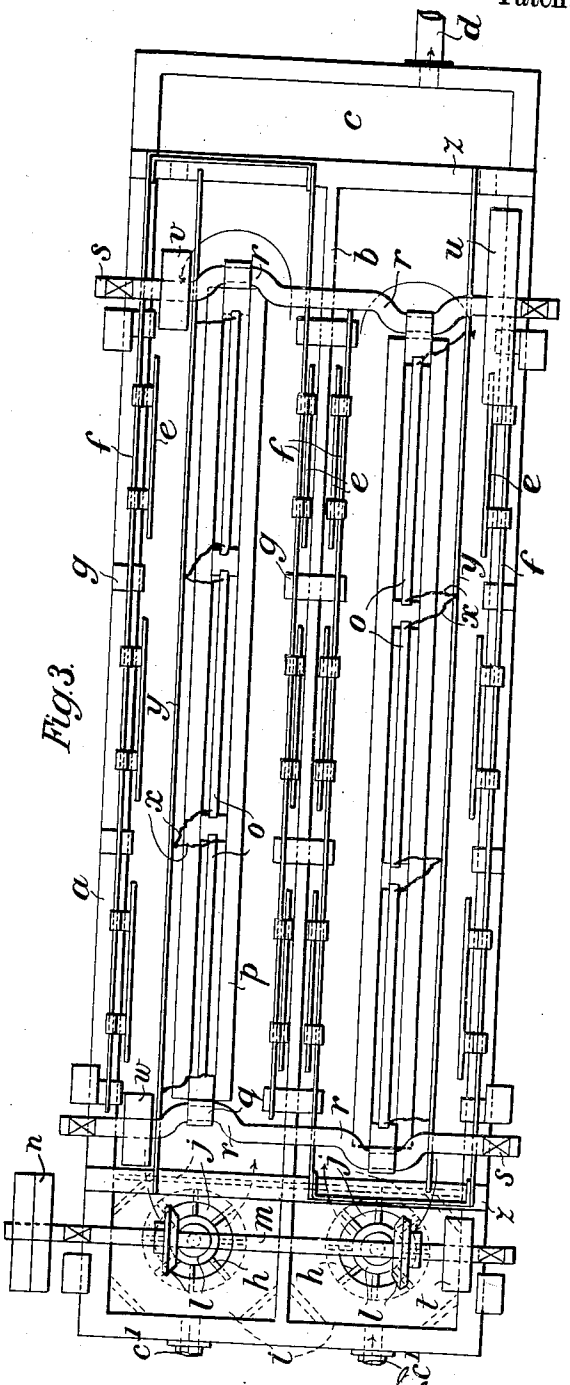


Fig3.

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# UNITED STATES PATENT OFFICE.

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## MANUFACTURE OF COPPER PLATES FOR PROCESS-PRINTING.

1,362,082. Specification of Letters Patent. Patented Dec. 14, 1920.

Application filed March 15, 1920. Serial No. 366,065.

*To all whom it may concern:*

Be it known that I, SHERARD OSBORN COWPER-COLES, a subject of the King of Great Britain, residing at Rossall House, Thames street, Sunbury-on-Thames, Middlesex, England, have invented new and useful Improvements in the Manufacture of Copper Plates for Process-Printing, of which the following is a specification.

My invention relates to the manufacture of copper plates for process printing.

Many attempts have been made to produce such plates electrolytically, but the plates have not proved satisfactory, inasmuch as they were soft and of uneven gage, the length of time required to deposit the necessary thickness was too long, and the back of the plates was rough.

The object of the invention is to overcome these objections, and for this purpose the electrolyte is caused to pass at a high rate of speed, for example 500 or 600 feet per minute, over the surface of the cathode by means of vertical paddles placed at one or both ends of the vat. At the same time the cathode has imparted to it an irregular reciprocating and oscillating motion which continually varies in relation to the anode surface, the cathode plates being suspended by connecting rods attached to eccentrics, cranks or cams. The eccentrics, cranks or cams are connected together by means of belting or chains running over different sized pulleys, so that one eccentric, crank or cam is always gaining slightly on the other. The copper solution is at the same time continually filtered by pumping it through a suitable filter bed or medium. Under these conditions a current density of 100 amperes, or more, per square foot of cathode, a surface can be employed without the formation of nodules.

