(No Model.) 2 Sheets—Sheet 1.

R. C. SCHUPPHAUS & M. T. WHITE.

PROCESS OF MANUFACTURING PYROXYLINE.

No. 418,237. Patented Dec. 31, 1889.

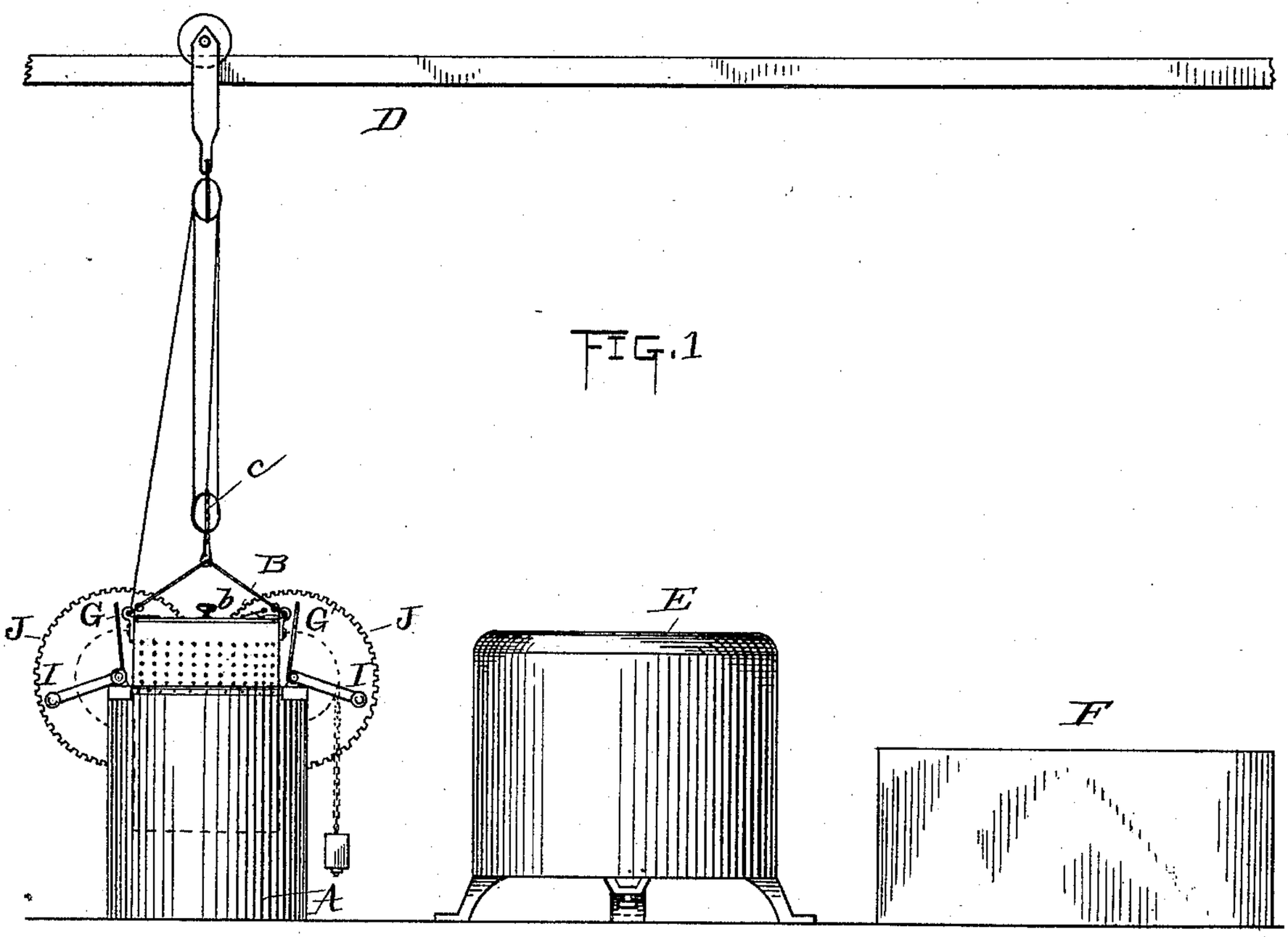

FIG. 1

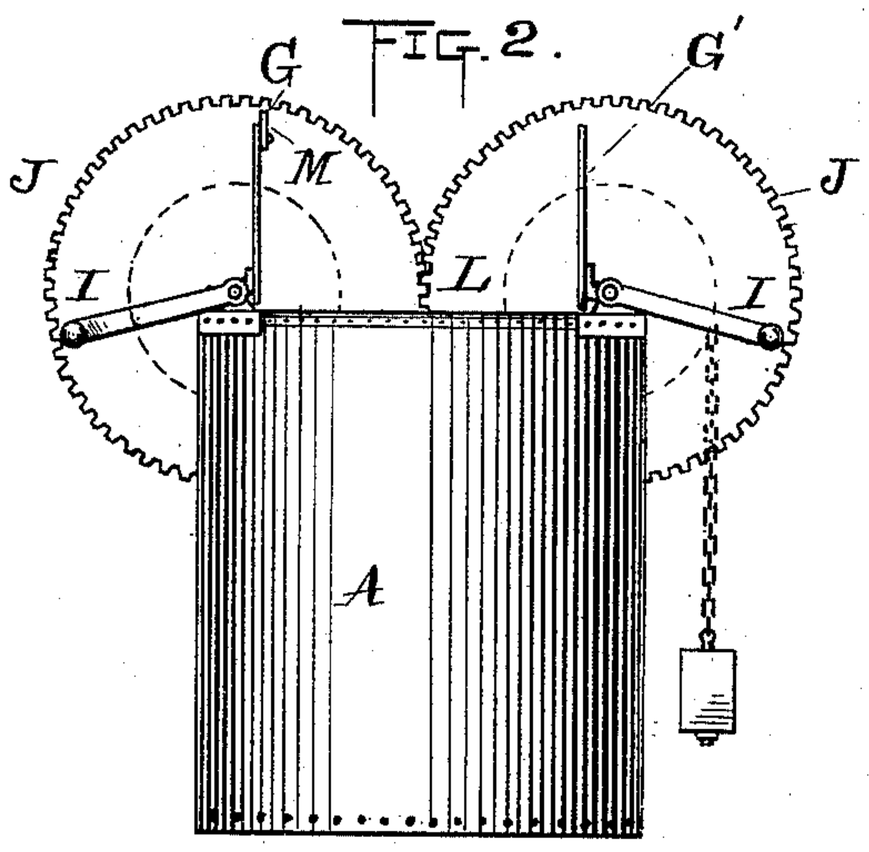

FIG. 2.

