A. W. JOHANSON.

PROSPECTING DRILL.

APPLICATION FILED MAR. 27, 1908.

903,194. **Patented Nov. 10, 1908.**

2 SHEETS—SHEET 1.

Fig 1

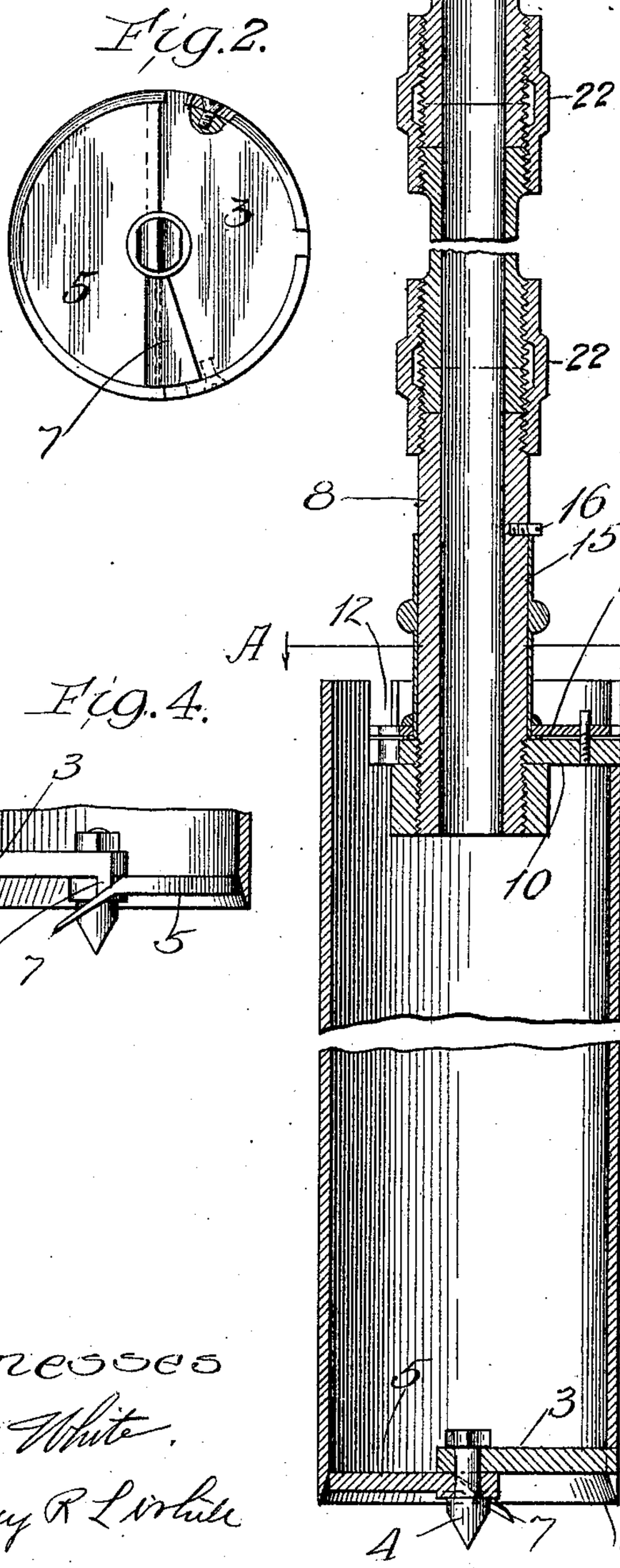


Fig.2.

Fig.3

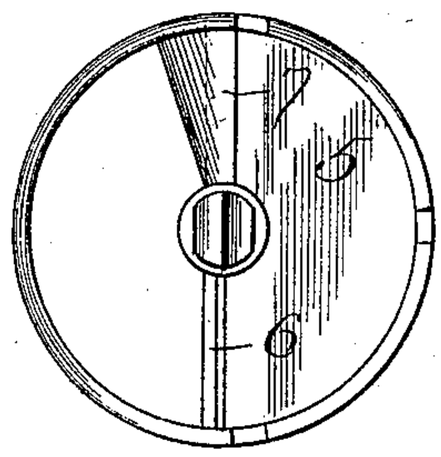
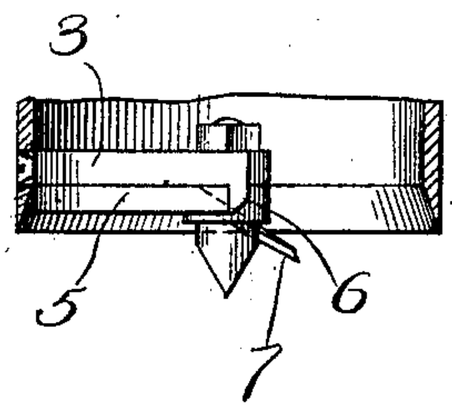


Fig.4.

