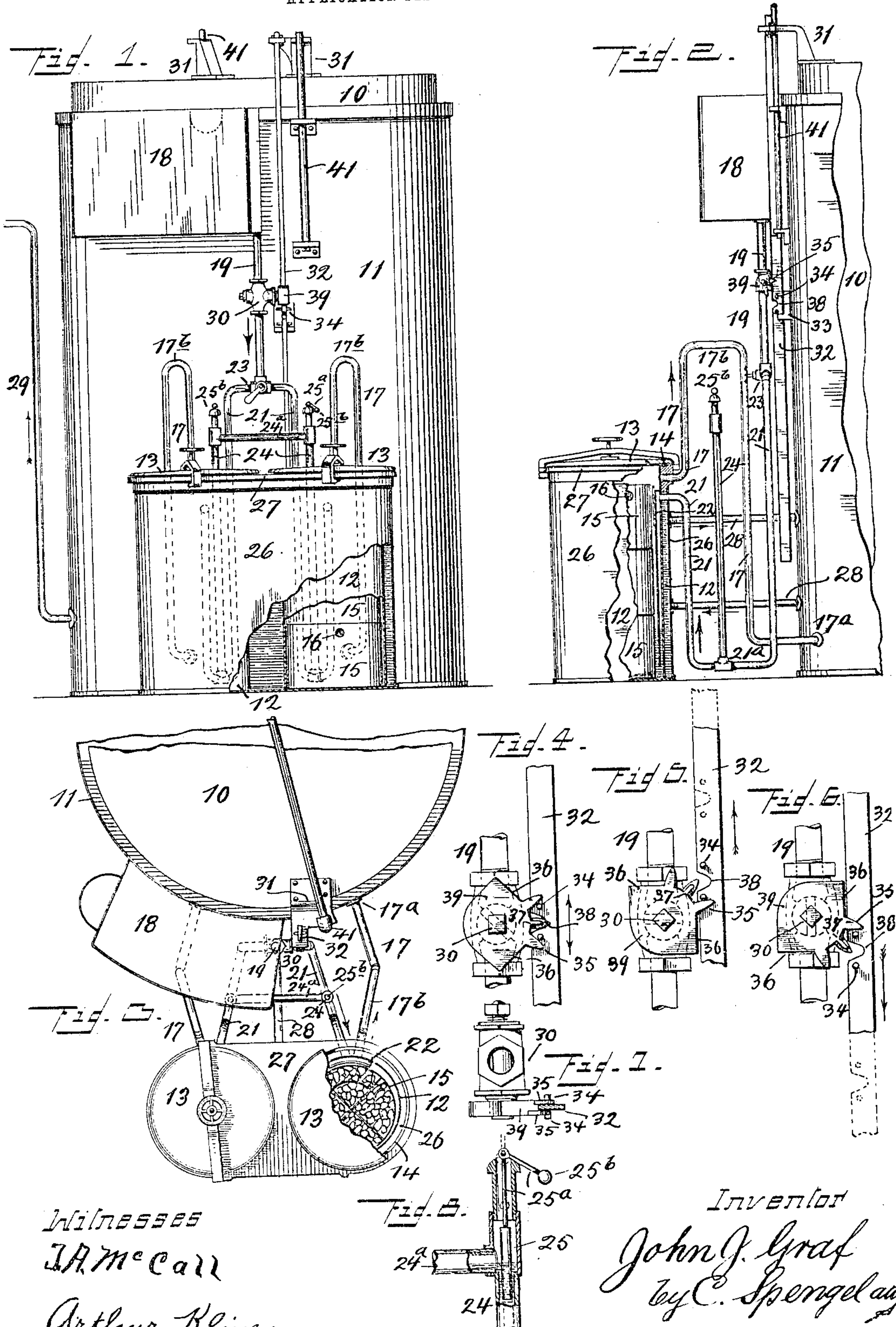


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J. J. GRAF.
ACETYLENE GAS GENERATOR.
APPLICATION FILED AUG. 22, 1904.



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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

No. 798,672.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN J. GRAF, a citizen of the United States, residing at Crescent Springs, Kenton county, State of Kentucky, have invented certain new and useful Improvements in Acetylene-Gas Generators; and I do declare the following to be a clear, full, and exact description thereof, attention being called to the accompanying drawings, with the reference characters marked thereon, which form also a part of this specification.

