(No Model.)

H. W. WILSON.

STORAGE BASIN FOR WATER WORKS.

No. 289,877. Patented Dec. 11, 1883.

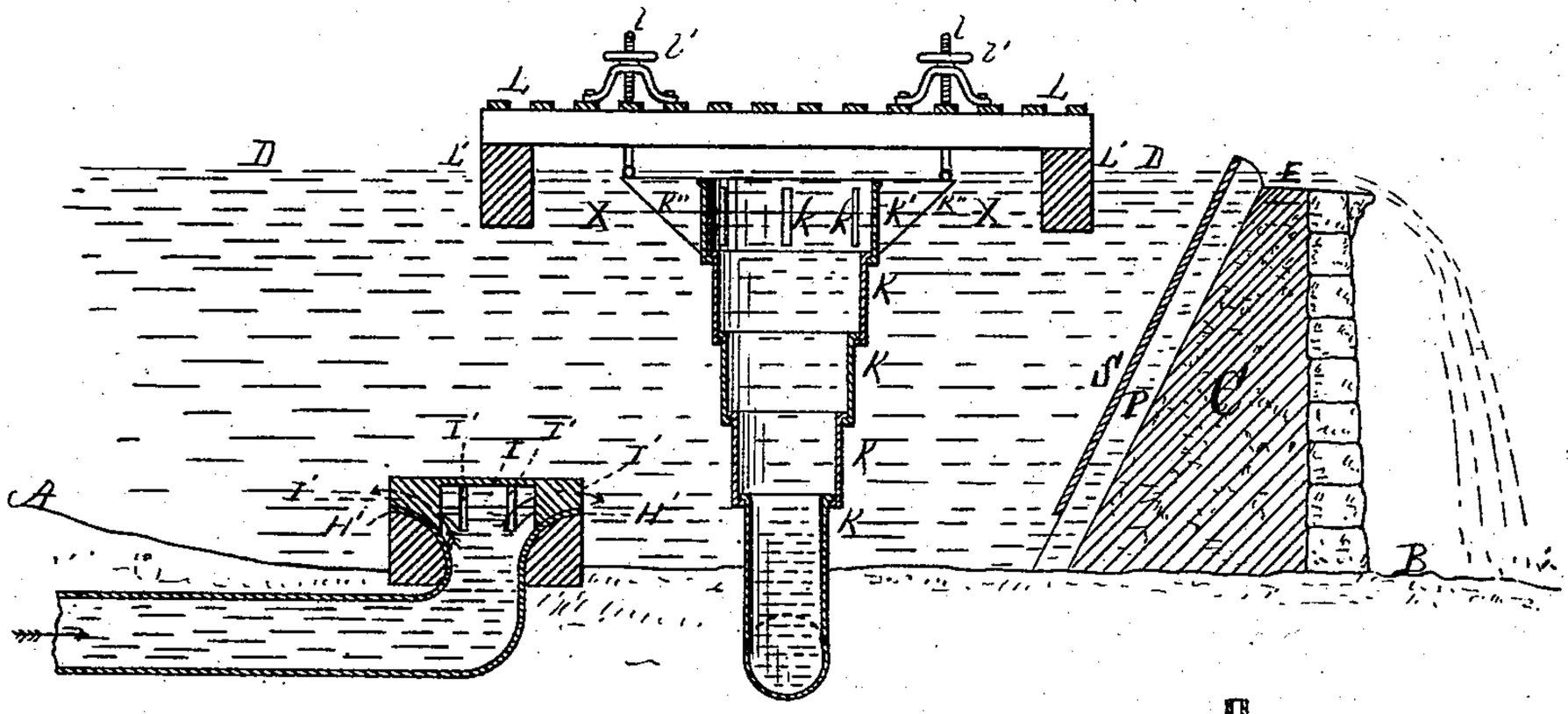

Fig. 1.

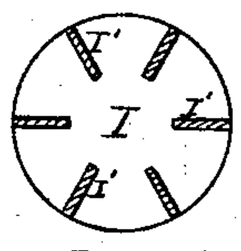

Fig. 4.

