No. 813,414. PATENTED FEB. 27, 1906.

J. H. FOX.

BEVERAGE CARBONATOR.

APPLICATION FILED APR. 29, 1903. RENEWED AUG. 4, 1905.

2 SHEETS—SHEET 1.

Fig. 1a.

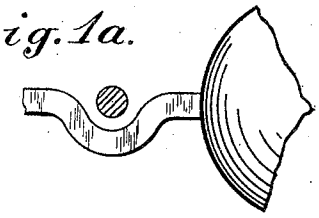


Fig. 1b.

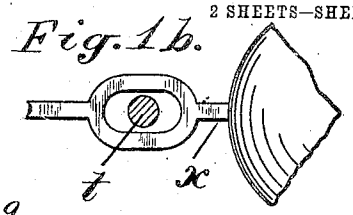
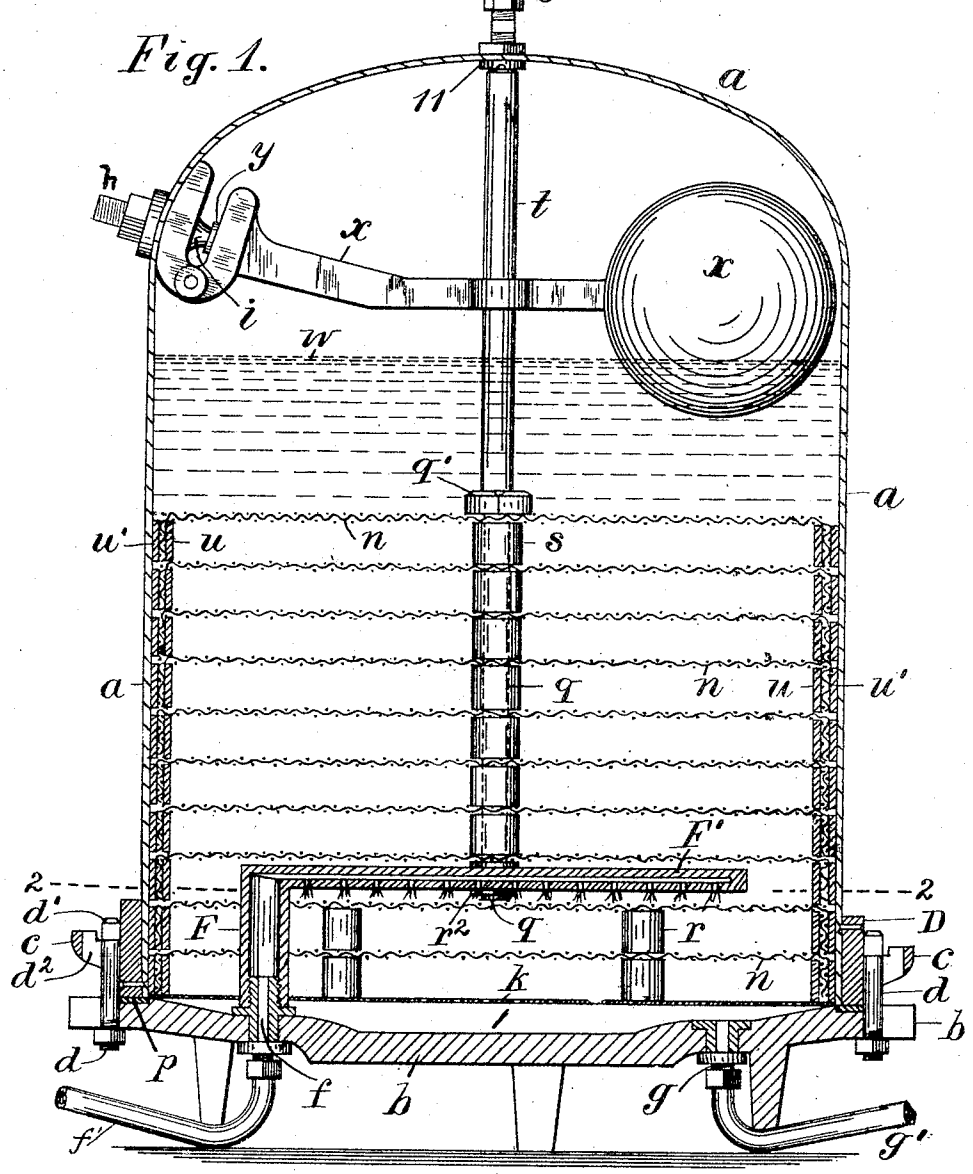


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 9.