Fig.5



Witnesses

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2 SHEETS—SHEET 2.

Fig. 6

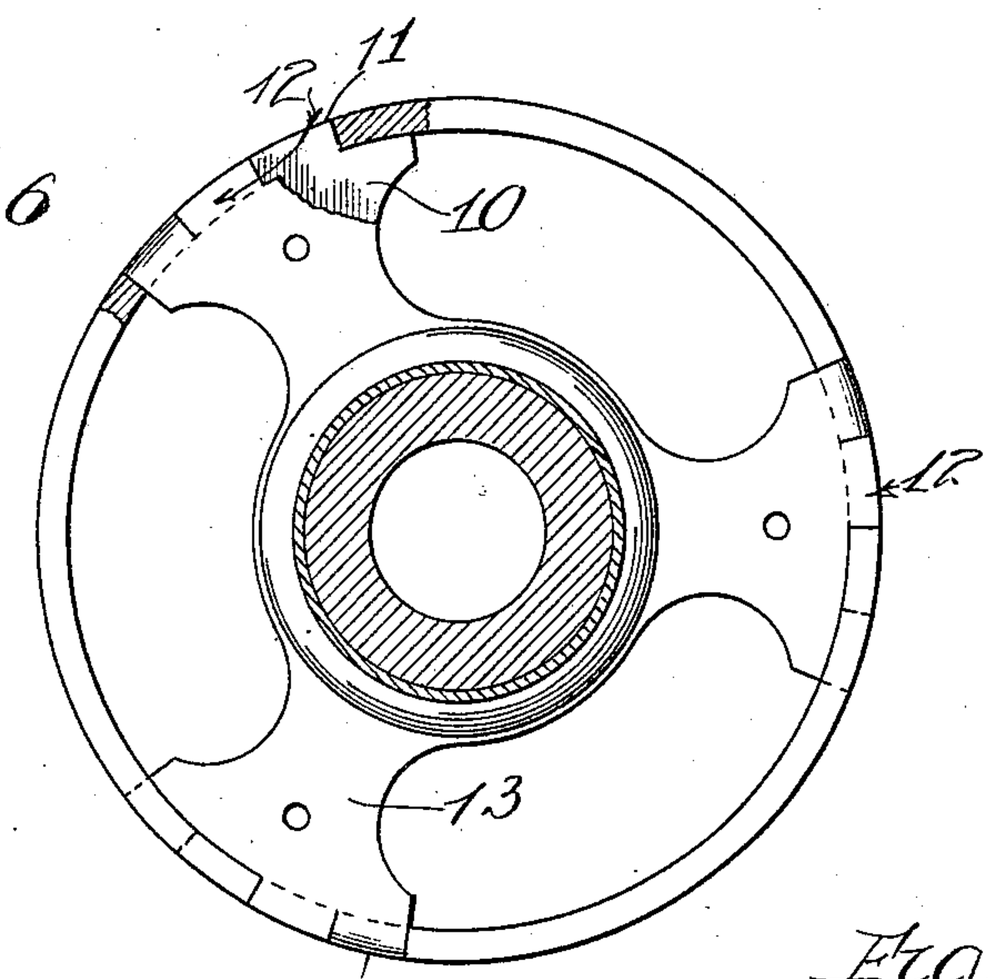


Fig. 7

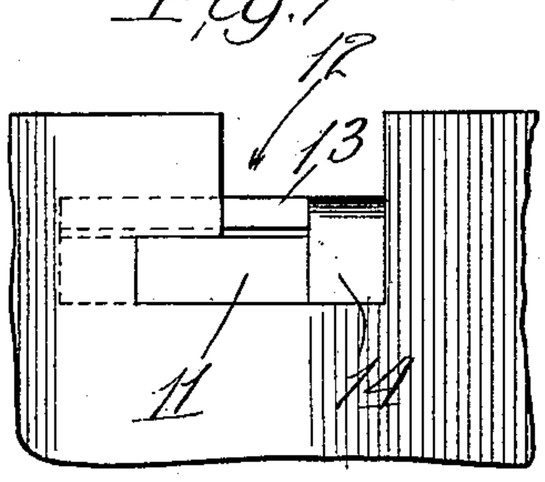


Fig. 10

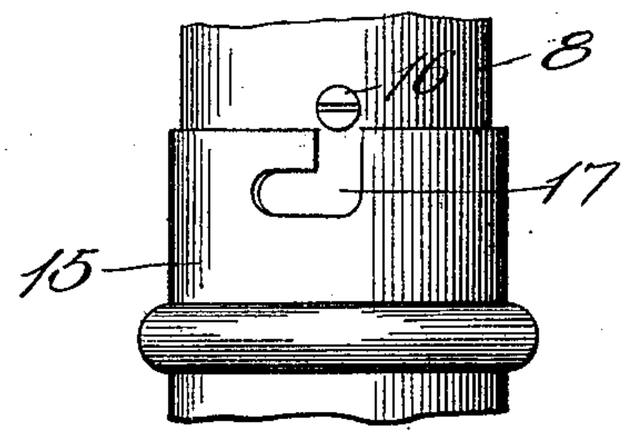


