

E. E. JOHNSON.
WELL SCREEN.

APPLICATION FILED JUNE 27, 1910.

1,040,342.

Patented Oct. 8, 1912.

2 SHEETS-SHEET 1.

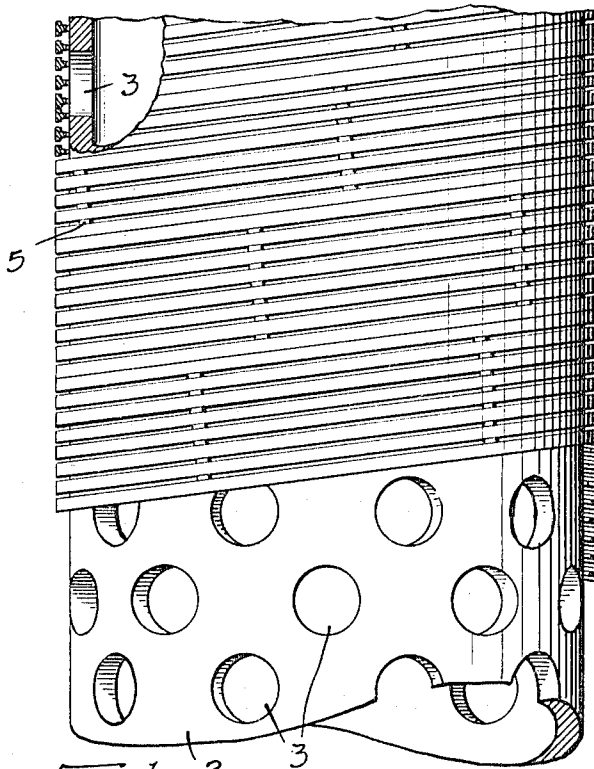


Fig. 1.

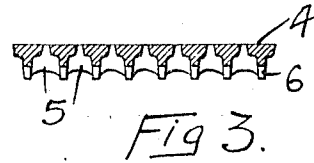


Fig. 3.

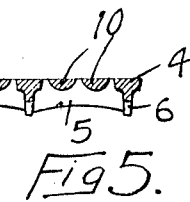
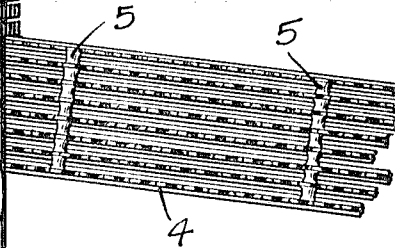


Fig. 5.

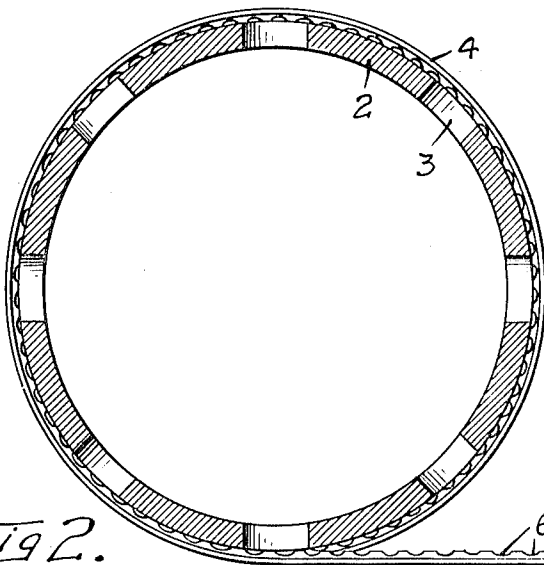


Fig. 2.

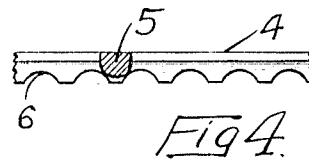


Fig. 4.