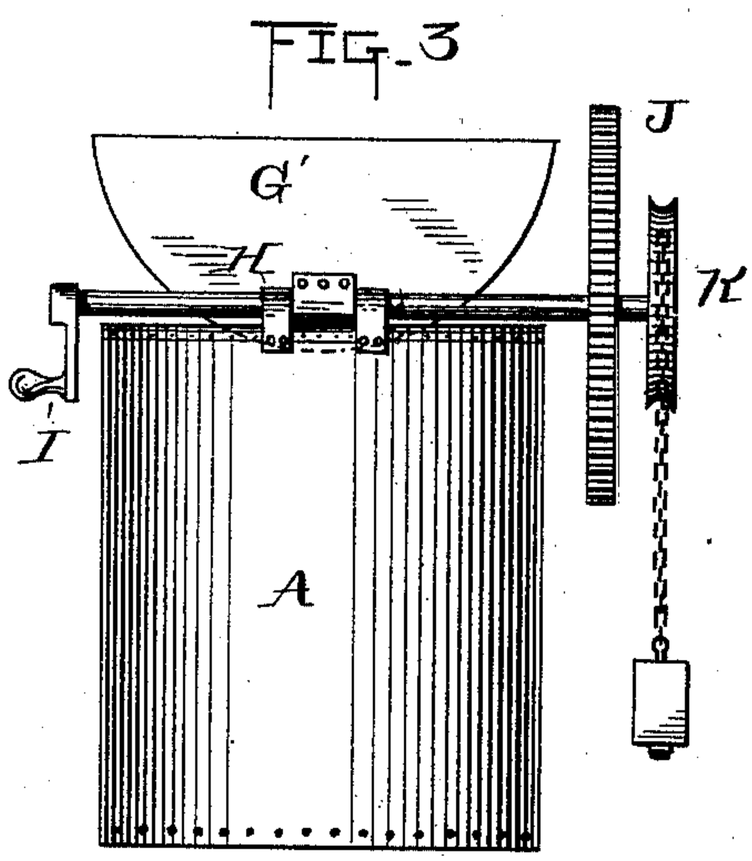

FIG. 3

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FIG. 4

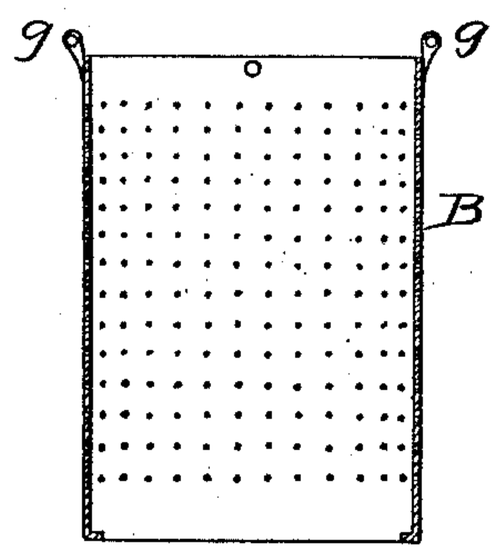


FIG. 5.

