

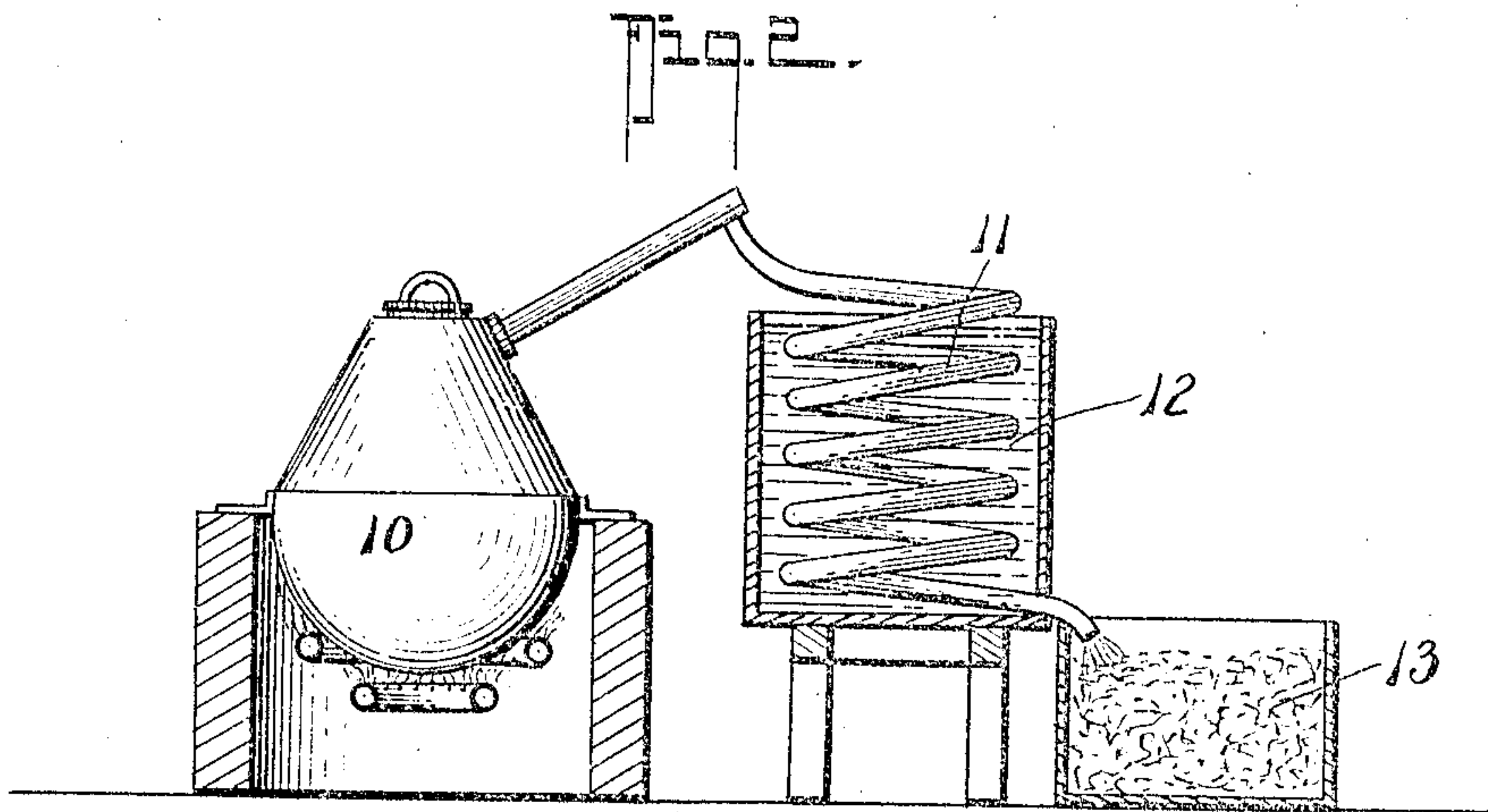
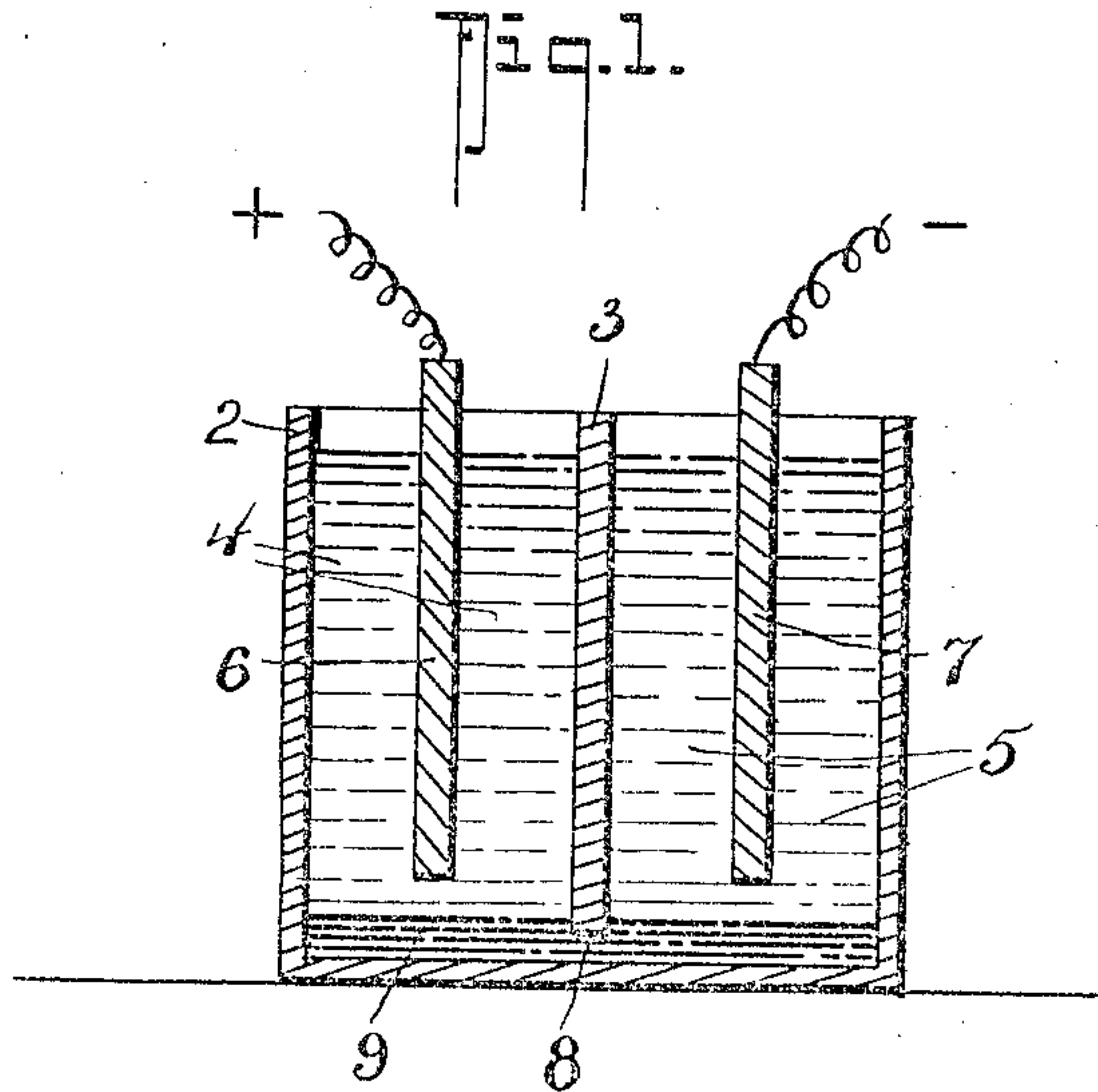
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PATENTED NOV. 26, 1907.

