CLOVER LEAF TUBE POINTERS

Written by Henry Green

Published by

GREEN & BAUER

Hartford, Conn.

THE LEADING TUBE MAKERS

This little Pamphlet
is Dedicated
to
JOHN BAUER
My Late Partner
who gave his life
for this science

Pointers on the Use of X-Ray Tubes

IN presenting this little pamphlet to our many friends and patrons among the medical profession, we desire to say that we are the oldest established manufacturers of X-Ray Tubes in the United States if not in the world, and that our creation, the CLOVER-LEAF tube is so universally and favorably known that we need not comment here on its quality. It has spoken for us so well in the past that we are now manufacturing more of these tubes than all other tube makers put together. We shall therefore devote most of our space to pointers for X-Ray Tube users.

We heartily thank you for your support in the past, and shall endeavor strenuously to merit it in the future.

Respectfully,

GREEN & BAUER.

Pointers

There are many points which we realize would be a great benefit to radiographers especially, which, through failure to make the proper exposures, or through accident or avoidable troubles with the tubes.

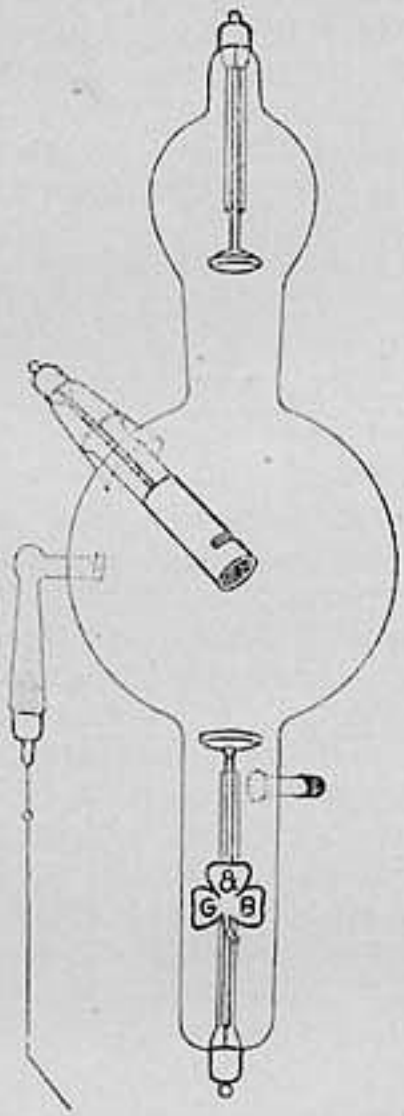
Those who are using the CLOVER-LEAF know that it is a tube of high vacuum and great penetration, and requires special technic for its use. The best radiographs that were ever made on short time exposures have been made with the CLOVER-LEAF, and we desire to assist to the best of our ability all its users to obtain the highest value in the shape of long life with the CLOVER-LEAF.

Clover Leaf Pointer No. 1.

One of the first and most essential things to do is to keep your tube thoroughly clean. This will help to eliminate punctures, inasmuch as most of the punctures are from the inside. A little piece of dirt will sometimes attract the current.

Clover Leaf Pointer No. 2.

All tubes of high vacuum retain a considerable charge of electricity after the current is turned off. Therefore always touch the metal terminals of the tube, at least two of them, before laying the tube away, otherwise it is liable to discharge itself by grounding upon whatever object it is placed, which frequently results in puncture. The Doctor says "my tube worked excellently yesterday, but today is punctured, although the last picture I took with it was excellent." It had punctured because it had not been discharged by the doctor, and had to discharge itself.



HIGH FREQUENCY

Heavy Anode	6"	$20.00
Light Anode	6"	18.00

Clover Leaf Pointer No. 3.

A tube is made to stand about 15 to 18 mil-amps, and at this current will make the most difficult pictures with very short exposures, but if this limit is exceeded, at least a good percentage of the tubes are overstrained, which may result disastrously. It is not necessary to force more than from 5 mil-amps. up, to do rapid and excellent work, if the proper regulating technic is employed as set forth in

Clover Leaf Pointer No. 4.