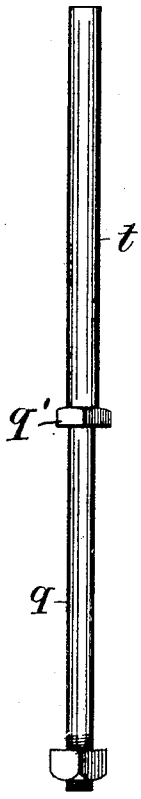


Fig. 10.

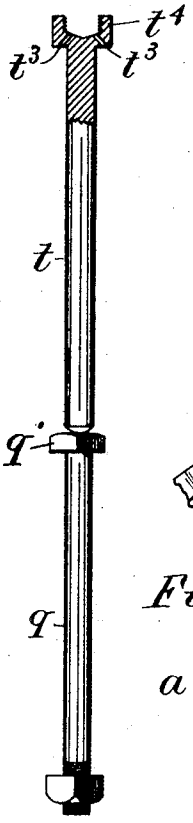


Fig. 2.

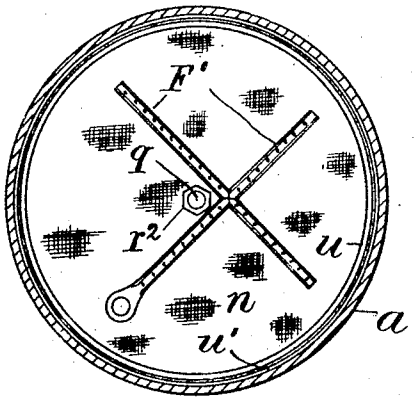


Fig. 3.

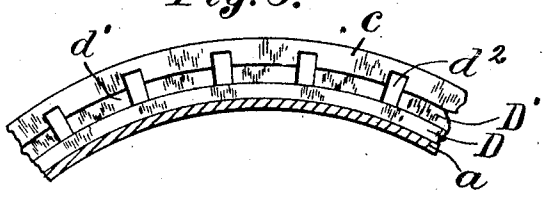


Fig. 5.

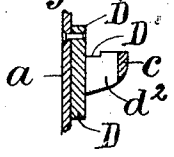


Fig. 4.

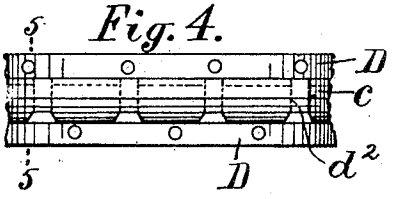




Fig. 6.



Fig. 7.

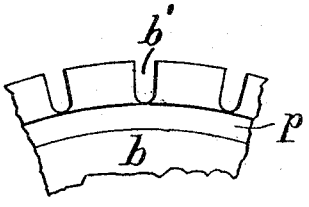


Fig. 8.

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UNITED STATES PATENT OFFICE.

JOHN H. FOX, OF NEW YORK, N. Y., ASSIGNOR TO MOTT CARBONATOR COMPANY, OF UTICA, NEW YORK, A CORPORATION OF NEW YORK.

BEVERAGE-CARBONATOR.

No. 813,414 Specification of Letters Patent. Patented Feb. 27, 1906.

Application filed April 29, 1903. Renewed August 4, 1905. Serial No. 272,794.

To all whom it may concern:

Be it known that I, JOHN H. FOX, a citizen of the United States, residing at 228 East One Hundred and Twenty-third street, New York, county of New York, State of New York, have invented certain new and useful Improvements in Beverage-Carbonators, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to improvements in the apparatus shown in my Patent No. 702,718, granted June 17, 1902, for carbonator for beverages.

One object of the present improvements is to permit the construction of the disks or pans with very thin wire-cloth or fibrous woven cloth instead of metal when desired, which is effected by stretching the edge of the cloth over a supporting-hoop and locking it thereon by an outer clamping-hoop.