F. W. MORRIS.

PROCESS FOR THE MANUFACTURE OF CYANID OF POTASSIUM OR SODIUM.

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WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## PROCESS FOR THE MANUFACTURE OF CYANID OF POTASSIUM OR SODIUM.

No. 871,943.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed December 23, 1906. Serial No. 349,329.

*To all whom it may concern:*

Be it known that I, FRANK W. MORRIS, citizen of the Dominion of Canada, residing at Victoria, in the Province of British Columbia, Canada, have invented a new and useful Improvement in a Process for the Manufacture of Cyanid of Potassium or Sodium, of which the following is a specification.

10 This invention relates to an improved process for the production of cyanid of potassium or of sodium cyanid.

The process is fully described in the following specification reference being made to the 15 drawings by which it is accompanied, which represent specific parts of an apparatus suited to the process, but in which no attempt is made to show particular features of construction.

20 In these drawings, Figure 1 is a vertical section of the electrolytic tank or cell in which the first part of the process is effected, and Fig. 2 an elevation of the still and condenser such as may be used for the later 25 stage.

In Fig. 1, 2 represents an electrolytic tank or cell of that particular form known as the "Castner Kellner" in which the cell is divided by a partition 3 into two compartments 4 and 5. The compartments 4 and 5 are connected by a passage 8 through the lower part of the partition 3 which passage is sealed against admixture of the contents of the compartments by a body of mercury 9.