A special and very intricate and expensive process is known and used by us, only, to make possible the destruction of 95% of all metallic gases which would otherwise remain in the tube, and which are inimicable to good rapid picture work and fine detail, but it is evident that gases are necessary to form a medium or path for the passage of the cathode stream. We supply for this purpose a regulator which, when properly operated, releases a small amount of gas, sufficient only to start the tube. When once the path of the current between cathode and anode is established, the heat generated within the tube keeps the path open during the short period required to destroy this foreign gas when the tube is new.

For a new tube, the following method should be strictly observed referring to cut of No. 24 tube, the regulating points of which are marked "A" and "B" should be at least 4" apart, and for heavy subjects, 5", proceeding as follows: First, test your coil, which should have sufficient current passing through the primary to induce a heavy yellow caterpillar spark between the secondary poles when separated to a distance of 7" or 8". Then, connect your tube, having A and B at proper distance. A few sparks should pass

between A and B and then stop, and the tube should fluoresce. If sparks pass after the tube commences to fluoresce, pass A and B a little further apart. The tube will then operate through one short exposure. The tube should be allowed a rest of one-half an hour before a second exposure is attempted to avoid overheating, but need not be discharged unless taken out of the holder. As the tube gets older it will be necessary to shorten the distance between A and B; this, however, must be dictated by the judgment of the operator.

Clover Leaf Pointer No. 5.

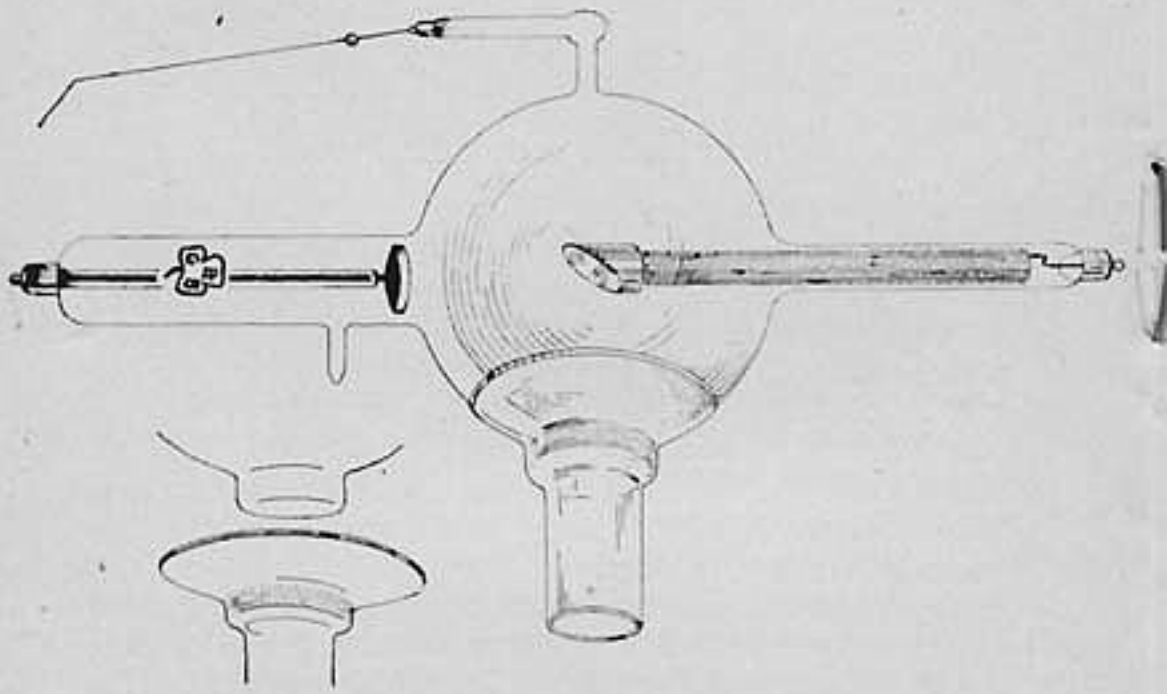
When a protective shield is used around the tube, care must be taken that no leakage of current strikes the shield, otherwise it will pass into the tube and puncture it.