Other improvements relate to the stop which holds the disks in place, to the bolting devices for the casing, and to the distributer-inlet for the gas.

Figure 1 is an elevation of the apparatus, shown in section a little at one side of the center line, the parts being in section where hatched. Figs. 1^a and 1^b show alternative forms for the float-lever *x*. Fig. 2 is a horizontal section of the parts which are intersected by the plane 2 2 in Fig. 1. Fig. 3 is a plan of part of the carbonator-shell and of the bolting-ring upon the same. Fig. 4 is an elevation or edge view of part of the bolting-ring, and Fig. 5 is a section of the same on line 5 5 in Fig. 4. Fig. 6 is an edge view, and Fig. 7 a side view, of one of the bolts for the bolting-ring, and Fig. 8 shows one edge of the base with the notches for the bolts. Fig. 9 is a detached view of the combined tie-rod and stop. Fig. 10 is an alternative construction for the same.

a designates the shell or casing of the carbonator, which constitutes the gas and water chamber and which is shown connected with the bottom *b* by means of a bolting-ring *c*, secured at the bottom of the shell, and T-headed bolts *d*, inserted through the ring and the bottom. The bottom is formed with radial notches *b'* (see Fig. 9) to insert the bolts laterally, with the nuts already applied to their lower ends, and the bolting-ring is provided with radial bolt-holes d^2, shown with their outer ends closed, through which slots the T-heads *d'* of the bolts may be passed from the lower side. The bolting-ring is formed with a flange D, which is attached to the lower end of the carbonator-shell *a* and forms a seat for contact with a packing *p* upon the bottom *b*. A groove D' is formed in the surface of the bolting-ring adjacent to the flange D to receive the heads *d'* of the bolts and is adapted to fit such bolt-heads and hold them from turning, as indicated by the bolt-head *d'* in Fig. 3. The bolt-holes d^2 are closed at their outer ends for the purpose of strengthening the bolting-ring. The bolt-heads *d'* are shown in Figs. 6 and 7 tapered upwardly, and the bolt-holes d^2 are shown in Fig. 4 tapered outwardly at their lower ends to facilitate the insertion of the bolt-heads upwardly through the slots, which are closed at their outer ends.

In Fig. 1, where ten disks are shown within the casing, the lower two disks are shown braced with studs *r;* but the upper seven disks are represented without any such supports. An outlet-nozzle *g* is extended through the bottom *b*, and a gas-inlet nozzle *f* is carried inward through the bottom, and a distributer is secured upon the same, such distributer consisting of the hollow shank F, screwed upon the nozzle and extended upward through one or two of the disks and having arms F' extended in different directions between the disks and provided upon their under sides with holes to distribute the gas at many points. The hollow shank F is made detachable from the nozzle *f* to permit the application of the distributer above the lower disks. The removal of the disks from the carbonator for cleaning is greatly facilitated by securing the greater part of the disks together in a loose or movable group by means of a tie-rod extended through the center. The gas introduced at the inlet is prevented from escaping directly to the outlet by locating the distributer above one or two of the lower disks, which retard any downward flow of the gas. Such arrangement is best effected by making the lower disks separate from the group having the tie-rod. Such loose disks may be set upon the bottom before the distributer is connected with the inlet, and such connection is then effected by screwing the shank F upon the nozzle, holes or apertures being made through the loose disks where such

connection is effected. The connected disks are then set upon the top of such loose disks. The distributer-arms are shown in Fig. 3 in the form of a cross; but the form is immaterial, provided the distributer is applied above one or two loose disks and the shank of the distributer connected with the nozzle through such disks. A water-outlet nozzle *g* is inserted through the bottom *b* at the side opposite the inlet-nozzle *f*. A water-inlet nozzle *h* is inserted through the shell near the top and provided with a valve-seat *i*, which is closed by a valve *y*, actuated by a lever and float *x* to maintain the desired water-level *w* in the apparatus. All the disks except those below the distributer-arms F′ are shown connected by a tie-bolt *q* and a stop inserted between the top of such tie-bolt and the top of the carbonator to hold the group of disks from rising within the shell. The lever of the float is shown extended across the carbonator with the float upon the same diametrical line as the valve *y*, and as the lever would necessarily cross the center of the shell it would intersect a central stop, if one be used, as hereinafter described. To prevent such interference with the stop, the lever of the float is formed to clear the stop, which may be done by reflexing the lever, as shown in Fig. 1ª, or by slotting the lever, as shown in Fig. 1ᵇ. The bottom *b* is dished, and a perforated grating *k* is inserted within the casing, resting upon the bottom and forming a chamber *l* in the bottom, which chamber connects with the outlet-nozzle *g*. The nozzle *g* is provided with a pipe *g′* to draw carbonated water from the nozzle, such water passing through the grating to reach the nozzle.