35 Both compartments of the tank are charged with a solution of a formate of a salt of one of the alkali metals, sodium or potassium, which forms the electrolyte. In one of these compartments is an anode plate 6 and 40 in the other a cathode plate 7 of suitable material and they are connected respectively to the positive and negative terminals of an electric circuit. On a current being passed through the electrolyte the formate is broken 45 up and formic acid is produced in the compartment 4 of the anode and caustic soda and hydrogen in the compartment 5 of the cathode.

When the changes in the electrolyte are 50 completed the current is cut off and the formic acid is neutralized by the addition of a suitable ammonium salt for the production of ammonium formate. The ammonium formate thus produced is siphoned from the 55 tank and is evaporated to form dry crystals or just to the point of breaking up which

point is indicated by a faint smell of hydrocyanic acid given off. The product, crystallized ammonium formate, is then charged 60 into a still 10 and quickly heated, when the ammonium formate is broken up into hydrocyanic acid and water which are condensed in a worm 11 connected to the still and contained in a water tank 12. The lower end of the worm 11 delivers into a receiver 13 65 which is charged with caustic soda or caustic potash one or the other of which is produced in the electrolytic process first described according as sodium or potassium formate is used as the electrolyte. 70

The introduction of the hydrocyanic acid to the caustic soda or potash in the receiver 13 results in the formation of the potassium cyanid or sodium cyanid as the case may be, which is dried in any approved manner and 75 forms the desired product.

If it is desired that the cyanid be anhydrous the hydrocyanic acid may be dehydrated in any approved manner before delivery into the receiver 13 containing the caustic 80 soda or caustic potash.

Having now particularly described my process, I hereby declare that what I claim as new and desire to be protected in by Letters Patent, is: 85

1. A process for the production of a cyanid of an alkali metal consisting in the formation of formic acid by electrolytic action on a solution of a formate of said metal, subsequently neutralizing the formic acid to 90 form ammonium formate, and treating said formate to obtain hydrocyanic acid and the association of that acid with a hydrate or oxid of an alkali metal.

2. A process for the production of a cyanid of one of the alkali metals consisting in the formation of formic acid by electrolytic action on a solution of a formate of such metal, then subsequently neutralizing the formic acid by ammonium salt, then evaporating the resulting ammonium formate to 100 crystallization, then distilling said crystals to form hydrocyanic acid, and then associating that acid with a hydrate or an oxid of an alkali metal. 105

3. A process for the production of cyanid of potassium, consisting in the formation of formic acid by electrolytic action on a solution of a formate of potassium, neutralizing the formic acid by the addition of a salt of ammonium, evaporating the resultant ammonium formate to the dry crystals, then 110



rapidly distilling the crystals and condensing the vapor thereof to form hydrocyanic acid, and adding thereto caustic potash to form cyanid of potassium.

5 4. A process of the class described consisting in simultaneously generating formic acid and caustic soda in an electrolytic apparatus, maintaining the formic acid separated from the caustic soda, then converting the formic  
10 acid into a formate, then evaporating said formate to crystallize the same substantially as specified.

5. A process of the class described consisting in simultaneously generating formic acid and  
15 caustic soda in an electrolytic apparatus, maintaining the formic acid separated from the caustic soda, then converting the formic acid into a formate, then evaporating said formate to crystallize the same, then heating  
20 such crystals to the decomposition or breaking-up point, substantially as specified.

6. A process of the class described consisting in simultaneously generating formic acid and caustic soda in an electrolytic apparatus,  
25 maintaining the formic acid separated from the caustic soda, then converting the formic acid into a formate, then evaporating said formate to crystallize the same, then heating such crystals to the decomposition or breaking-up point, then condensing the resultant  
30 product substantially as specified.

7. A process of the class described consisting in simultaneously generating formic acid

and caustic soda in an electrolytic apparatus, maintaining the formic acid separated from  
35 the caustic soda, then converting the formic acid into a formate, then evaporating said formate to crystallize the same, then heating such crystals to the decomposition or breaking-up point, then condensing the resultant  
40 product, then passing such condensed product into the caustic compound of an alkali metal to produce the cyanid of such alkali metal, substantially as specified.

8. A process of the class described consisting in simultaneously generating formic acid and caustic soda in an electrolytic apparatus, maintaining the formic acid separated from the caustic soda, then converting the formic  
45 acid into a formate, then evaporating said formate to crystallize the same, then heating such crystals to the decomposition or breaking-up point, then condensing the resultant product, then passing such condensed product into the caustic compound of an alkali  
50 metal to produce the cyanid of such alkali metal, then drying the same, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of  
60 two subscribing witnesses.

FRANK W. MORRIS.

Witnesses:

JOHN B. HUNKER,  
J. J. BAIRD.