Fig. 8

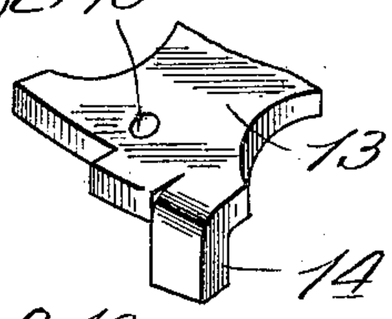


Fig. 9

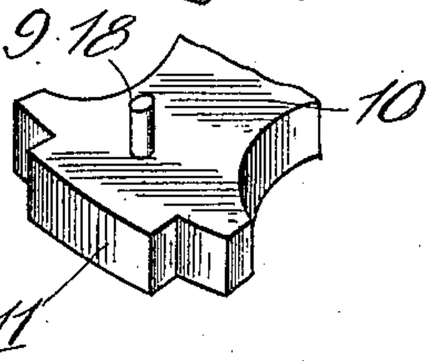
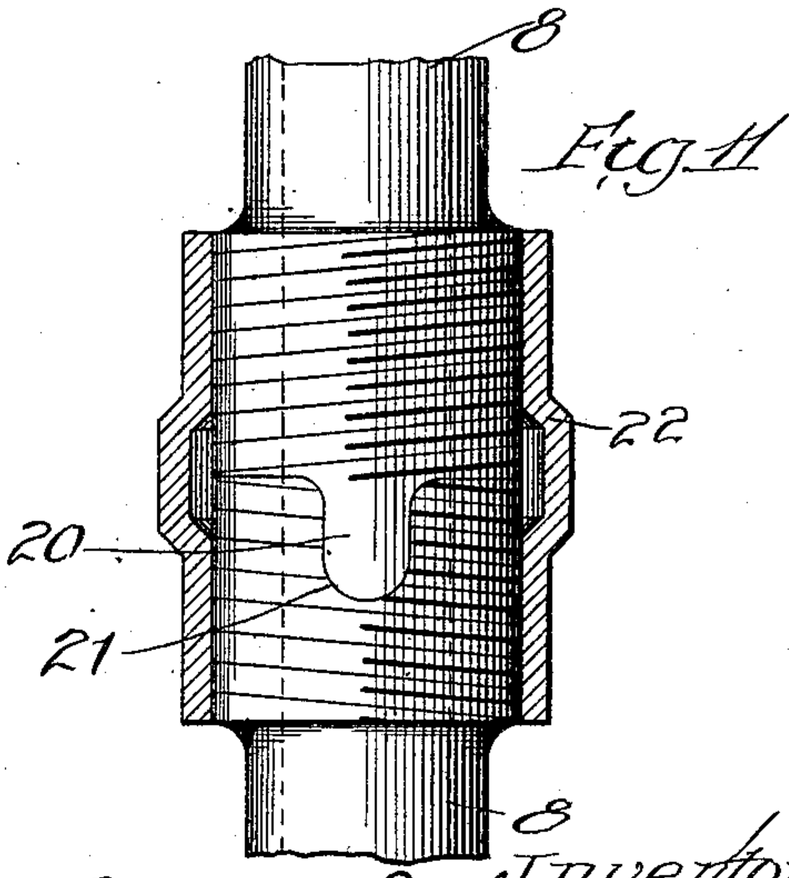


Fig. 11



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UNITED STATES PATENT OFFICE.