This invention relates to improvements in acetylene-gas generators, being devices whereby gas is generated out of carbid by use of water.

The invention consists of certain novel arrangements, combinations, and construction of parts, all of which will be more fully set forth hereinafter.

In the following specification, and particularly pointed out in the claims, is found a full description of the invention, together with its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 is an elevation with parts broken away of the generator with gas-tank pertaining thereto. Fig. 2 is part of a side elevation of the preceding figure as it appears when viewed from the right. Fig. 3 is part of a top view of Fig. 1 with parts broken away. Figs. 4, 5, and 6 are enlarged detailed views of the automatically-controlled water-cock, showing the same in different positions. Fig. 7 is a sectional top view of it as it appears in Fig. 4. Fig. 8 is an enlarged sectional detail view of the float-signal.

10 is the gas-tank or gasometer, which receives the generated gas, it being a cylinder closed at one end and floating with its open end down in a tank 11, which contains water to confine the gas and permit the gasometer at the same time to rise and fall in proportion to the supply and consumption of gas. Suitable means to guide the gasometer during these vertical fluctuations and to hold it to a straight motion may be provided at the upper end of tank 11 in the usual manner. The gas is produced in generators 12, two being shown; but more may be used. They consist of suitable vessels provided each with a removable cover 13, seated against an interposed packing or cushion 14 to render the closure

gas and water tight. The carbid is contained in pans 15, a number of which are superimposed for convenience in handling, each having one or more openings 16 near their upper edge to admit the water to the carbid. The water-supply is arranged so that it enters the lowermost pan first, and successively as the consumption proceeds it reaches the upper pans. The evolved gas leaves the generator through a pipe 17 and enters the tank of the gasometer at 17^a. There is an upwardly-extended loop 17^b in this pipe, in which the newly-generated gas is forced to rise first before it can enter the gasometer, the object being to prevent all possibility of any water being carried over with the gas into such gasometer or passing over when a generator fills with water after exhausted.

The water-supply may come from any suitable source and should be such after turned on as to proceed without interruption, except as controlled by the movements of the gasometer. For this purpose I attach a small tank 18 to the outside of tank 11, which also communicates with this latter tank, so that by supplying this small tank with water I arrange simultaneously for the maintenance of the water in tank 11 and for the supply to the generators. This supply to these latter proceeds through a pipe 19, which divides into as many branches 21 as there are generators, there being one branch pipe for each generator. These branch pipes enter the generators near their upper end to keep them clear of the sediment produced by the decomposed carbid. They are also provided with a dip or trap 21^a, the object being to prevent gas from backing out the wrong way, which object is accomplished by thus placing a column of water of sufficient weight in the way of the gas. To prevent the water which discharges into a generator from splashing into the upper carbid-pan therein and to cause it to enter the lower ones first, as before mentioned, I provide a shield or deflector 22, which accomplishes this object. By cock or valve suitably interposed I arrange that one generator only is in operation—that is, receives water at the time from pipe 19 to evolve gas. In the case illustrated I do this by using a three-way cock 23, by which the supply may be entirely cut off or admitted to either one of the branches. For explanation it may be assumed now that

the left one of the branch pipes 21 is open and feeds water to the left generator. When the carbide-supply in this latter is entirely exhausted and decomposed, the water in this generator will rise completely to the top. In the further progress of events it will also rise in one of the overfeed-pipes 24, of which one extends from the deepest part of each trap 21^a, and, passing over from this pipe through the horizontal branch 24^a, it enters the other pipe 24 on the other side, and thus communicates with the feed-water branch 21 of the other generator, which now enters into operation. It will thus be seen that this next generator is automatically cut in without requiring any attention whatsoever, which is quite an advantage, resulting in great convenience, especially if this shift takes place at night, thus obviating attention to the plant at night. The exhausted generator may be leisurely recharged at any selected time best suited without interfering with or interrupting the operation of the plant, since the other generator continues now to supply gas. For such recharging cock 23 is turned to close the water-supply to the exhausted generator and to open it to the one just entered into operation, cover 13 of the exhausted generator is removed, pans 15 with the residue are taken out, and a new charge inserted. Any water remaining is also taken out, most of it coming out with the pans, in which it is contained. From the generator now in use the operation in due time shifts back again to the charged generator in the same manner, which operation is repeated, shifting back and forth from one generator to the other. To indicate that such change from one generator to the other one has taken place, I provide signals in form of floats 25, one in the upper upwardly-extended end of each overfeed-pipe 24. They have an articulated stem 25^a with an enlarged end or button 25^b, which keeps the float from dropping down into pipe 24 by preventing its stem from passing entirely through the perforation in the upper closed end of said pipe. When the rising water has raised a float sufficiently to bring the joint in its stem above the end of such pipe, the upper part of the stem topples over, as shown in Fig. 8, thus causing the float to hold its position and preventing succeeding changes in the water-level from interfering with the observation of existing conditions, especially if such changes occur during the night. By the branch 17^b of gas-pipe 17 being carried above branch 24^a of the overfeed-pipe the possibility of the rising water entering the gasometer through the gas-pipe is excluded.