A safety-valve (designated K in Fig. 1) is shown upon the center of the shell at the top to relieve the pressure at a certain predetermined limit and has a hand-lever 19 to vent the gas or air when required.

The disks *n* are shown made of woven fabric, like cheese-cloth or muslin, which are held in form by distending the fabric over a wooden or metal hoop *u*, as shown in Figs. 1 and 2, and gathering the edges of the fabric firmly against the outside of such hoop and pressing another hoop *u′* downward outside of the same, so that the edge of the flexible fabric is clamped between the hoops, and thus held securely. The hoops keep the fabric distended and greatly stiffen the edges of the disks and adapt them to be handled without injury to the disks in assembling the parts together to form the carbonator. The group of disks above the distributer-arms F′ is shown connected together detachably by a tie-bolt *q*, with a collar *q′* at the upper end and a nut r^2 at the lower end of the group. Bushings or sleeves *s* are shown upon the bolt between the disks to space the disks apart at the center and sustain the clamping pressure of the nut. The loose disks below the distributer are shown spaced apart and supported intermediate to the center and rim by studs or blocks *r*, as shown in Fig. 1. The studs are not shown upon the disk in Fig. 2, as the view shows the under side of the disks above the level of the distributer with the nut r^2 at the lower end of the bolt *q*. All the internal parts of the apparatus excepting the disks when made of woven fibers are coated with block-tin to prevent corrosion by the acid-water.

When the gas is first admitted to the carbonator and only atmospheric pressure exists in the upper part, the air is vented by the valve K, and the gas under pressure rises rapidly through the perforations of the disks and tends to lift the same. The same thing occurs when a large amount of carbonated water is drawn from the shell, thus causing the gas to enter rapidly.

Heretofore a stop has been supported upon the shell of the carbonater to contact with the edges of the disks, as shown in my Patent No. 702,718; but such a stop cannot be attached directly to the sides of the shell, as it would injure the block-tin lining, and it is therefore necessary to extend it upward within the shell to the safety-valve, to be secured thereby. Such a stop involves a good deal of bending and fitting of the flat metal of which it is formed, and to avoid such bending and fitting I have devised a stop fitted directly between the tie-rod and the top of the carbonator, the stop thus operating upon the disks at their central point instead of at their edges. Such central stop (lettered *t*) is shown integral with the tie-rod in Figs. 1 and 9, and its upper end is arranged to contact with the fitting which secures the safety-valve K upon the shell. The shank of the safety-valve is necessarily extended through the shell and is held therein by a nut or collar 11, as shown in Fig. 1, through which a passage extends to discharge the gas to the safety-valve. By contact with such collar the top of the stop is prevented from bruising the shell or from bending the same when the carbonator is in transportation jarred or turned in such manner as to throw the weight of the disks against the stop. Instead of attaching the stop to the tie-bolt of the disks it may be formed, as shown in Fig. 10, with a threaded socket t^4 at the top adapted to screw upon the collar 11 of the safety-valve, holes t^5 being formed in the bottom of the socket, as shown in Fig. 10, to permit the escape of gas to the safety-valve. It is immaterial whether it is the safety-valve or some other fixture upon the center of the shell which supports the thrust of the stop, as any such fixture would serve to stiffen the shell in the desired manner where the upward thrust of the stop is sustained.

Patches of cross-lines are shown in Fig. 2 to indicate the woven character of the disks,

which may be made of very thin wire-cloth or cotton or of fibrous cloth of coarse mesh, the cloth in such case requiring the double hoops *u u'* to hold them in shape and the hoops also operating to space the disks suitably apart within the casing and to support them removably upon the bottom *b*.