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PROSPECTING-DRILL.

No. 903,194. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed March 27, 1908. Serial No. 423,592.

To all whom it may concern:

Be it known that I, ANTON W. JOHANSON, a citizen of the United States of America, and a resident of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Prospecting-Drills, of which the following is a specification.

The main objects of this invention are to provide an improved form of earth drill particularly adapted for prospecting purposes and for obtaining samples of material from inaccessible places, as, for instance, samples of the bottoms of river beds or deposits thereon, or samples of earth or rock located at a considerable depth below the surface; to provide an improved form of tubular drill having a closure at its lower end adapted to open to permit the inward passage of material when the drill is rotated in one direction and to automatically close through a reverse rotation of the drill; to provide an improved form of joint between such drill and its shank; and to provide and improved form of joint for connecting the successive shank sections. These objects are accomplished by the device shown in the accompanying drawings, in which—

Figure 1 is a vertical section, partly broken away, of a drill constructed according to this invention. Fig. 2 is a bottom plan detail, showing the closure in its closed position. Fig. 3 is a similar view, showing the closure in its open position. Fig. 4 is an elevation of the parts shown in Fig. 2, the tube being in section. Fig. 5 is an elevation of the parts in the relation shown in Fig. 3, the tube being in section. Fig. 6 is an enlarged section on the line A—A of Fig. 1. Fig. 7 is a detail of the bayonet-slot and pin locking joint by means of which the operating shank is connected with the drill. Fig. 8 is a detail in perspective of the locking dog. Fig. 9 is a detail in perspective of one of the arms of the locking head. Fig. 10 is a detail of the pin and bayonet-slot lock for securing the locking dog. Fig. 11 is a detail of the joint between successive shank sections.

In the construction shown in the drawings, the drill comprises a tube 1 which is of substantially uniform diameter throughout its length and which is open both at the top and bottom. The lower end of the tube is sharpened to provide an annular cutting edge 2. A detachable bridge piece 3 extends across the end of the tube 1 near the cutting edge 2 and forms a partial closure therefor. The bridge piece 3 is of sector shape and has mounted therein, in alinement with the axis of the tube 1, a guide point 4. There is a sector-shaped opening, which is nearly semi-circular, at one side of the bridge piece, and a sector-shaped closure 5 is pivotally mounted on the guide pin 4 and is movable into and out of position for closing said opening. The bridge piece 3 has a projecting shoulder 6 which serves as a stop for limiting the rotation of the closure 5 toward its open position, as illustrated in Fig. 5. The closure 5 is also provided with an inclined radially disposed cutter blade 7, which extends downwardly and is inclined at such angle that it will cut the earth when the drill is rotated in one direction, and through friction therewith will cause the closure 5 to be opened so that the cuttings will be directed by the blade 7 into the interior of the tube 1.

When the tube is rotated in the reverse direction, the friction of the cutter 7 with the earth causes the closure 5 to swing to its closed position, as in Figs. 2 and 4, thus preventing the escape of the contents of the tube 1 when said tube is pulled upward. The shoulder 6 is preferably beveled to fit the cutter 7, as illustrated in Fig. 4, so as to form a fairly tight closure.

In order to permit the contents of the tube 1 to be readily removed, the upper end of said tube is connected to the operating shank 8 by means which in no way obstruct the upper end of the tube 1 when the shank is disconnected therefrom. The shank 8 is formed of a series of detachable sections, so that it may be extended for permitting samples to be obtained from any depth by the tube 1. The shank 8 is hollow, so as to permit water to be forced downwardly through the tube 1 for washing away the cuttings, as is usual in certain classes of work, and the upper end of said shank is provided with suitable means for rotating it, said means being indicated in the drawing by the transverse handles 9.

Rigidly connected at the lower end of the lower shank section is a head 10 which fits within the upper end of the tube 1 and is provided with projections 11 slidably fitting bayonet-slots 12 extending inward at the upper end of the tube 1. These slots are

provided with branch slots extending toward one side at their lower ends, so that the head 10 may be rotated partly to cause the lugs 11 to enter the branch slots and lock the head 10 against longitudinal shifting with respect to the tube 1.

