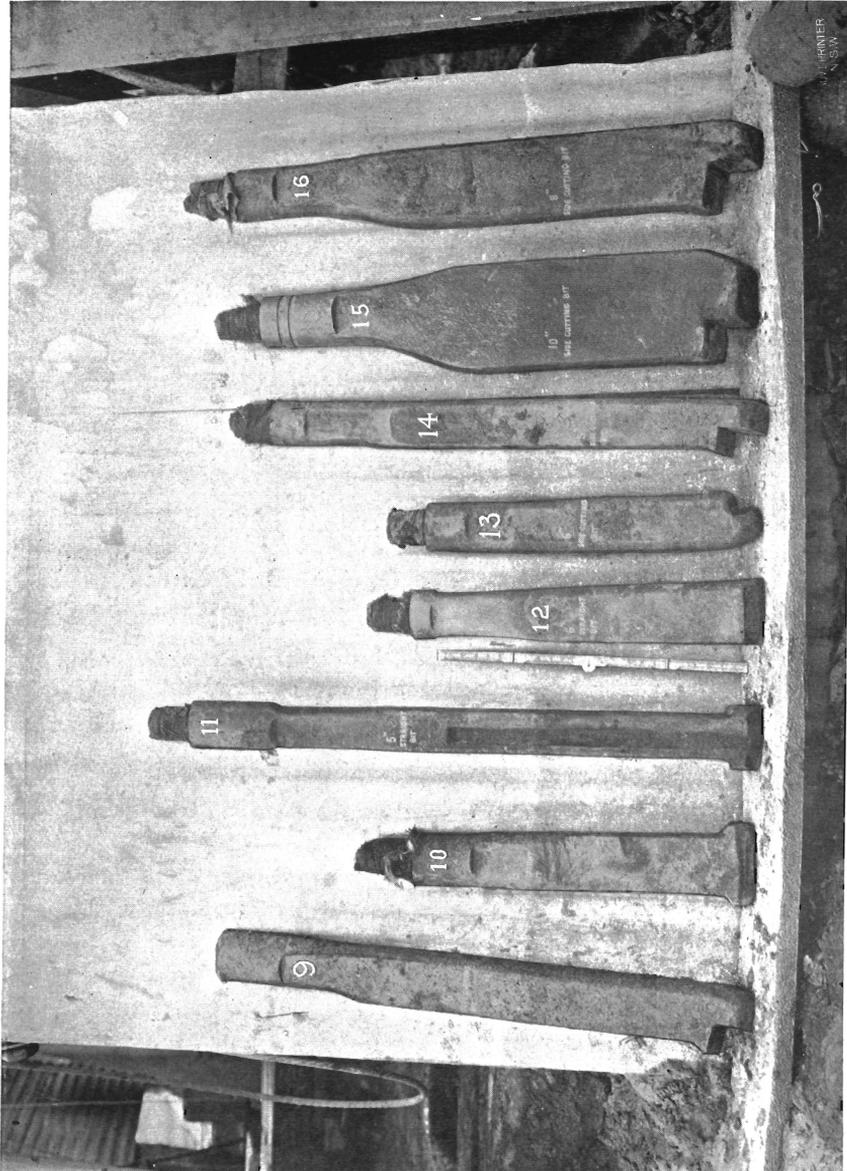


When casing is once in position the drilling is continued with a 9-inch



TOOLS.

9. 6 in. side Cutting Bit. 10. 6 in. Straight Bit. 11. 5 in. Straight Bit. 12. 6 in. Straight Bit. 13. 6 in. side Cutting Bit.
 14. 5 in. side Cutting Bit. 15. 10 in. side Cutting Bit. 16. 8 in. side Cutting Bit.

straight bit, followed by a side-cutting bit, the casing being forced down as drilling is completed.



21. SCREWING ON AN ADDITIONAL LENGTH OF CASING.



RELEASING CLAMP AND LOWERING CASING.

When deep enough a sinker-bar consisting of a solid wrought-iron rod, some 4 inches diameter by 30 feet long, is interposed between the bit and the jars, the total weight of the string of tools being some 12 cwt.