The apparatus is operated by first introducing water through the valve *y* to the water-level *w*, then introducing gas through the nozzle F, the gas being supplied at a suitable pressure, as one hundred and sixty pounds, to permit the charging of siphons with the carbonated water. The gas is discharged downwardly by the distributer, and is thus diffused beneath the disks and rises through the numerous perforations of the disks, and is thus not only caused to rise more slowly, but to be more evenly distributed in the receptacle when rising. Such distribution of the gas through the numerous perforations cause it to be absorbed by the water with great rapidity. The stop applied to the disks prevents the gas from lifting the disks when entering rapidly, the air in the upper part of the carbonator being discharged by opening the relief-valve, and the carbonator is thus filled with gas and carbonated water in readiness for use.

It will be observed that the perforated disks are wholly immersed in water, as the pile of disks lies entirely below the water-level *w*, and the water does not drip downwardly through the perforations in the disks, as in certain classes of carbonators; but the perforations are used to distribute the gas evenly throughout the receptacle as it rises through the water, and thus promote its absorption with the greatest rapidity.

I have found that the improvements described herein are of great practical value in constructing and operating the carbonator, as the bolting-ring (shown herein at the lower end of the shell) avoids the careful fitting of hook-bolts to a thin locking-ring upon the shell, as shown at *b c* in my Patent No. 702,718, and substitutes therefor the closed bolt-holes d^2, which may be readily cast in the bolting-ring, and the bolts with T-heads *d'*, which are readily formed by drop-forging and do not require to be carefully finished to hold securely. With the construction shown in my aforesaid patent it was common for the joint of the shell and base to leak, as the hooked heads of the bolts were easily strained by the high pressure employed in the shell, while the bolts *d* in my present construction are not liable to yield, as their heads are supported at opposite sides.

The bolting-ring is preferably made so that the heads of the bolts *d* lie below the top of the flange D, which is indicated by the relation of the groove D' to the top of such flange in Fig. 5, as the bolts thus pull the shell downwardly through the agency of the upper rivets. (Shown in Fig. 5.) The central stop avoids the necessity of fastening anything to the shell of the carbonator, as in my former construction, while the employment of one or two loose disks below the movable group permits the location of the distributer above such disks, and thus effectually prevents the gas as it enters the shell from being carried to the outlet *g*. When the gas is permitted to reach the outlet, it is mixed with the water without absorption and produces a great deal of sputtering when the carbonated water is drawn. By locating the distributer above certain of the disks such sputtering is wholly prevented.

Having thus set forth the nature of the invention, what is claimed herein is—

1. In a carbonator, the combination, with a shell having means therein for mingling the gas and water, a water-inlet, a gas-inlet, a water-outlet, and a removable bottom, of the flange D attached to the shell and having below its upper edge the bolting-ring with annular groove D' to sustain bolt-heads below the top of the flange D, the oblong radial bolt-holes d^2 in the bolting-ring, the integral ring *c* closing the outer ends of the slots, and the base *b* having slots *b'* corresponding with the bolt-holes, with bolts *d* having nuts thereon and T-heads *d'* adapted to pass upwardly through the bolt-holes d^2 and turn into the groove D', substantially as herein set forth.

2. In a carbonator, the combination, with a shell having means therein for mingling the gas and water, and having a water-inlet, and a removable bottom provided with a gas-inlet and water-outlet, of the flange D attached to the shell flush with its bottom and having below its upper edge the bolting-ring with annular groove D', to sustain bolt-heads below the top of the flange D, the bolting-ring having the oblong radial bolt-holes d^2 intersecting the groove D' with integral ring *c* closing the outer ends of the bolt-holes, and the base *b* having slots *b'* corresponding to the bolt-holes, with bolts *d* having nuts thereon and T-heads *d'* adapted to pass through the bolt-holes d^2, and turn into the groove D, the whole arranged and operated substantially as herein set forth.

3. In a carbonator, the combination, with a shell having integral top and open bottom, and a base with bolting-flanges and bolts connecting it with the bottom of the shell, of the series of disks supported loosely upon the base, means for maintaining a water-level within the shell above the top of the disks, a central tie-bolt extended through the disks securing them together, and a central strap securing them together, and a central stop extended between the top of the tie-bolt and the top of the shell, and the shell entirely detachable from the disks to permit its removal

by lifting therefrom when desired, substantially as herein set forth.