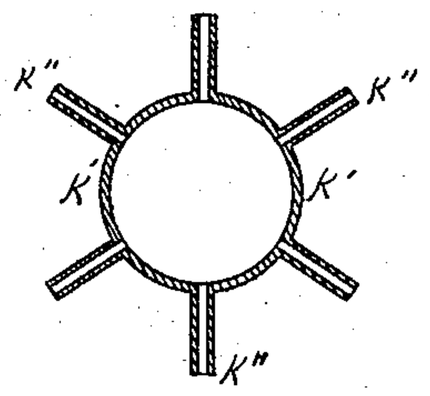

Fig. 3.

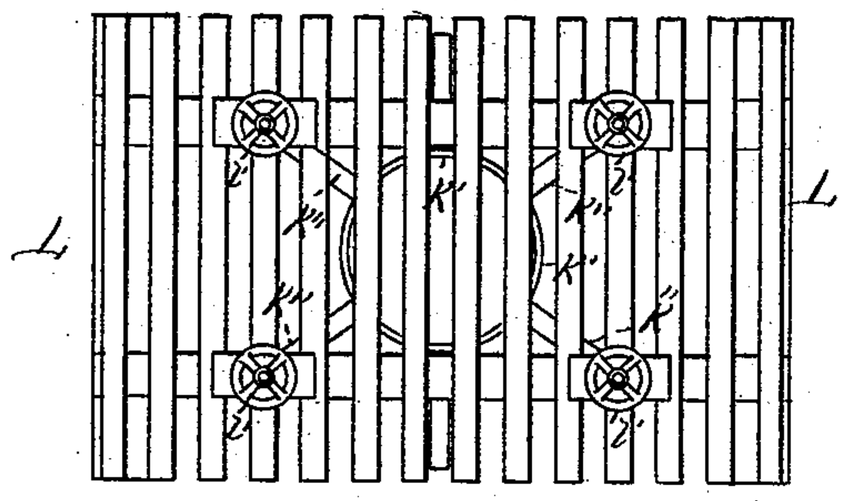

Fig. 2.

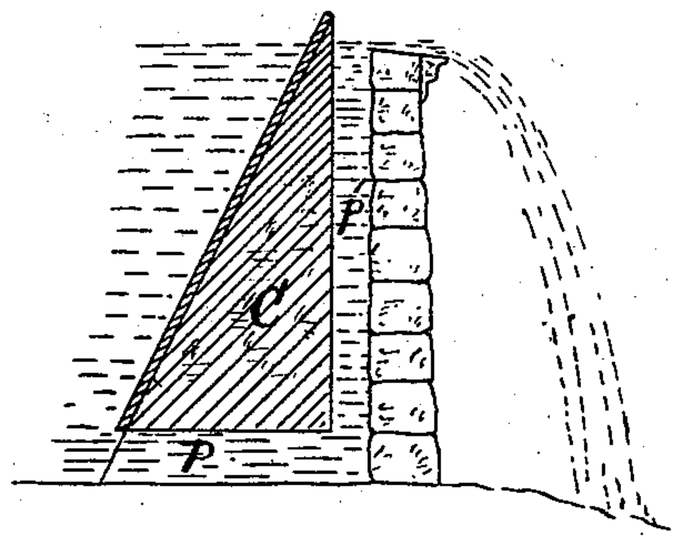

Fig. 5.

WITNESSES

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STORAGE-BASIN FOR WATER-WORKS.

SPECIFICATION forming part of Letters Patent No. 289,877, dated December 11, 1883.

Application filed February 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. WILSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Storage-Basins for Water-Works, of which the following is a specification.

