My invention relates to amalgamator machines and methods and the primary objects of the invention are to provide an efficient means and method for separating gold from sand gravel or crushed ore. In carrying out these objects the ground auriferous material mixed with a solution of salt and water is passed through brass pipes of a machine wherein electrodes are installed for the purpose of converting some of the brine into chlorine gas. The gold bearing material is attacked by the chlorine gas which converts the gold into a soluble chloride thus separating it from the sand, gravel or crushed ore. The circulatory action of the machine is carried on by a rotary pump which forces the brine, carrying the gold and dross, through a tank of mercury. The gold is amalgamated and retained by the mercury while the tailings are carried off by mechanical means, and the circulation of brine is continuous as hereinafter more fully described.

With the above and other objects in view which will appear as the description proceeds, the invention consists of the novel method, construction, adaptation, combination and arrangement of parts as more fully hereinafter described and claimed. These objects are accomplished by devices illustrated in the accompanying drawings; wherein:

Figure 1 is a plan view of the machine which I use in carrying out my method;

Fig. 2 is a view in side elevation of the same with parts shown in section;

Fig. 3 is a view in transverse section taken substantially on a broken line 3, 3 of Fig. 1; and

Fig. 4 is a fragmentary detail view showing the baffle plate mounted in the delivery chute.

Referring to the drawings throughout which like reference numerals designate like parts, the numeral 5 indicates a combustion engine in outline which furnishes the motive power for the machine although it will be understood that same may be driven by any source of power desired. The numeral 6 indicates the main shaft of the machine which is driven by said engine. Said main shaft operates a rotary pump 7 from which a pipe 8 extends and doubles back upon itself to form a coil as clearly shown in the drawings. Electrodes 9 are installed within each length of said pipe for reasons hereinafter set forth.

The remote end of the pipe 8 extends downwardly at 10 into a tank 11 which serves as a container for a bath of mercury as designated by the numeral 12. Said tank is sealed with the exception of an upwardly slanting delivery chute 13 which empties into a discharge hopper 14 and rests on the top edge thereof by means of a lip 15. A baffle plate 16 is mounted in said chute by means of insulator blocks 17 and said baffle plate is provided with cleats 18 for reasons hereinafter stated.

A conveyor casing 19 extends upwardly from the bottom of the hopper 14 and an endless conveyor member 20 installed therein travels around a drum 21 at its outer end and around a drum 22 at its inner or hopper end. A pulley 23 mounted on the shaft of the latter named drum exteriorly of said hopper is driven by a belt 24 which in turn is driven by a pulley 25 keyed to an auxiliary shaft 26 and said auxiliary shaft is driven by a belt 27 from the main shaft 6.

A return pipe 28 extends from the hopper 14 back to the rotary pump 7 thus completing the circuit as will be understood. A receiving hopper 29 with its lower end communicating with said pipe furnishes means for feeding material to the herein described circulatory system as presently set forth.

The source of electricity for supplying current is taken from a generator 30 which is operated by a belt 31 from the auxiliary shaft 26. A cable connection 32 from said generator is grounded on the machine at 33 and another cable 34 with shunts 35 supplies current to each of the electrodes 9. An extension cable 36 carries the current to the baffle plate 16.

In the operation of my device the auriferous material, after being ground or otherwise pulverized, is fed into the hopper 29 with a mixture of brine consisting of one-quarter...
of a pound of salt to one gallon of water. The pump, being set in motion will drive the mixture through the pipe coils 8 and upon coming in contact with the electrodes 9 a part of the chlorine will be liberated from the salt solution by electrolysis. The chlorine gas thus set free will attack the mass and convert the gold into a soluble chloride thus freeing it from the ground material.

The action of the pump will force the entire mixture through the pipe coils 8 and downwardly into the tank 11 where it will be forced through the mercury 12 as clearly indicated in Fig. 3 of the drawings. In passing through the mercury the gold will amalgamate therewith and the residue of brine and pulverized material will be forced upwardly through the chute 13. Any mercury that might be carried upward by the waste material will magnetically adhere to the charged baffle plate 18 and, by reason of the standing currents, will drain back into the tank 11.

As the residue mixture passes from the chute 13 into the discharge hopper 14 its solid content of crushed material will precipitate to the bottom thereof and will be carried off to the dump by the conveyor manner 20, while the brine will be drawn off and sucked back through the pipe 22 to the pump 7 to be used over again in continual succession as will be readily understood. It will be understood that my herein described method of extracting gold contemplates the use of heat in distilling off the mercury when the amalgam as is ordinarily done.

Having thus described my invention, it being understood that certain changes may be resorted to in the construction of the machine without departing from the scope and spirit of the invention wherein I claim and desire to secure by Letters Patent of the United States as follows:

1. An amalgamator machine comprising a power driven pump, a pipe coil connected at one end with the pump, an electrode within each reach of the pipe coil, electrical means for charging the electrodes, a closed tank of mercury at the other end of the pipe coil, an upwardly standing discharge chute for the closed tank, a discharge hopper for the discharge chute, a return pipe for the discharge hopper extending back to the pump, and said pipe disposed at a lower level than the discharge end of the discharge chute, said hopper means for feeding material into the return pipe adjacent the pump.

In testimony whereof I have signed my name:

ALAN R. MICROCHEM