Clover Leaf Pointer No. 6.

Another cause of tubes cracking while in use is the lowering of the vacuum too much by having A and B too close together. To much gasses are released. These gasses are forced from the path of the cathode stream by the force of the heavy discharge , and are forced against the nearest point, which is the glass encircling the cathode, where they are visible as yellow streaks or spots striking the glass wall of the cathode neck. These spots are of sufficient heat to greatly expand the glass at the point where they hit and that at only irregular points. This causes the glass to expand unequally and invariably cracks if these spots are allowed to remain. When they appear, the tube should be immediately shut off, and after one-half hour's rest, the tube will be found to have recovered its high vacuum. The tube can very rarely be repaired when cracked in this way.

Clover Leaf Pointer No. 7.

Do not attempt to use a tube which is intended for radiographic work for treatment work also because the vacuum required for treatment must necessarily be softer in order to operate on a lower amperage for a longer time, and to lower your picture tube to this point by means of the regulator would soon destroy its penetration and result in strain when the heavy current required for your rapid exposure is put through it. Remember a tube is glass, which cannot be allowed to become overheated, or it will crack. This is no fault of construction, simply, glass. We make treatment tubes when asked for them.



SHIELD GLASS TREATMENT TUBE

Complete with Speculums for either Coil or Static Machines

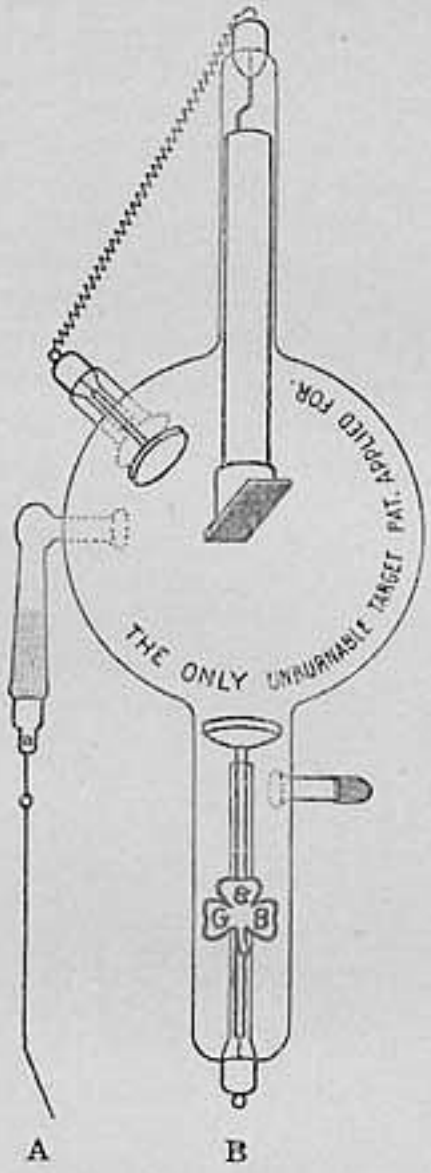
6" Bulb. $20.00 each

Clover Leaf Pointer No. 8.