WITNESSES
M. Watson
J. Byrnes

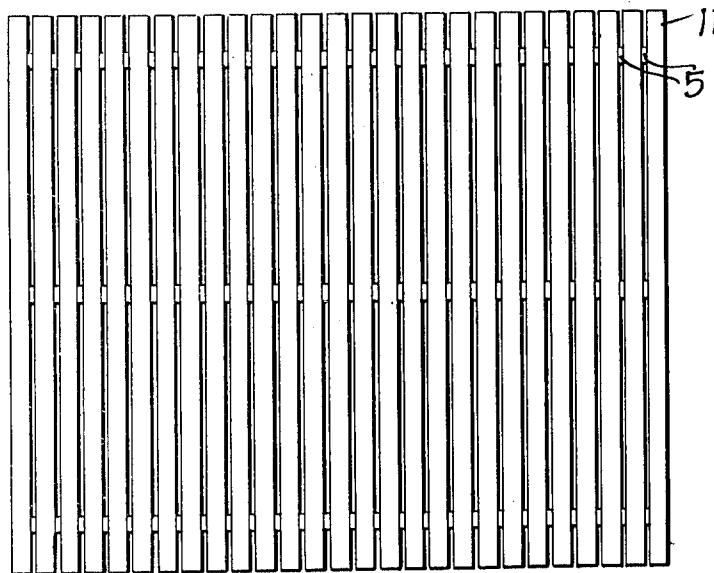
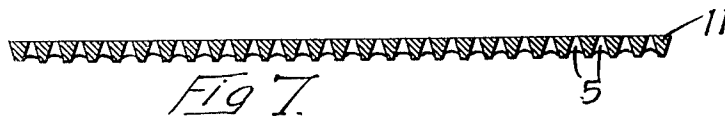
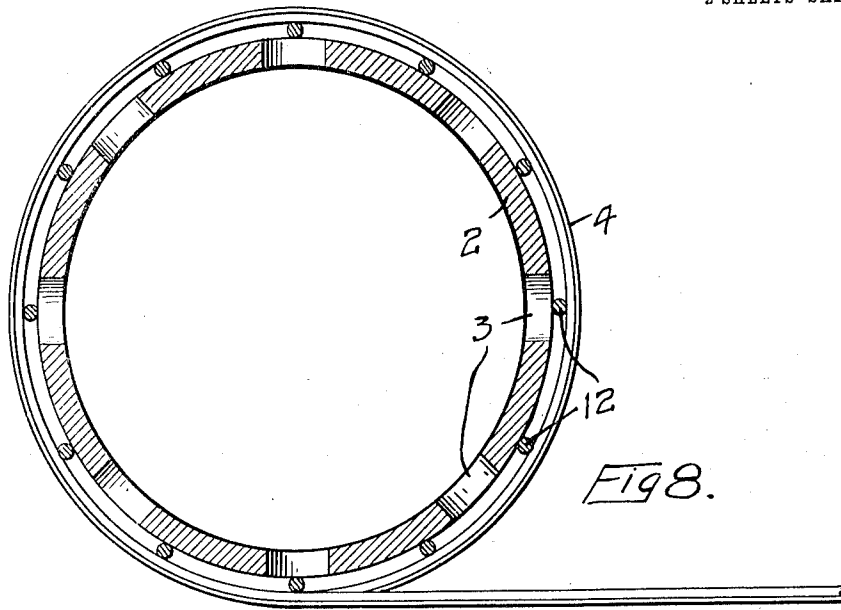
INVENTOR
EDWARD E. JOHNSON
BY *Paul & Paul*
ATTORNEYS

E. E. JOHNSON.
WELL SCREEN.
APPLICATION FILED JUNE 27, 1910.

1,040,342.

Patented Oct. 8, 1912.

2 SHEETS-SHEET 2.



WITNESSES
Am. Water
J. B. Byrnes

INVENTOR
EDWARD E. JOHNSON
BY *Paul O. Paul*
ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWARD E. JOHNSON, OF ST. PAUL, MINNESOTA.

WELL-SCREEN.

Specification of Letters Patent.

Patented Oct. 8, 1912.

1,040,342.

Application filed June 27, 1910. Serial No. 569,093.

To all whom it may concern:

Be it known that I, EDWARD E. JOHNSON, of St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improvements in Well-Screens, of which the following is a specification.

Well screens of this type comprise a centrally perforated pipe around which is wrapped in spaced relation thereto a strainer. This strainer may be formed of ordinary sheet metal perforated with a series of small more or less parallel slots, in which case strips of material or other means for holding the perforate metal spaced from the perforated pipe will have to be employed. A more common means of forming such a screen is to wrap wire spirally around the perforated pipe, each coil of wire being spaced the desired distance from the preceding coil. In order that the strainer openings thus formed between the coils shall properly communicate with the perforations of the pipe it is necessary for the wire to be formed so that that part of it which engages the pipe will act as a spacer to hold the outer surface of the wire away from the surface of the pipe. Various forms of wire for accomplishing this have been used, but in general it may be stated that such wires are usually wedge-shaped in form and may be provided with feet or separated engaging points for contact with the surface of the pipe. In coiling such wire there is a tendency for the same to twist and curl so that the employment of skilled labor and special machinery to perform the winding operation. Such screens have in the past, therefore, been made ready for use at the factory equipped for the purpose and employing skilled workmen.