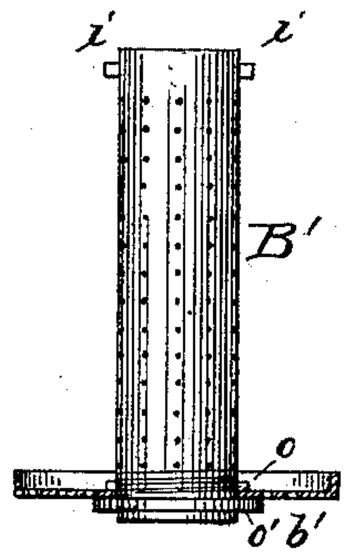


FIG. 6.

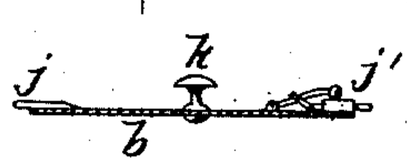


FIG. 7.

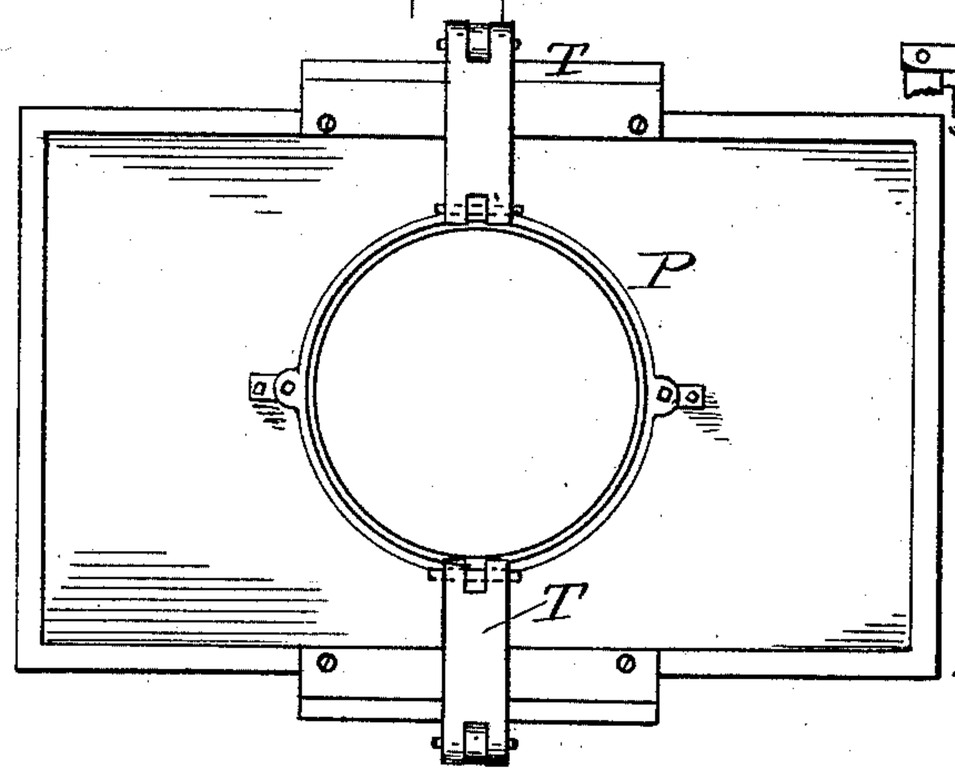
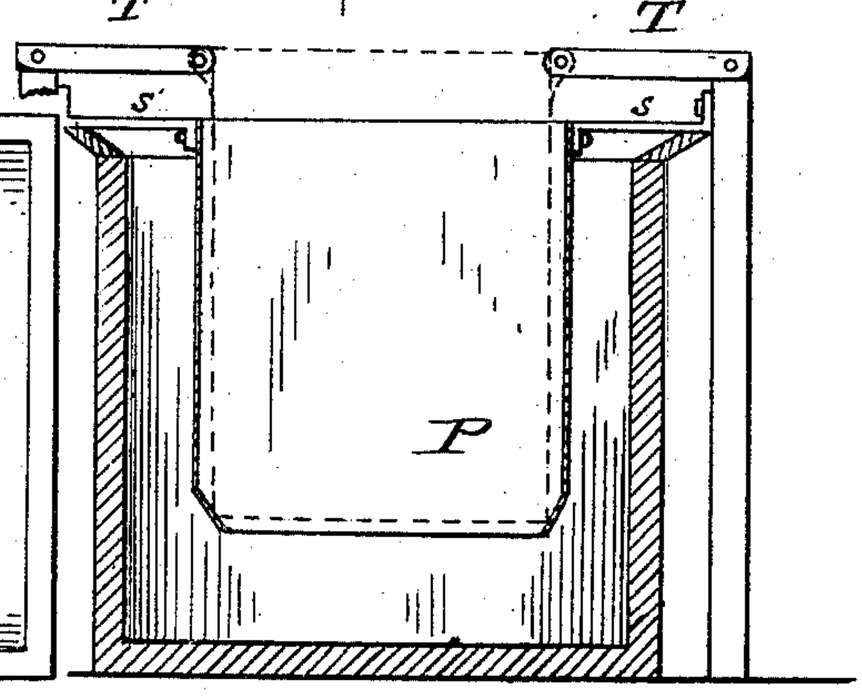