This is an improvement in the mode of constructing storage-basins for water-works, whereby the purer and more aerated waters from the surface can be secured for use by means of the ordinary conduits and pipes, while the more turbid and contaminated waters from the bottom can be ejected from the basins and carried to waste over the dam and down the stream; also, by means of which the more speedy and effectual subsidence of any matters held in suspension in the water can be accomplished. While this mode of construction is applicable to all storage-basins, however they may have been previously constructed, yet as most of them are designed as impounding-reservoirs, by constructing a dam across the bed of a stream, and thus flowing the water back over the low grounds of greater or less extent, this description will be especially applicable to that particular class of basins or reservoirs which may be fairly considered as a type of that kind of public works, but is not restricted to them exclusively.

In the accompanying drawings, Figure 1 is a vertical section of so much of a storage-basin as is necessary to illustrate my invention. Fig. 2 is a plan view, showing the platform, &c., below described. Fig. 3 is a horizontal section on line *x* of the mouth-piece or upper section of the telescopic surface-pipe. Fig. 4 is a horizontal section of the diffuser. Fig. 5 is a vertical section of a portion of a storage-basin, showing a slightly-different construction of the flue P, below described.

The dam C, being built, as is commonly the case, across the bed A B of the stream, will cause the water to flow back and rise to the height of line D, when the surplus water will flow over the crest of the dam at E. The waters of the stream are poured into the upper end of the storage-basin at or nearly at a level with its surface, and are always more or less charged with sediment and impurities, which, as the waters pass along the basin toward the point of discharge, are deposited by the action of gravity, which often requires the lapse of several days for its perfect accomplishment.

It has been the uniform practice hitherto to place or enter the effluent pipes and conduits at a point near to the bottom of these basins, and, of course, far beneath the surface, without the intervention of any device excepting the ordinary screens, which prevent fish or other large objects from entering the pipe, but cannot eliminate fine sediments or other similar corrupting materials, which the action of gravity cause to subside to the bottom of the basins, leaving the pure and aerated water upon the surface.

It is a fact which has been long and well known that the mechanical effect of gravity would cause sediment-bearing waters to tend toward the bottom upon entering a basin, while the clearer water, rising to the surface, would become aerated, and thus becoming specifically lighter than the rest of the water would remain there; but by the means and appliances commonly in use hitherto none of these pure and aerated waters could be utilized for distribution and use, so that the only waters which have entered the effluent conduits and pipes to be delivered for consumption from this class of works have been those from nearer the bottom of the basins, and thereby more liable to be contaminated.

By my improvements the flowing waters are first introduced into the basin at or as near to the deepest portion of the basin as is practicable, for the reason that it is preferable to deposit the sediment at once at the bottom of the basin and allow the clear water to rise from it, as it will, than to have the turbid waters poured continuously into the basin at or near a level with its surface, so that the sediments, while slowly gravitating toward the bottom, are continually adding to the turbidity of the water near the surface through which they are slowly subsiding.

At the expanding mouth H′ of the inlet pipe or conduit H, through which the waters are introduced into the basin or reservoir, is placed a device, which I term a "diffuser," bolted to said pipe H or made integral therewith, and consisting of the flat closed top plate, I, and downwardly-extending radial

guide-plates or partitions I′, (see Figs. 1 and 4,) so constructed in order that the inflowing water may be gently deflected into a horizontal direction and the velocity of the current greatly reduced, so as to prevent any material disturbance of the subsiding sediments and impurities. The expanding and curved sides H′ of the inlet-pipe H at this point aid the diffuser in permitting and controlling a gradual change in the current of the water and a diminution in its velocity. The diffuser should be placed at some distance above the bottom of the basin, but still much nearer to the bottom than to the surface of the water, yet the exact ratio is not material, and might be determined differently for sediments of different specific gravities.

K represents the telescopic surface effluent-pipe, so constructed that its open (upper) end may be adjusted to any given depth below the surface of the water. This adjustment is obtained by means of screws *l*, operating in the platform L, secured to and supported by the floats L′, which, of course, rise and fall with the varying changes of the level of the water. These screws *l* extend downwardly into the arms or wings K″, radiating from the upper section or mouth-piece, K′, of the telescopic effluent surface-pipe K. Suitable hand-wheels, *l*′, operate the screws *l*. The telescopic form of the effluent-pipe permits the vertical motion of the mouth-piece as borne by the floats.