4. In a carbonator, the combination, with the shell and a removable bottom, of the pile of disks secured together in a movable group by a central tie-bolt and supported upon the bottom, a stop arranged centrally above the pile of disks between the top of such tie-bolt and the top of the shell, a water-inlet nozzle at the side of the shell above the pile of disks, and a valve with lever having a float upon the same diametrical line as the inlet-nozzle and the lever formed to clear the central stop, substantially as herein set forth.

5. In a carbonator, the combination, with the shell having water-inlet for supplying the shell with water and having a removable bottom provided with water-outlet *g* and gas-inlet nozzle *f* having thread upon its inner end, of a series of disks supported upon the bottom, the lower disk being detachable from the bottom and from the said series and formed with an aperture over the nozzle *f*, the distributer having shank connected detachably with the said nozzle through the said aperture, and having one or more perforated arms with holes in the lower side extended over such lower loose disk, whereby the water may be drawn from the bottom outlet *g* adjacent to the perforated arm, and the direct passage of gas from such arm to the outlet prevented by the lower loose disk.

6. In a carbonator, the combination, with the shell having water-inlet for supplying the shell with water and having a removable bottom provided with water-outlet *g* and gas-inlet nozzle *f* having thread upon its inner end, of a series of disks supported upon the bottom, the lower disk being detachable from the bottom and from the said series and formed with an aperture over the nozzle *f*, and the remainder of the series being connected by a central tie-rod, the distributer having shank F extended downwardly through such aperture and screwed detachably upon said nozzle, and having a plurality of perforated arms F′ extended over such lower loose disk, whereby the water may be drawn from the water-outlet *g* adjacent to the perforated arms, and the direct passage of gas from such arms to the outlet prevented by the lower loose disk.

7. In a carbonator, the combination, with a shell having means therein for mingling gas and water, of a bottom secured removably thereto and provided with a gas-inlet and water-outlet, and a series of disks formed of pervious woven fabric provided each at the margin with two supporting-hoops *u* and *u′*, the fabric of the disk being gathered at the edges around the outer side of the hoop *u* and clamped thereon by the hoop *u′*, and the hoops being adjusted to sustain the entire series upon one another and upon the bottom *b*, substantially as herein set forth.

8. In a carbonator, the combination, with a shell having means therein for mingling the gas and water, of a bottom secured removably thereto and provided with a gas-inlet and water-outlet, and a series of disks formed of pervious woven fabric provided each at the margin with two cylindrical hoops *u* and *u′*, the fabric of the disk being gathered at the edges around the outer side of the hoop *u* and clamped thereon by the hoop *u′*, the cylindrical form of the hoops preventing them from nesting within one another and sustaining the entire series upon one another and upon the bottom *b*.

9. In a carbonator, the combination, with the shell and a removable bottom, of the pile of disks secured together in a movable group by a central tie-bolt and supported upon the bottom, a stop arranged centrally above the pile of disks between the top of such tie-bolt and the top of the shell, a water-inlet nozzle at the side of the shell above the pile of disks, and a valve with lever having a float, and the lever formed to clear the central stop, substantially as herein set forth.

10. In a carbonator, the combination, with a shell having closed top and open bottom, and a bottom attached removably to the shell, of a fixture, as the outlet-valve K, secured in the center of the shell at the top, a series of disks supported upon the bottom, the lower disk being detachable from the bottom and from the said series, a gas-distributer extended upwardly through such lower disk, the remainder of the series being connected together by a central tie-bolt, and a central stop extended between the top of the tie-bolt and the fixture secured to the top of the shell.

11. In a carbonator, the combination, with a shell having integral top and open bottom, and a base and bolting-flanges and bolts connected detachably with the bottom of the shell, of the series of disks supported loosely upon the base, means for maintaining a water-level within the shell above the top of the disks, a central tie-bolt extended through the disks securing them together, and a stop integral with the tie-bolt extended into loose contact with the top of the shell, whereby the shell may, when necessary, be lifted simultaneously from the bottom and the series of disks, and the disks then lifted from the bottom, substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN H. FOX.

Witnesses:
L. LEE,
THOMAS S. CRANE.