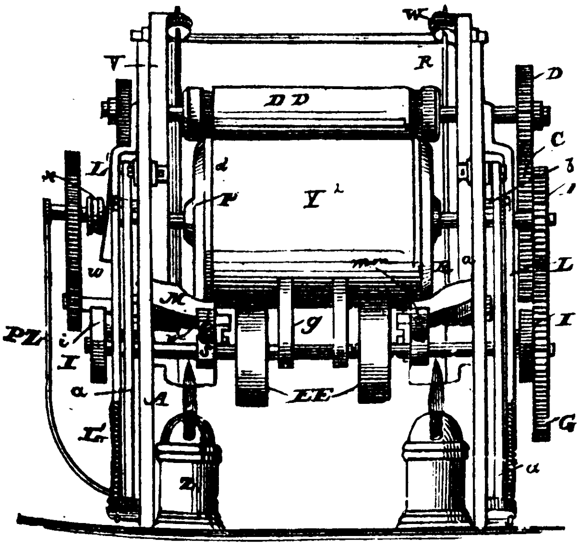

FIG. 2.—AUTOMATIC SOLDERING MACHINE.

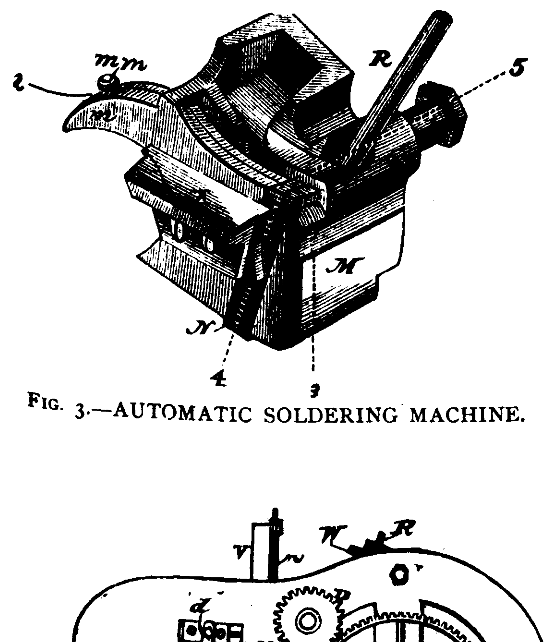

FIG. 3.—AUTOMATIC SOLDERING MACHINE.

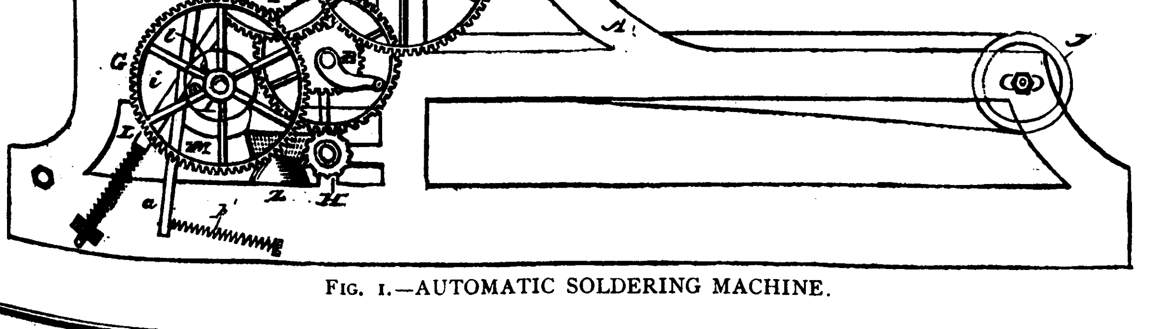

FIG. 1.—AUTOMATIC SOLDERING MACHINE.

45 lb.; but by increasing the diameter of the supply pipe to eight inches the loss of working value by friction would be greatly diminished, if not rendered inappreciable. The boring has now advanced to the length of 1,250 yards, or, say, three-quarters of a mile, and it is going on at the rate of three miles a year. Simultaneous borings from the French side at the same rate would give six miles a year, or a complete tunnel underneath and across the Channel in three years and a half.

The shape which the completed tunnel will assume will probably be a circle 14 feet in diameter, but flattened at the bottom to receive the rails. It will be lined with two feet thickness of cement concrete; not that this is necessary to insure the stability of the work, but to prevent accidental falls of chalk. The concrete will be made of shingle from Dungeness, and of cement formed from the gray chalk excavated from the tunnel itself. In this manner the tunnel will afford the means of its own lining at a cheap rate. The gradients will be 1 in 80, on each side, until the depth 150 feet below the bottom of the sea is reached; after which the line may be said to be level, subject only to a very slight inclination from the center outward, to prevent the lodging of water.—*Scientific American.*

AUTOMATIC SOLDERING MACHINE.

Messrs. Williams and Forbes, of Dover, Del., have recently made useful improvements in that kind of machinery designed to be used for soldering to the bodies of tin cans. This is accomplished by certain devices which operate automatically, thus saving hand labor in the soldering operation as well as in the delivery and removal of the cans.

Fig. 1 is a side view of the machine. Fig. 2 is an end view. Fig. 3 is a perspective view of the iron M, and the copper bar N, by which the molten solder is held and applied.

The operation of the machine is as follows: Power being applied to the crank or belt wheel Q on shaft S_1 of Fig. 1, is imparted to the various wheels and shafts. The roller D D is lifted and disk P is withdrawn. A can Y, is now placed on the feed board O, rolls over the pulleys E E, and rests immediately upon E E and the roller C C and the copper bars N at each end. The bar L now descending, the can is firmly gripped between the disk P at each end, and the roller D D above C C and E E below. At the same time the disk P is pressed firmly against the head of Y by the action of the spring P Z upon the end of the shaft S_4. The disks and rollers give a powerful rotary movement to the can. Bits of solder from the cutting apparatus have already been dropped from the tube V upon the irons M and M. When melted the solder flows down into the curved part of the iron M. This curved upper edge of M forms a small reservoir for the melted solder. Each head of the can runs over one of these reservoirs and upon the point of the bar N. During the rotation of the can the back ends of the irons M are gradually raised by the scroll cams *s*, thus pouring the molten solder forward to the point of contact between Y and N, and the friction between N and the seam of the can applies the solder evenly to all parts of the seam. The soldering operation being completed by one or more rotations of the can, the roller D D is again lifted, the disk P withdrawn, the arm *g* throws the soldered can off the iron M upon the chain K in time for the introduction of another can before the roller D D descends, and the operation is repeated without loss of time or stoppage of the machinery. The sagging belt or brake S B, by its contact with the cans upon the carrier, K, retards their forward movement and continues their rotary movement until the solder is entirely cooled.—*American Inventor.*