The primary object of my invention is to provide a perforate ribbon which may be shipped in ribbon form to any point and there wrapped on the pipe by unskilled labor and without the use of special tools or machinery, and which shall include the necessary structure for properly spacing the perforate surface of the ribbon from the pipe without the use of spacing strips or other devices.

A preferred form of such a ribbon comprises a series of wires or strands of inwardly turned wedge-shape, and also, where desired, provided with separated feet, which plurality of strands will be permanently secured in parallel relation at the factory. I

have found that the twisting and curling of the wire is incidental to the wrapping of a single strand and that when once the wires have been properly united to form a ribbon that in this form they can be easily and quickly wrapped around the perforated pipe.

My invention consists generally, therefore, in a ribbon or plate composed of a series of wires or strands arranged parallel with one another and spaced apart and secured together or of a ribbon of sheet metal otherwise formed, the structure of such ribbon or of the wires composing it being such that when complete the said ribbon will include means for spacing an outer perforate surface thereof from the pipe around which the ribbon is designed to be wrapped.

Further the invention consists in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification, Figure 1 is a detail view, illustrating a section of perforated pipe with my invention applied thereto, Fig. 2 is a transverse, sectional view of the pipe, Figs. 3 and 4 are detail views illustrating a portion of the ribbon, Fig. 5 is a detail sectional view of a modified construction, Fig. 6 is a plan view showing a plate composed of ribbons secured together to adapt the device for use in a drip pan, Fig. 7 is a transverse sectional view, Fig. 8 is a transverse sectional view of a pipe illustrating a modified means for forming a water passage between the ribbon and the pipe.

In the drawing, 2 represents a pipe having a series of perforations 3 therein.

4 is a ribbon composed of a series of wires arranged parallel with one another with spaces between them and held in such parallel relation by suitable means, such as electric welding, welding by the oxy-acetylene process or by solder 5. The wires have flat outer faces, flush substantially with one another and the slits between them permit the flow of water, oil, or other liquid, through the ribbon toward the perforations in the pipe. The passages between the wires, as shown in the drawings, widen from the outer surface of the ribbon toward the pipe, due to the wedge-shaped inner faces of the wires, said inner faces having preferably transverse recesses or notches which allow the liquid to flow lengthwise of the pipe or transversely with respect to

the ribbon to the nearest perforation. This construction causes the narrowest portion of the strainer to be exposed first to the material to be strained. The transverse recesses are arranged a suitable distance apart and when the ribbon is wound on the pipe a series of passages will be formed between the wires and the pipe communicating with the different perforations. The wires between the notches bear on the surface of the pipe and are held in engagement therewith by the tension of the ribbon. In wrapping a single wire around the pipe I have found that the wire will twist and curl and that it is extremely difficult to wrap it smoothly and evenly on the pipe so that the coils will lie close to one another with their outer surfaces smooth and flush and their inner faces hugging snugly the surface of the pipe. I have found that skilled labor is required for this work and that it is practically impossible to wind a single wire on the pipe without the use of special machinery. The making of the ribbon or the assembling of the wires in a ribbon also involves the use of special machinery and skilled labor, but when the ribbon has once been made it can be shipped in any desired length to any point where it is to be used and there wrapped on the pipe to complete the strainer. It is not necessary, therefore, to ship the pipe with the ribbon and the ribbon can be readily wound on the pipe without the use of special machinery and by unskilled labor. This is due to the fact that a series of wires formed into a ribbon and secured together, will maintain their proper position during the winding operation while a single wire can be wound only by the exercise of the greatest care and with the aid of special machinery.

Fig. 5 illustrates a ribbon composed of wires 10 having flat outer faces and rounded inner faces and arranged preferably in pairs between the wires 4 and secured thereto, the wires 4 bearing on the pipe and forming with the wires 10 comparatively large water-ways; the webs or inner edges of the wires being notched transversely to allow the flow of water or oil from one passage to another, lengthwise of the pipe.

In Figs. 6 and 7 I have shown a plate or slab 11 composed of a series of wires suitably united and in flattened form to adapt the device for use in the bottom of a drip pan, filter bed, or wherever a screen or strainer might be used. These wires, as shown, have flat outer surfaces with rounded inner faces, the openings between the wires widening or expanding inwardly or from the point where the openings are first exposed to the liquid to be strained.