The 10-inch casing in a 4,000-foot hole is carried down to a depth of 300 feet, its function being to cut off the sand and reduce the friction in sinking the 8-inch and 6-inch casing. Upon the bedding of the 10-inch casing the diameter of hole is reduced to a limit of $9\frac{1}{2}$ -inch diameter or $\frac{3}{4}$ -inch clearance for the 8 inch outside diameter of casing, which is $\frac{9}{32}$ inch thick and weighs 23 lb. per foot run, the 8-inch casing being also provided with a similar shoe to that on the 10-inch; the mode of drilling and cleaning hole being as already described. It may here be remarked that, after a depth of 250 feet has been attained with the aid of poles, which are of spotted gum $2\frac{1}{4}$ inches in diameter and lengths of about 38 feet, a length of cable is used from the top of the jars to near the surface where the poles are again used until another 250 feet is attained, when another length of cable is spliced on. It is held that with the handling of the poles at the surface, the tools are more certainly revolved, with consequent less risk of an oval or crooked hole. The 8-inch casing is, if possible, carried to a depth of 700 feet in a 4,000-foot hole, and then, as in Euraba Bore, the 6-inch outside diameter casing, $\frac{1}{4}$ inch thick, weighing 15 lb. per foot run, is carried to the bottom of the hole and firmly bedded at a depth of 4,000 feet.

Plate 21 illustrates the screwing on of an additional length of casing by means of a chain grip and lever worked by four men, thus ensuring joint being run up tight. When the additional length of casing has been screwed on, the whole weight of the string of casing is taken on the cable tackle, and the clamp holding casing being released by a couple of pinch-bars, the casing is lowered into the hole until again caught under the swell by the clamp. The clamp is in three pieces, with internal serrated surface bearing against the casing, and as the clamp fits into a cone-shaped casting, the necessary grip is ensured. Plate 23 shows the method adopted in unscrewing string of tools from sand line previous to removing from hole with cable, and inserting pump.

In cases where it is found impracticable to carry the 6-inch casing down to the full depth, 5-inch outside diameter casing is inserted. When the casing is on bottom it is perforated *in situ* with slots $\frac{5}{8}$ inch wide x 3 feet long, staggered round the casing for such lengths