In order to prevent the head 10 from being rotated in a reverse direction so as to permit the lugs 11 to be withdrawn from the branches of the slots 12, a locking member 13 is mounted above the head 10 and is provided with depending lugs 14 which, when seated beside the lugs 11, as in Fig. 7, prevent such rotation of the head 10. The member 13 is carried by a sleeve 15 which surrounds the shank 8 and is both longitudinally slidable and rotatable thereon. The member 13 is secured against longitudinal movement on the sleeve 15, but is free to rotate relatively thereof. The stud 16 on the shank 8 co-acts with a bayonet-slot 17 for controlling the position of the sleeve 15. Dowels 18 and registering dowel holes 19 in the head 10 and disk 13 prevent relative rotation of said head and disk until said disk has been raised a sufficient distance above the head 10 to draw the lugs 14 clear of the lugs 11. The dowels give additional strength to the joint when it is closed.

The sections of the shank 8 are formed with interlocking tongues 20 and recesses 21 so as to prevent relative rotation, and the opposed ends of successive sections are provided with right and left hand threads which fit correspondingly threaded sleeves 22, by means of which the sections of the shank 8 are secured together in axial alinement.

The closure 5 and bridge piece 3 are removably connected into the tube 1, so that rock cutting means may be substituted therefor in places where the apparatus is used to penetrate rock formations. The device may also be used in connection with an outer casing such as is usual where hydraulic means are used for removing cuttings from the hole. In that case, the particular advantage of the herein described construction lies in the fact that it provides means for raising particles of heavy matter, as, for instance, gold or other metal which cannot be lifted by the hydraulic current.

The operation of the device shown is as follows:—To disconnect the shank from the head, the sleeve 15 is rotated so as to bring the stud 16 into alinement with the vertical part of the bayonet-slot 17, and is then raised to slide the lugs 14 clear of the lugs 11. The sleeve 15 may be locked in this position by turning it so as to cause the stud 16 to enter the branch of the bayonet-slot 17. When the lugs 14 have been so lifted, the shank and head may be rotated to bring the lugs 11 into alinement with the vertical part of the slots 12. The head may now be readily withdrawn from its engagement with the tube 1.

The operation of connecting the shank with the tube 1 is the reverse of the foregoing operation. The fact that the disk 13 is loose on the sleeve 15 permits the necessary rotation of said disk with respect to the shank when the head is swung so as to carry the lugs 11 out of the transverse parts of the slots 12. When the head is in position with the lugs 11 locked in the branch parts of the slots 12, the sleeve 15 may be rotated so as to carry the bayonet-slot 17 to a position out of alinement with the stud 16, and thus prevent accidental disconnection of the shank from the head.

During the operation of drilling, the cutter 7 penetrates the earth and causes the closure 5 to be swung to its open position. The inclination of the cutter blade 7 guides the cuttings into the tube 1. When it is desired to remove a sample of the cuttings, the rotation of the drill is reversed, and the friction of the earth with the cutter 7 then turns the closure 5 to its closed position and prevents the escape of the cuttings, regardless of how finely divided they may be.

The head 10 is preferably in the form of a spider, so as to leave as much opening as possible at the upper end of the tube 1.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a drill of the class described, the combination of a drill tube, a shank of less diameter than said tube and adapted to have detachable interlocking engagement with the upper end of said tube, and means for preventing the accidental disconnection of said shank from said tube through the rotation of said shank in either direction.

2. A device of the class described, comprising a tubular drill open at its upper end and having a plurality of bayonet-slots extending inward from said upper end, an operating shank having at its lower end a head provided with projections adapted to enter said bayonet-slots for securing said shank in alinement with said tube, said bayonet-slots having branch portions adapted to permit the partial rotation of said head when said shoulders are seated in said slots, and a locking member movably mounted on said shank and adapted to enter said slots adjacent to said shoulders when said head is so rotated, thereby locking the head against disconnection from said tube.

3. A device of the class described, comprising a tubular drill open at its upper end and having a plurality of bayonet-slots extending inward from said upper end, an operating shank having at its lower end a head provided with projections adapted to enter said bayonet-slots for securing said shank in alinement with said tube, said bayonet-slots having branch portions adapted

to permit the partial rotation of said head when said shoulders are seated in said slots, a locking member movably mounted on said shank and adapted to enter said slots adjacent to said shoulders when said head is so rotated, thereby locking the head against disconnection from said tube, a sleeve surrounding said shank and adapted to shift said locking member into and out of locking position, said locking member and sleeve being relatively rotatable, and locking means for securing said sleeve.

Signed at Chicago this 21st day of March, 1908.

ANTON W. JOHANSON.

Witnesses:

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E. A. RUMMLER.