To all whom it may concern:

Be it known that I, Benton A. Hook, a citizen of the United States, and a resident of Escondido, county of San Diego, and State of California, have invented a certain new and useful Apparatus for Agitating Fluid Masses, of which the following is a specification.

The invention relates to an apparatus for agitating fluid masses.

An object of the invention is to provide an apparatus for agitating fluid masses while cooking, or to facilitate the solution of solids in liquids.

Another object of the invention is to provide an apparatus of the character described which is especially adapted for use in agitating thick masses such as tomato pulp while it is being cooked.

In the manufacture of tomato catsup, the raw tomato pulp is charged into a kettle having steam coils arranged therein at the bottom and steam is fed through the coils to heat and boil the tomato pulp for a sufficient length of time to cook it. The raw tomato pulp is very thick and sluggish, so that when the steam is turned on through the coils, that portion of the pulp lying against the coils becomes overheated and sticks to the coils and becomes blackened and burned, impairing the transfer of heat from the coils and the quality of the pulp, and also causing a waste of pulp. After every batch of pulp is cooked it is necessary to scrape or scrub the caked material from the coils, before another batch can be charged into the kettle. It is therefore an object of my invention to provide an apparatus for cooking thick pulp which eliminates this caking and burning of the material on the steam coils.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where I shall outline in full the process of my invention when applied to tomato pulp and that form of apparatus which I have selected for illustration in the drawings accompanying and forming part of the present specification.

Referring to said drawings:

Figure 1 is a vertical section of the apparatus as arranged for agitating thick masses while cooking. Figure 2 is a plan view of the apparatus shown in Figure 1. Figure 3 is a vertical section of the ejector. Figure 4 is a vertical section of the apparatus as arranged for agitating a fluid mixture. Figure 5 is a vertical section of a modified form of the apparatus.

Referring first to the use of my apparatus for agitating thick masses such as tomato pulp while it is cooking. The cold raw pulp is charged into a kettle and agitated with a jet of steam or compressed air. The jet produces a circulation of the pulp, so that when the steam is turned into the coils, the pulp is not overheated or burned by them. While I may employ either steam or compressed air as the agitating fluid, I prefer to use steam as the steam is more readily heated, and is desirable to maintain the agitating jet in action until the mass begins to boil, after which the jet may be turned off, the agitation produced by the boiling being then sufficient to prevent sticking and burning on the coils.

In practice, the steam jet is turned on when the kettle is only partly full and the charging of the kettle is continued until it contains the desired charge. By this time the mass has approached the boiling temperature. Whether the steam is turned into the coils before or after the pulp becomes heated, it is desirable to maintain the agitating jet in action until the mass begins to boil, after which the jet may be turned off, the agitation produced by the boiling being then sufficient to prevent sticking and burning on the coils.

Arranged within the kettle or receptacle are the copper steam coils which preferably consist of two coils, the outer coil 3 and the inner coil 4, the coils being spaced apart radially to permit circulation of the pulp between them. Steam is admitted to the coils from the steam pipe 5 through the nipples 6—7 and discharges through the nipples 105—8—9.

Depending into the receptacle at the side thereof and connected to the steam pipe 5, is a pipe 12 on the lower end of which is secured an ejector 13. The ejector is preferably disposed between the inner and outer coils 3—4 and is preferably arranged ad-
jacent the bottom of the receptacle, so that it may be brought into operation to agitate only a small portion of the complete charge while the receptacle is being filled. The ejector comprises a spider 14 secured to the end of the pipe 12, a converging sleeve 15 secured to the spider, a steam nozzle 16 forming an extension of the steam pipe and extending down into the sleeve, and a deflector 17 attached to the sleeve for the purpose of deflecting the stream, drawn through the sleeve, across the receptacle from side to side. The pulp is drawn into the upper end of the sleeve 15 by the steam jet and is forcibly discharged at considerable velocity from the lower end of the deflector 17, being simultaneously heated by the steam. If the direction of the discharge were downwardly, the bottom of the kettle would act as a baffle, the point of impact being a center of agitation, but the circulation of the mass being interfered with. It is desirable to place the ejector close to the bottom so that it can be used with the introduction of the first pulp into the kettle. By placing it as shown, the streams of steam and pulp are discharged into a mass of the pulp substantially the width of the kettle, so that the energy of the streams is absorbed by such mass, which then begins a slow bodily movement across the bottom of the kettle away from the ejector, then upwardly, across and downwardly toward the ejector again. Although the velocity of the stream of mingled pulp and steam is relatively high at the ejector, the movement of the mass of pulp at the opposite wall of the kettle is quite slow, so that such wall deflects the slow moving current without appreciably lessening its velocity. That is to say, the side wall opposite the ejector and separated therefrom by a heavy mass of pulp does not act as a baffle to set up a localized disturbance, as does the bottom upon which the stream from the ejector impinges at high velocity without "picking up" any considerable mass of the pulp. As a result of the operation of the ejector the entire mass in the kettle rolls over and over, past the steam coils thoroughly agitating and heating the mass.

The pipes 5 and 12 are provided with valves 18-19 for controlling the flow of steam. By the use of this process or apparatus the pulp does not adhere to the steam coils and they remain bright and clean, overcoming a loss of pulp and time and producing a purer food product.

Figure 4 shows a receptacle equipped with an ejector. This apparatus may be used with steam or air under pressure for the preparation of solutions requiring agitation. Its operation is the same as that already described. In Figure 5, I have shown a modified form of ejector. The elbow portion of the ejector is omitted and direction is given to the stream by means of a deflector 21, which consists of a curved plate attached by a bracket 22 to the pipe 12. If desired the bracket may be fixed to the wall of the receptacle. The stream issuing from the nozzle 15 strikes the deflector and changes its direction, so that it moves from the deflector across the receptacle, its energy being absorbed by picking up the mass of the mixture in the receptacle which then moves in the direction shown by the arrow.

I claim:

In a cooking apparatus, a kettle, a steam pipe extending into the kettle, a conical tube with its larger end contiguous to the outlet of said pipe, a spider connecting the tube and the pipe to permit ready inflow of the substance in the kettle into the tube when steam is discharged from the pipe, and an elbow attached to the end of the tube for directing the discharge.

In testimony whereof, I have hereunto set my hand.

BENTON A. HOOK.