Radiographs must be made very rapidly with as high amperage in the primary as possible, while the vacuum of the tube remains about stationery. To explain this, I will say that the strong rays are given off at different angles in a high and low vacuum tube. For instance, in a high vacuum tube the strong rays are at right angles with the axis of the tube, whilst in a low vacuum tube the strongest rays flow at an angle of 45 degrees to the axis of the tube, and at intermediate vacuum, the rays flow at intermediate angles, varying be tween 45 and 90 degrees from the axis of the tube. The most powerful rays may be maintained at an angle of 90 degrees in a tube whose vacuum is high for a period of a few seconds only. The heating of the electrodes in the tube after the first few seconds tends to lower the internal resistance, and the angle of the rays changes, which has nearly the same effect as moving a camera during a time exposure. In other words, if you do not make your pictures quick with a powerful current you are exposing the plate to rays given off at several different angles, and blurring it. This explains why detail is blotted out.

Clover Leaf Pointer No. 9.

Selecting a tube for radiographic work demand that it shall stand up on at least a 12" coil for at least 20 seconds with a current of 15 amperes in the primary and not show any drop in vacuum. CLOVER-LEAF tubes will stand this test and more. X-Ray tubes have been made in many and varied forms and some makers today would not exist if it were not for the worthless so-called new devices which they are offering as bait to catch the dollars of the unwary. When such are offered to you take them only on approval, stipulating that they shall stand current test as above.



HEAVY COIL TUBE No. 24.

Diameter 6″	$20.00
Diameter 7″	25.00
Diameter 8″	30.00

Clover Leaf Pointer No. 10.

Be sure that your wires are properly connected to the terminals of your tube and that there is no leakage of current to the tube clamp or shield. This can be tested by touching the clamp or shield when the tube is in operation because a current which you could feel but not see will sometimes puncture a tube. Should a wire drop off while in operation it is almost sure to do so.

Clover Leaf Pointer No. 11.

If rings or inverse appear it is an indication that you have lowered the tube too much for the amount of current passing through it. An easy way to prove this in your own office is to reduce the current in your primary until the inverse disappears. If it is a CLOVER-LEAF tube, and you give it a short rest, it will regenerate itself as soon as thoroughly cold, and next time you use it have A and B further apart. No tube except the CLOVER-LEAF will regulate and regain its high vacuum in this way.

Clover Leaf Pointer No. 12.

So much trouble has been experienced by users of tubes by occlouded gases being released, from the target face fusing deeply that I have invented, and have a patent pending on a target which does not puncture beyond the surface and no occlouded gases are given off. This target consists of a heavy copper piece faced with a square block of metallic alloy which stands about double the heat of platinum. This, in turn, faced with platinum-vidium. The platinum-vidium facing will burn through, but inasmuch as it is only .001" thick, its burning does not injure the tube; the target itself cannot burn. This target is only obtainable in CLOVER-LEAF tubes.

Clover Leaf Pointer No. 13.

In taking radiographs of the heavy parts of the body, small plates should not be used without a diaphram. It is almost impossible to obtain good results through the torso except with a plate at least 14" x 17" without diaphram. Some advantages will be found in having the back and edges of your plates covered with lead.

Clover Leaf Pointer No. 14.

There are many operators who have an idea that the focal point of a tube must strike the center of the target. In a properly made tube there is no such thing as a focal point, but simply a pencil of smaller or larger diameter made up of the Ions passing from the cathode to the anode. The diameter of this pencil being determined by their force of impact and the condition of the vacuum, inasmuch as the cathode stream only strikes a very small percentage of the anode face, it does not signify what part of the anode face it hits so long as it does hit the anode face somewhere. Tubes are made free-hand, and it is next to impossible to tell just where the focus will hit until a tube is finished.

Clover Leaf Pointer No. 15.

One of the most important parts of your apparatus is the interrupter, the platinum point of which should fit snugly into the hole of the porcelain piece. The best way to determine this is to take it out of the porcelain sleeve and try the points of the interrupter into the points of the sleeve. If the taper in the hole and on the platinum is very wel defined and the point loose, inverse discharge will surely be present in your coil and spoil the otherwise good work of your tube.

Clover Leaf Pointer No. 16.

In the operation of the CLOVER-LEAF tube with heavy coil for picture work, under no circumstances should spark gaps be used, as they only add additional resistance and prevent your tube getting the full force of the current. Spark gaps are only for tubes of low or medium vacuum.