In Fig. 8 I have shown a pipe having a series of wires 12 extending lengthwise

thereof, the ribbon inclosing these wires between it and the pipe, longitudinal passages being thereby formed communicating at intervals with the perforations in the pipe. With this construction the corrugations or recesses in the inner faces of the ribbon may be dispensed with. Any suitable number of the longitudinal wires may be employed and they may be varied in form to suit different conditions.

The cross section of the wires composing the ribbon may be varied, but I prefer to make them substantially wedge-shaped in cross section instead of in the form of a trapezoid, as usual in well screens of this type, where a single wire is coiled around the pipe. The trapezoidal form of ribbon has a flat inner face of less width than the outer face of the wire and this flat inner face seats itself against the pipe during the coiling operation and aids in holding the wire in proper position with respect to the pipe. A single wire, wedge-shaped in cross section, cannot be successfully wound on the pipe owing to its narrow knife-edge contact with the pipe surface, but when a plurality of wires of this form are assembled in a ribbon they are easily wrapped on the pipe and will be less likely to slip than a single wire with the flat inner surface. This is particularly true if the wedge or knife edge forming the inner surface of each wire of the ribbon is recessed or notched transversely, as this construction will increase the efficiency of the gripping surface and hold the ribbon securely against creeping. A ribbon made in this way will have a rough inner surface composed of a series of points corresponding somewhat to surfaces used for grating purposes and I have found that a ribbon so constructed will grip the surface of the pipe so firmly that creeping or slipping of the strainer on the pipe is positively prevented. A further advantage resulting from the wedge-shaped cross section of the wire is the increase in width of the opening from the outer surface of the ribbon toward its inner surface. I gain, therefore, in two ways by this construction. First, the ribbon has a better frictional grip on the surface of the pipe and the width of the water-way between the strands of the ribbon is increased. The abutting coils of the ribbon on the pipe may be secured together by any suitable means to prevent their accidental separation.

I have shown the ribbon composed of eight strands or wires, but a greater or less number, down to two strands, may be employed if preferred. A ribbon composed of two strands may be wound on the pipe without difficulty, but better results may be obtained by employing substantially the width of ribbon herein shown.

I claim as my invention:—

1. A strainer for well-screens comprising a flexible metal ribbon having a perforate outer shell, and means on said ribbon for engaging the walls of a pipe and spacing the perforations therefrom when the ribbon is wound on the pipe.

2. A strainer for well-screens comprising a flexible metal ribbon provided with a plurality of parallel openings extending inwardly from the surface thereof, and means on said ribbon intermediate said openings for engaging the walls of a pipe and spacing the openings therefrom when the ribbon is wound on the pipe.

3. A strainer for well-screens comprising a flexible metal ribbon having a smooth outer surface and provided with a plurality of parallel openings extending inwardly from said surface, and means on said ribbon intermediate pairs of said openings for engaging the walls of a pipe and spacing the openings therefrom when the ribbon is wound on the pipe.

4. A strainer for well-screens comprising a flexible metal ribbon having a perforate outer shell, and means on said ribbon for engaging the walls of a pipe in a plurality of separated places to space the perforations therefrom when the ribbon is wound on the pipe.

5. A strainer for well-screens comprising a flexible metal ribbon formed of a plurality of members secured together in parallel re-

lation with openings between pairs thereof, and means on each of said members extending away from the common surface formed by the members for engaging the walls of a pipe and spacing the openings therefrom when the ribbon is wound on the pipe.

6. A strainer for well-screens comprising a flexible metal ribbon formed of a plurality of members secured together in parallel relation with openings between pairs thereof, and separated feet on each of said members projecting away from the common surface formed by the members, said feet being adapted to engage the walls of a pipe and space the openings therefrom when the ribbon is wound on the pipe.

7. A strainer for well-screens comprising a flexible metal ribbon formed of a plurality of flat-topped wires secured together in parallel relation with their tops in a common plane and with openings between pairs thereof, and a plurality of separated feet on some of said wires projecting away from said common plane and being adapted to engage the walls of a pipe and space the openings therefrom when the ribbon is wound on the pipe.

In witness whereof, I have hereunto set my hand this 3rd day of June 1910.

EDWARD E. JOHNSON.

Witnesses:

G. E. SORENSEN,
J. A. BYRNES.