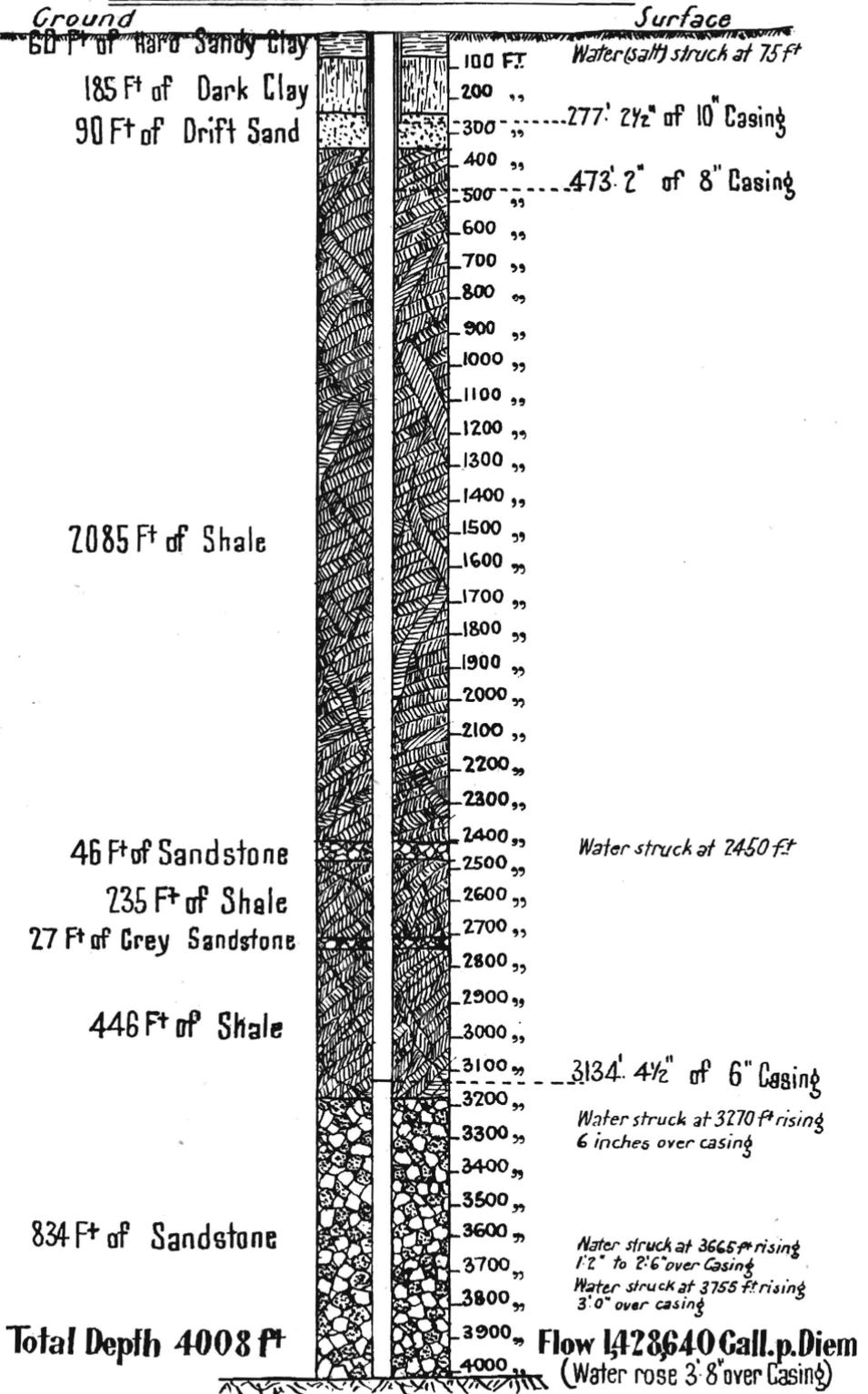


23. UNSCREWING STRING OF TOOLS FROM SAND LINE.

as come opposite the water-bearing strata. Where, however (as at Boomi), there is no likelihood of caving, owing to the soundness of the water-bearing rock, the casing is only taken down and bedded on the top of the rock, as shown by section of bore.

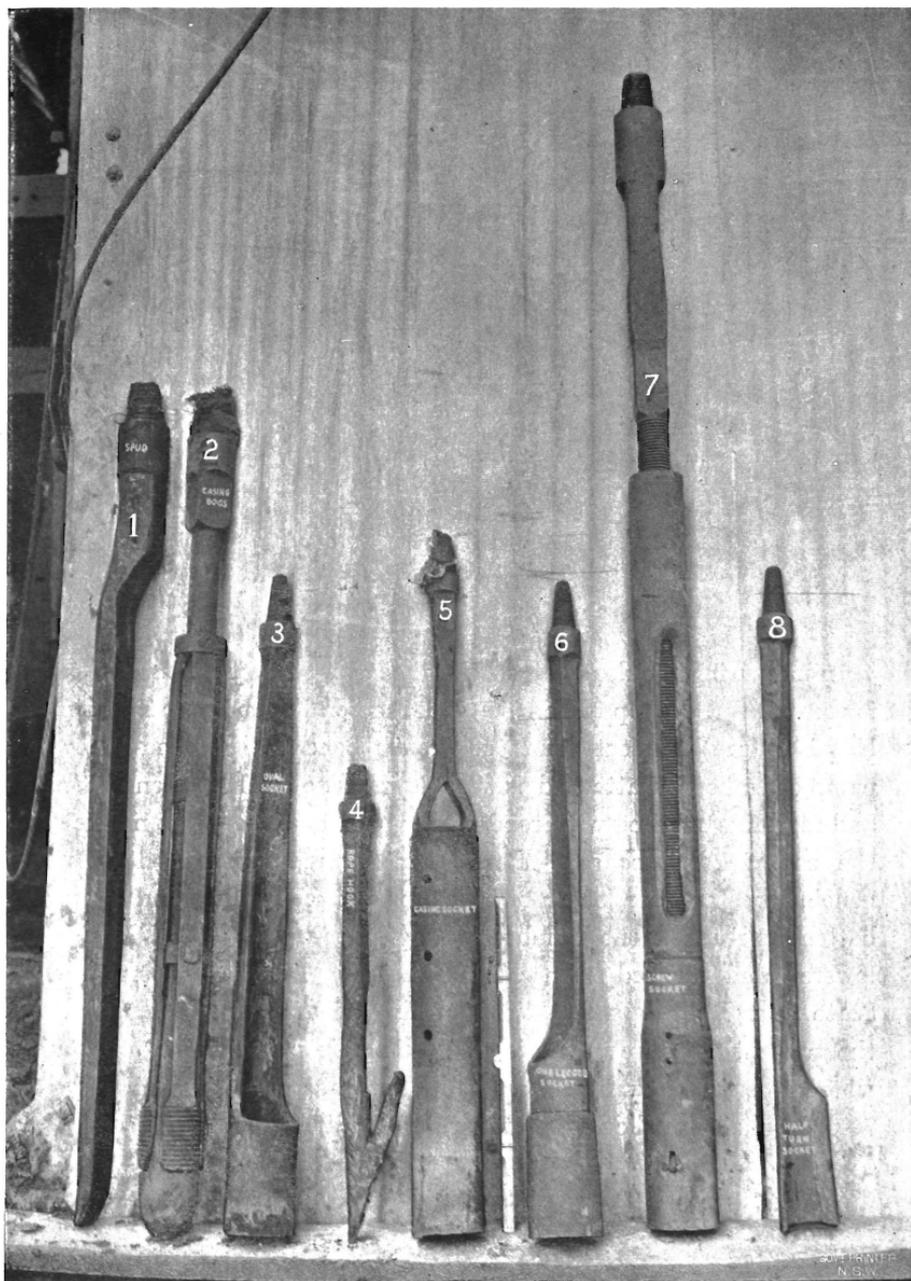
Although in many bores in this State the 8-inch and 10-inch casing have been drawn, yet the present practice is to leave all casing in the hole, the larger sizes of casing being driven for the greater portion of their lengths fit the softer strata more closely than the smaller casing which passes through the hard strata in a free hole. By leaving all casing *in situ*, it is considered less risk is run from water under pressure (when bore is shut down) finding its way along the outside of casing, or sand running into the hole from the higher levels.