FIG. 8.



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PROCESS OF MANUFACTURING PYROXYLINE.

SPECIFICATION forming part of Letters Patent No. 418,237, dated December 31, 1889.

Application filed January 3, 1889. Serial No. 295,337. (No model.)

To all whom it may concern:

Be it known that we, ROBERT C. SCHUPPHAUS, a subject of the Emperor of Germany, residing at Adams, in the county of Berkshire and State of Massachusetts, and MERRITT T. WHITE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in the Process of Manufacturing Pyroxyline, of which the following is a specification.

The most common forms of cellulose used in the manufacture of pyroxyline are tissue-paper in strips and the same in small shreds. When the former is employed, it is pushed beneath the acid and turned over with paddles. Afterward the charge has to be forked out. As the paper has become massed together in the stirring, this is not an easy task, and large quantities cannot be handled in this way. When the shredded form is employed, the acid is first set into whirling motion by means of a propeller-shaped stirrer. Then the stirrer is raised and the paper introduced. In both processes the mass, after stirring, is removed and placed in the whizzer-basket of a centrifugal machine and transferred from there to a receptacle, where it is washed; but when the shredded form of cellulose is used the whole contents of the pots are emptied into the whizzer. This makes it necessary for the manufacturer to carry a large stock of acids, and the shreds also tend, like the strips, to clog the pipes leading to the spent-acid tanks.

We obviate the defects and difficulties above indicated by conducting the process of manufacture in a manner to be described hereinafter.

Our process, generally speaking, consists in subjecting a confined body of cellulose to the nitrating process and performing the subsequent steps of the process upon such confined body while contained in its original receptacle up to the washing step.

In carrying out our process we employ apparatus which is illustrated in the accompanying drawings, in which—

Figure 1 illustrates the general arrangement of the apparatus employed in our process. Fig. 2 is a side elevation of the pot; Fig. 3, a front elevation of the same. Figs. 4, 5, and 6 are detail views of the cage, and Figs. 7 and 8 are respectively a plan and a vertical section of the dumping-trough.

In Fig. 1, A is the pot, containing the acid solution; B, the cage; C, the hoisting apparatus; D, the elevated track; E, the centrifugal machine, and F the dumping-trough.