Considerable heat is developed during the generation of the gas, for which purpose a water-jacket is provided around the generators, it being obtained by providing a tank 26, into which these generators are set in a manner to leave a clear space all around the sides of them. In practice the bottom of this tank

serves also for the bottom of the generators, and the sides of these latter at their lower edges are connected directly to such bottom. The space between the upper edges of these sides of the generators and the upper edge of tank 26 is permanently closed by a cover 27. Water for this jacket-space is obtained from tank 11, and by providing two water-pipes 28 at different levels such water is caused to circulate. The gas furnished by the generators for the gasometer leaves this latter through a service-pipe 29, by which it is supplied to the burners. It is desirable that the generation of gas be commensurate with its consumption, and such is accomplished by controlling the supply of one to the other of the elements necessary to produce gas, it being done here by controlling the supply of water to the carbide. The means whereby this is carried out are operated by the fluctuations of the gasometer, all of which is as follows: In the upper branch 19 of the water-supply pipe there is a cock 30, controlling passage through this pipe. Attached to the gasometer by a bracket 31, so as to move with it, there is what I call a "feed-rod" 32, located so as to be capable to act by certain means upon cock 30 and guided during its movements by a guide 33. These latter means consist of projections on the feed-rod which engage projections on the cock, and the operation and arrangement are such that the feed-rod may either entirely open the cock or entirely close the same, and it may also fluctuate and play in a limited way between the two extreme positions, thereby delicately adjusting the water-supply to suit the conditions of the gasometer. The arrangement is further such that the cock after turned to either of its extreme positions—that is, open or closed—will not be acted upon any further by a continual movement of the feed-rod in the same direction, so that this latter while moving with the gasometer in either direction will not now affect any more the position to which it has turned the cock before, thus leaving this latter in ready position to be again acted upon when the feed-rod returns. A quarter of a turn is about sufficient to accomplish the necessary rotation of the cock between extremes and is obtained by pins 34 on the feed-rod, which engage teeth 35, projecting radially from the cock. The number of these pins and teeth should of course be sufficient to maintain engagement until the requisite extent of rotation is obtained. I find that three teeth and two pins are sufficient, and by preference I arrange them so that two teeth lap over the feed-rod on one of its sides and the middle tooth laps over the other side, thereby furnishing additional guiding means for the feed-rod and obtaining an accurate and true movement. This requires that pins 34 be located on the side of the feed-rod, and there are two of them on each side.

Referring now to Fig. 4, the cock is in in-

intermediate position, partly open, and the feed-rod may instantly act upon it no matter in what direction it is carried by the gasometer.

If carried up by rising gas-pressure, it will instantly shut off the water, as shown in Fig.

5 5. If increased draw from the gasometer requires more gas and a plentiful supply of water, the dropping rod will turn the cock on full, as shown in Fig. 6. (Observe dotted lines in each of these figures, which show the port.)