Section of Boomi Bore



FISHING TOOLS.

There are many most ingenious devices used for fishing for lost tools, broken cables, &c., some of these being—



1. Spud. 2. Casing Dogs. 3. Oval Socket. 4. Rope Hook. 5. Casing Socket. 6. One-legged Socket. 7. Screw Socket. 8. Half-turn Socket.

- No. 1. Spud—used for clearing space round lost tool.
- No. 2. Casing Dogs—used for drawing casing.
- No. 3. Oval Socket—used for taking out broken pole.
- No. 4. Rope Hook—used for drawing broken cable.
- No. 5. Casing Socket—used for taking out tools.
- No. 6. One-legged Socket—used for taking out tools.
- No. 7. Screw Socket—used for taking out tools.
- No. 8. Half-turn Socket—used for taking out tools.

When it is remembered that these devices have to work in a hole some $7\frac{1}{2}$ inches diameter, and from half to three-quarter mile deep, the results achieved are truly remarkable, whilst requiring wonderful patience on the part of the driller, who, at Boomi Bore, spent over twelve months in clearing from the hole, 3,000 feet of casing which had been dropped and become telescoped at bottom.

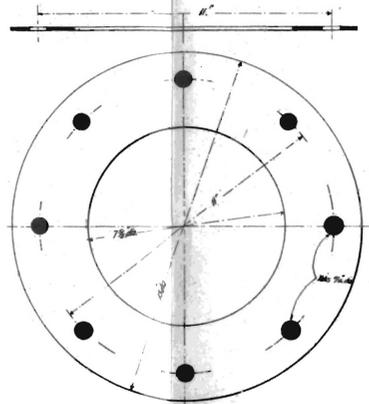
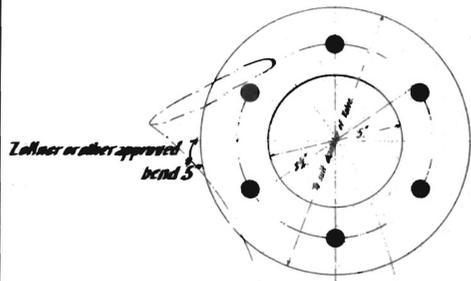
MEASURING DEPTH OF BORE.

In measuring the depth of a hole, the “cow-sucker” on end of cable is run to near the top of derrick, and thereon is marked with paint a length of (say) 50 feet from the wrench bench. The sand-line with pump or sinker-bar attached is then lowered to level of wrench bench, and sand-line marked with rope yarn opposite to the point marked on the cow-sucker; the sand-line is then lowered away till level with bench, when another length of 50 feet is marked on line, and so on till bottom is reached, the number of lengths being booked as the line is lowered, and checked when being hoisted. The deepest bore in this State is at Dolgelly, 4,068 feet, finishing with a 4-inch liner; whilst the greatest depth yet attained in Australia is at Bimerah, Queensland, where bore was sunk 5,045 feet, with but the small resulting flow of 70,000 gallons per diem. However, the Euraba Bore, recently sunk to a depth of 4,005 feet, with a finishing diameter of 6 inches, and a flow of 1,097,420 gallons per diem, is looked upon as the finest example of deep-well sinking yet carried out in this State, and, in regard to finishing diameter, is understood to be one of the remarkable wells of the world.