The details of the pot are shown in Figs. 2 and 3. It is provided with a cover in halves G G′, each of which is carried by a hinged shaft H. Each shaft is provided at opposite ends with a crank or handle I and a pinion or gear wheel J. The two pinions gear with each other. Thus both covers may be closed or opened by operating either of the cranks. On one of the shafts is carried a pulley K, to which a chain and weight are attached to balance the covers, so that they will work easily. The edge of the pot has a flange L for holding a packing of asbestus or other suitable material to make a close joint. A piece of iron M is attached to one of the covers along its front edge for a similar purpose, and similar pieces are secured to the narrow edges of the covers. For apparatus of small dimensions the covers may be made in one piece. The cage B is perforated at the sides and has a perforated cover *b* and a perforated bottom *b′*. The latter is removable and is held between two disks *o* and *o′*, both of which are internally screw-threaded and screwed to the bottom of a perforated tube B′ in the center of the cage. The cage itself is provided with lugs *g g*, to which hooks can be attached for hoisting it. The tube B′, for a similar purpose, has a bolt *i* projecting from opposite sides. The cover *b* has a handle *k* and two bolts *j j′* at opposite edges, the former being a stationary bolt and the latter a slide-bolt. The bolt *j′* is operated by a lever to which a ball of iron is attached. The object of the ball is to keep the lever down and the bolt thrust out when the cage is in rapid motion. The bolts enter perforations in opposite sides of the cage.

The details of the dumping-trough are shown in Figs. 7 and 8. The trough, which is a spacious water-tank, contains an iron cylinder P, supported above the water-line by arms *s s*, and into which the cage is set. On

the standards, outside the tank, are hinged the bifurcated fingers T T, which are brought into line with the lugs on the cage when the cage is in place. Bolts are then put through to hold the cage.

The process of utilizing the described apparatus is as follows: The charge having been put into the cage the latter is lowered with its contents into the pot A, which is supplied with a suitable quantity of mixed acid. The pot is then preferably closed and the process of nitration begins. Owing to the open character of the cage and the perforated top and bottom, and also to the presence of the perforated tube B′, the cellulose must become thoroughly saturated with the acid, thus preventing the formation of "white specks" and doing away with the necessity of stirring. Moreover, when the nitrating-pot is tightly closed, as is preferred, the atmosphere can neither work injury to the product nor become itself contaminated. When the nitration is complete, the covers are thrown back, the cage is withdrawn and allowed to drain, preferably near an open ventilator-flue. It is then carried to the centrifugal machine E, where it takes the place of the whizzer-basket. It is now carried to the dumping-trough F and lowered into the holder P, and held by bolts passing through hinged fingers T T and lugs *g g*. Then hooks are passed over the ends of the bolt *i*, and the tube B′ and the movable bottom of the cage are hoisted out, thus discharging the cellulose into the trough. This latter action is also preferably carried on near a ventilating-flue. It will be observed that there is no stirring required during the process of nitration, and that there is no waste of material at any stage of the process, and that the material does not require to be dumped or transferred from one receptacle to another, but is carried in the same receptacle from one stage of the process to another.

What we claim is—

1. The improvement in the process of making pyroxyline, which consists in securing the body of cellulose against substantial disintegration or disarrangement while being subjected to treatment in a nitrating-solution, substantially as set forth.

2. The improvement in the process of making pyroxyline, which consists in securing the body of cellulose against substantial disintegration or disarrangement while being subjected to treatment in a nitrating-solution and during the subsequent operation of drying by centrifugal means, substantially as set forth.

3. The improvement in the process of making pyroxyline, which consists in subjecting a confined body of cellulose to treatment in a nitrating-solution, then removing said confined body of cellulose from said solution, then permitting said solution to drain from said confined body, then subjecting said confined body to the drying action of a centrifugal machine, and finally releasing said body from its confinement and washing it, substantially as set forth.

4. The within-described improvement in the process of making pyroxyline, which consists in arranging the cellulose in annular form and subjecting it to the action of the acid solution from all sides of the annulus.

This specification signed and witnessed by ROBERT C. SCHUPPHAUS the 22d day of December, 1888, and by MERRITT T. WHITE the 31st day of December, 1888.

ROBERT C. SCHUPPHAUS.
MERRITT T. WHITE.

Witnesses to the signature of Robert C. Schupphaus:

JAMES W. SUTHERLAND,
HARVEY C. PIERCE.

Witnesses to the signature of Merritt T. White:

H. W. SEELY,
WILLIAM PELZER.