In order to increase the perimeter of the upper end of the mouth-piece K′, to allow a more shallow vein or stratum of water being drawn from the surface of the basin, the arms or wings K″ (above mentioned) are placed upon its sides, as shown in Fig. 3. These wings K″ are hollow, open at the top and inner ends, closed at the bottom and outer ends, and are preferably of the triangular shape shown in Fig. 1. They may be greater or less in number or dimensions, but form an important feature in the construction of the mouth-piece, as they greatly increase the length of the lip of the same over which the water falls, as over a weir, and thence pours into the mouth-piece K′ through the openings *k* therein without increasing, in a corresponding ratio, the size of the pipe itself. The telescopic effluent-pipe connects at the lower end with the conduits and pipes as they are ordinarily constructed and disposed.

When the rigor of winter makes it evident that the mouth-piece K′ is likely to be affected by the formation of anchor-ice within it, the attendant can lower it, by means of the adjusting-screws *l*, to such a depth as will place it below the level at which ice will be formed, which depth can be easily determined by experiment in each instance.

The observed tendency of turbid waters flowing into a storage-basin or other reservoir, as ordinarily constructed, from a running stream, when the flow of that stream is in excess of the outward flow through the effluent-conduit, is for the excess of the turbid and otherwise contaminated waters to fill the entire body of the basin gradually from the bottom upward, and cause the clear and purified waters to rise upon their surface and flow over the dam and run to waste. To obviate this characteristic movement of water, and secure the pure and areated water within the basin during times of floods or freshets, when the waters of all rivers and streams are loaded with impurities, I construct, when building a basin throughout, a vaulted space, P′, (shown in the sectional view illustrated in Fig. 5,) said space or flue being built longitudinally within the dam itself, and extending in length as far as may be necessary to secure a free outlet for the surplus waters, and from the bottom to the top of the dam by means of the connecting-flue P′. The vaulted space or flue P opens out into the bottom of the basin, so that the waters from the bottom may enter it freely. The upstream side of the connecting flue or space P′ is continued at the top to a greater height than the lower side or lip, E, of the dam, so that the purer water may be restrained from flowing away, but, by its hydrostatic pressure, may cause the turbid waters from below, with their impurities and sediments, to rise through the spaces or flues P P′ and flow over the dam or weir and go to waste, thereby disposing of the deleterious waters, and retaining the purer waters to be drawn away and used.

When a solid dam is already constructed, I make a vaulted space, P, as shown in Fig. 1—viz., by laying an apron, S, of broad flagging-stones or equivalent material, supported upon ribs or partitions of brick or other suitable material, and extending from the bottom to the top of the slope of the water-surface or upstream side of the dam, the lower part or edge of this apron being left at a sufficient distance from the bottom of the basin to allow the free and unrestricted entrance of the water, and the upper portion being constructed, as shown, in manner similar to the flue P′, above described, whereby the purer waters may be withheld from flowing away and the foul waters discharged over the dam.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a storage-basin for water-works, the combination of an inlet-pipe adapted, by means of a diffuser, to introduce the water into said basin near the bottom thereof with a decreased velocity, and an effluent-pipe opening into said basin near the surface of the water therein, substantially as and for the purpose described.

2. In a storage-basin for water-works, the combination, with the inlet-tube H, provided with the expanding mouth H′, of the diffuser I I′, constructed substantially as described, and for the purpose set forth.

3. In a storage-basin for water-works, the telescopic effluent surface-pipe K, having an

upper section or mouth-piece, K′, provided with the hollow wings or radial arms K″, constructed substantially as described, and for the purpose specified.

4. The combination of the telescopic effluent surface-pipe K K′ K″, the platform L, provided with the adjusting-screws *l*, and the floats L′, substantially as and for the purpose described.

5. In a storage-basin for water-works, a wall or dam built with a flue or internal space leading from the bottom of the basin to the top thereof, said wall or dam being lower on the outer side of said flue than on the inner side of the same, substantially as and for the purpose set forth.

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Witnesses:
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