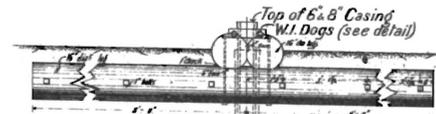
FINISHING OFF BORE HEAD-CONTROL OF FLOW

SCALE

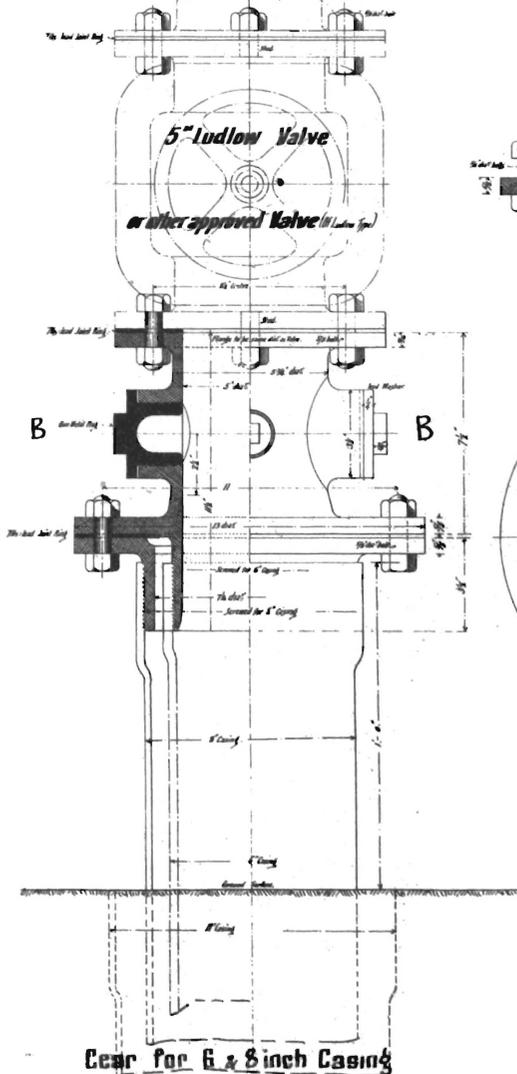
SIZE



This lead joint Ring.



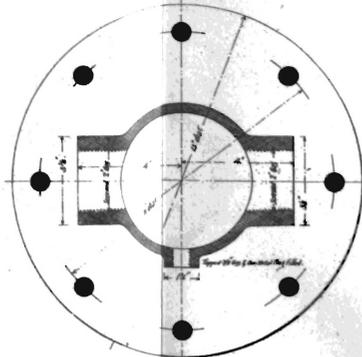
Elevation.



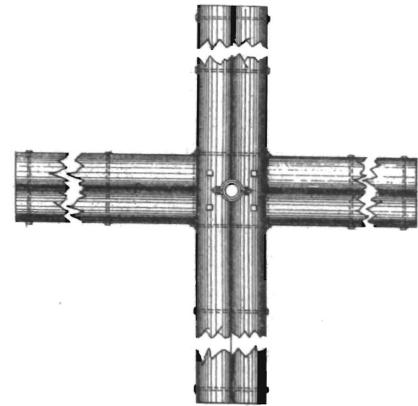
Clear for 6 x 8 inch casing



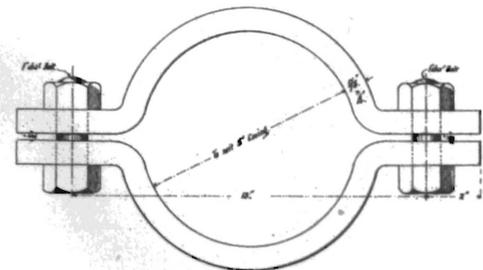
8\"/>



Section on A.B.



*Plan.
Bed logs round bore head.
Scale 1/2\"/>*



Casing Dogs.