10 If now from either of these two extreme positions shown in Figs. 5 and 6 the feed-rod continues to move in the same direction in either case—that is, up in Fig. 5 and down in

15 Fig. 6—it will not act any further upon the cock. This latter is thus left in the position to which it has been turned by the pins on the feed-rod and with one tooth in each case in the path of one of the pins, so that as soon as

20 the rod returns the cock is acted upon again as soon as the first pin strikes one of the teeth in its path. It is clear that disturbance of this particular position of the cock at that

25 time when its teeth 35 are out of engagement with pins 34, but during which time it remains ready to be acted upon by rod 32, might cause said pins 34 to pass and miss the teeth

30 on the cock without acting upon them, thereby defeating the object of the entire operation, since the gasometer would thus lose control of the water-supply. To prevent all

possibility of such disturbance—as, for instance, the turning of the cock by children or persons unfamiliar with the manipulation of

35 the plant—I provide means which render it impossible to turn the cock at that time. These means consist of flat surfaces 36, which at that time—that is, when teeth and pins have

40 come to lie against the edge of the feed-rod and in which position, in conjunction with a short tooth or stop 37, which also lies against the edge of the feed-rod, they prevent turning of the cock. Figs. 5 and 6 show this

45 most clearly. There is also a notch 38 in the feed-rod to clear this stop when the feed-rod passes the center of the cock or plays in its intermediate position, as shown in Fig. 4. A

50 convenient way in construction is to provide these teeth 35 and stop 37 on a hub 39, which is mounted at the end of the cock. To obviate possible confusion I call attention to the fact that stop 37 and notch 38 have no part in

55 the operation of the means which effect actuation of cock 30, but, as described, merely prevent the same at the time desired. This automatic control as thus described is subject to the positive control by means of three-way

60 cock 23, whereby the entire plant is controlled, so that no manipulation whatsoever is required of the feed-rod and of cock 30, controlled thereby. Since closing of positive

65 it in whatever position they are and corre-

sponding to conditions in the gasometer, it is clear that whenever the water is turned on again at 23 these parts simply resume their operation.

Bracket 31 on the gasometer, to which feed-rod 32 is connected, may be one of the brackets which I use as part of the means for guiding the gasometer during its movements. The other means are guide-rods 41 on tank 11, with which these brackets are in sliding 75 engagement.

Having described my invention, I claim as new—

1. In an acetylene-gas-generating plant, the combination of a series of generators, a water- 80 supply pipe to each entering the same near the top, a trap in each water-pipe with its lowest part below such point of entrance and overfeed-pipes connecting the trap of one water- 85 supply pipe with the other.

2. In an acetylene-gas-generating plant, the combination of a series of generators, a water- supply pipe to each, overfeed-pipes connect- 90 ing one of these supply-pipes with the other, one for each generator, and a float-signal in each of these overfeed-pipes.

3. In an acetylene-gas-generating plant, the combination of a series of generators, a water- supply pipe to each, overfeed-pipes connect- 95 ing one of these supply-pipes with the other, they consisting of horizontal and vertical branches, which latter have a perforated top, a float-signal contained in these vertical pipes, an articulated stem on which it is suspended and an enlargement on the outer end of this 100 stem preventing it from passing through the perforated top.

4. In an acetylene-gas-generating plant, the combination of a series of generators, a gaso- 105 meter which receives the gas from them, a water-tank in which this gasometer floats, a common cooling-tank in which these generators are contained and which forms a jacket for them, a permanent top closing the space be- 110 tween the upper edges of the side of each generator and the upper edge of the surrounding side of this tank-jacket, a removable cover for each generator and means to supply water to this jacket.

5. In an acetylene-gas-generating plant, the 115 combination of a generator, a gasometer which receives the gas therefrom, a water-tank in which this gasometer floats, a pipe to supply water to the generator, a cock to control this 120 pipe, a hub on one end of this cock, teeth projecting from this hub, a feed-rod connected so as to move with this gasometer, pins on this feed-rod adapted to engage the teeth on 125 the cock to turn this latter to open or close the same, flat surfaces and a stop projecting laterally from one of the teeth mentioned which when turned so as to lie against the feed-rod, prevent turning of the cock and a notch in the feed-rod to clear this stop during 130 the movements of the former.

6. In an acetylene-gas-generating plant, the
combination of a generator, a gasometer which
receives the gas therefrom, a water-tank in
which this gasometer floats, a pipe to supply
5 water to the generator, a cock to control this
pipe, a feed-rod connected so as to move with
the gasometer, a hub on one end of the cock,
teeth projecting from this hub and staggered
or alternately arranged on opposite sides of

this hub so as to straddle the feed-rod and to
pins on the latter adapted to engage the teeth.

In testimony whereof I hereunto set my
signature in the presence of two witnesses.

JOHN J. GRAF.

Witnesses:

C. SPENGEL,
ARTHUR KLINE.