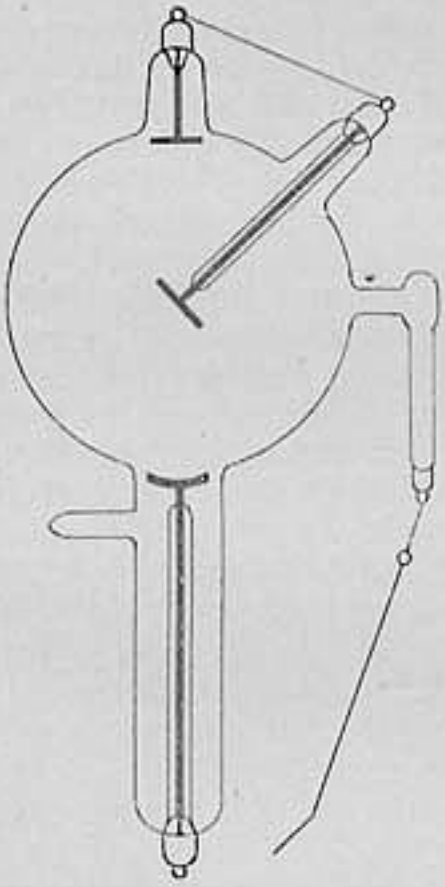
Clover Leaf Pointer No. 17.

To those who have never used our tube, or who have no meters, the following technic should be used: Connect the tube in the usual way, place A and B 4" apart, then throw in your switch for an instant only. If the tube does not spark from the regulator, increase the current and continue to flash in the switch and increase the current in the primary alternately until the tube properly fluoresces. It will give an intense fluorescense, but do not be afraid to run it. Greater penetration may be obtained by separating A and B to 5" or even 6" and proceeding in the same manner until current enough is passing to properly light up the tube, but do not waste time on tubes on long exposures and remember that anything over 30 seconds is very long exposure.

Clover Leaf Pointer No. 18.

In my long experience in the manufacture of X-Ray tubes I have tried, tested, and made every type of tube which is today and ever has been on the market, and have no hesitation in stating that I have abandoned most of them as worthless. I have presented to the medical profession a standard tube, the many good qualities of which are culled from the best points of many experiments. Your appreciation of my work has been shown, especially during the past year, by my largely increased sales, and this, notwithstanding the persecution of certain manufacturers under the guise of patent litigation, knowing that they could not compete with my quality, have sought

to prevent my operations, in the event of which if you could not get mine, Doctor, you would be forced to take theirs. I trust that your demand for CLOVER-LEAF tubes during the coming year will be so positive that your continued appreciation of my efforts will be demonstrated more unmistakably than ever.



STATIC TUBE No. 37

Diameter 5½" $11.75

Diameter 6" 13.50

The Clover leaf tube is
the Standard of the
U. S. Army and Navy.

TRADE MARK.

See that the above Trade Mark
is on the tube you purchase
It is a guarantee of perfect work
and any tube not bearing it
is not genuine.

THE PROPER TEST FOR A RADIOGRAPHIC TUBE

A properly made tube should not require nursing, it should be ready to radiograph the heavy parts of the body as soon as you purchase it. You can stipulate on your order that the tube shall stand 20 amperes in the primary of your coil at 110 volts, or 10 amperes at 220 volts. If the tube will not stand that current for 30 seconds, without dropping in vacuum, it will not make good radiographs of stone in kidney, or pelvis.

We Guarantee our No. 24 Tube to stand up as above, and we believe no other will.

Nearly all of the most prominent X-Ray operators are using our tubes, and we refer you to any user, and will give names on application.

Satisfied customers is the principal source of our advertisements. Don't pay any more good money for tubes that need nursing. Ask your dealer for ours, or send direct to

GREEN & BAUER,

Manufacturers,

Hartford, Conn., U. S. A.