In the accompanying drawing—

Figure 1 is a sectional side view of a suitable arrangement of apparatus for the manufacture of copper plates for process printing according to the invention.

Fig. 2 is a sectional end view and

Fig. 3 is a plan of the same.

*a* is the vat containing the electrolyte and which is provided with a central longitudinal partition *b* and an overflow trough *c* fitted with a pipe *d* leading to a suitable filtering apparatus (not shown); *e*, *e* are anodes suspended from bus bars *f*, *f* supported upon blocks *g*, *g* on the edges of the vat *a* and partition *b*; *h* *h* are the vertical paddles located in chambers *i* *i* in the vat *a* provided with openings *j*, *j* for the passage of the electrolyte to and from the paddles which cause it to circulate rapidly over the surfaces of the cathodes *o*, *o* the direction of flow being indicated by the arrows in Figs. 1 and 3. The paddles *h* are carried upon shafts *k* to which motion is imparted by means of bevel gear *l*, shafts *m* and driving pulley *n*.

*o*, *o* are the cathode plates which are held in frames *p*, *p* suspended by links *q*, *q* from cranks *r*, *r* on shafts *s* *s* to which motion is communicated from the shaft *m* by means of pulleys *t*, *u*, *v*, *w*, and belts $a^1$ and $b^1$, the pulleys *v* and *w* on the crank shafts *s* being of slightly different size whereby the cranks at the two ends of the vat are driven at different speeds and consequently an irregular up and down and oscillatory motion is given to the cathode-frames *p*. The cathode plates *o* are electrically connected by wires *x* to bus-bars *y* supported on transverse bars *z* on the vat *a*.

$c^1$ indicates the inlets for the copper solution pumped up from the filtering apparatus.

Claims:

1. A process for the electrolytic production of copper plates for process printing, consisting in causing electrolyte to pass at a high rate of speed over the surface of a cathode, placing an anode in the electrolyte, and causing movement of the cathode relatively to the anode during circulation of the electrolyte.

2. A process for the electrolytic production of copper plates for process printing, consisting in causing electrolyte to pass at a speed of approximately 500 feet per minute over the surface of a cathode, placing an anode in the electrolyte, and moving the cathode relatively to the anode during circulation of the electrolyte.

3. A process for the electrolytic production of copper plates for process printing, consisting in causing electrolyte to circulate over the surface of a cathode, placing an anode in the electrolyte, and reciprocating the cathode relatively to the anode during circulation of the electrolyte.

4. A process for the electrolytic production of copper plates for process printing, consisting in causing electrolyte to circulate over the surface of a cathode, placing an

anode in the electrolyte, and reciprocating and oscillating the cathode relatively to the anode during circulation of the electrolyte.

5. A process for electrolytic production of copper plates for process printing including the steps of causing electrolyte to pass at a high rate of speed over the surface of a cathode, placing an anode in the electrolyte, and reciprocating and oscillating the cathode relatively to the anode during circulation of the electrolyte.

6. A process for electrolytic production of copper plates for process printing, including the steps of causing electrolyte to circulate over the surface of a cathode member, placing an anode member in the electrolyte, and moving one of said members relatively to the other member during circulation of the electrolyte.

7. An apparatus for the electrolytic production of copper plates for process printing, comprising a tank containing electrolyte, means for causing circulation of the electrolyte in the tank, anode and cathode members located in the tank, and means for moving one of said members relatively to another member.

8. An apparatus for the electrolytic production of copper plates for process printing, comprising a tank containing electrolyte, means for causing circulation of the electrolyte in the tank, anode and cathode members located in the tank, and means for reciprocating and oscillating one of said members relatively to another member.

9. An apparatus of the kind defined by claim 8 in which the liquid circulating means includes a rotatable paddle located at one end of the tank.

10. An apparatus of the kind described comprising a tank containing electrolyte, anodes extending along the sides of said tank and immersed in the electrolyte, a cathode located between the anodes, means for reciprocating the cathode, and a paddle for causing the electrolyte in the tank to rapidly circulate over the surface of the cathode.

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