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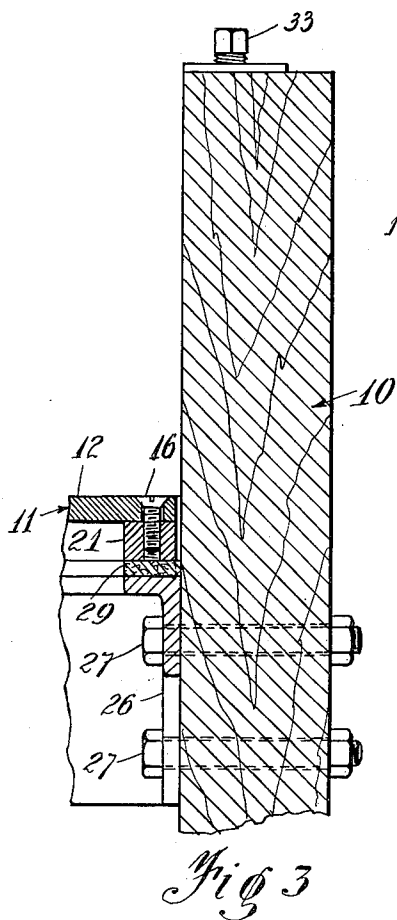
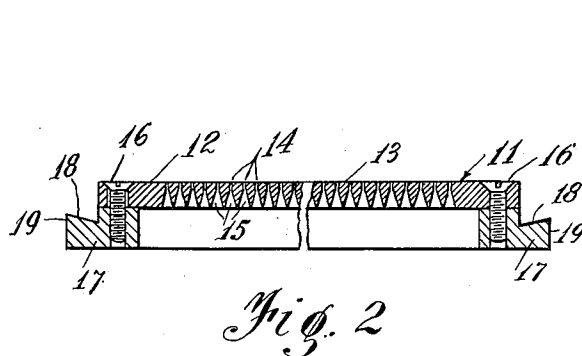
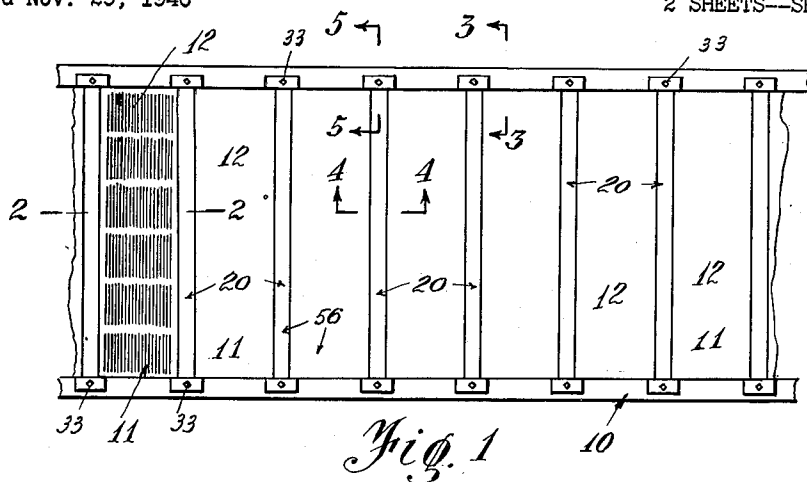
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PAPER PULP SCREEN-PLATES AND SUPPORT MEANS FOR THE SAME

Filed Nov. 29, 1946

2 SHEETS--SHEET 1



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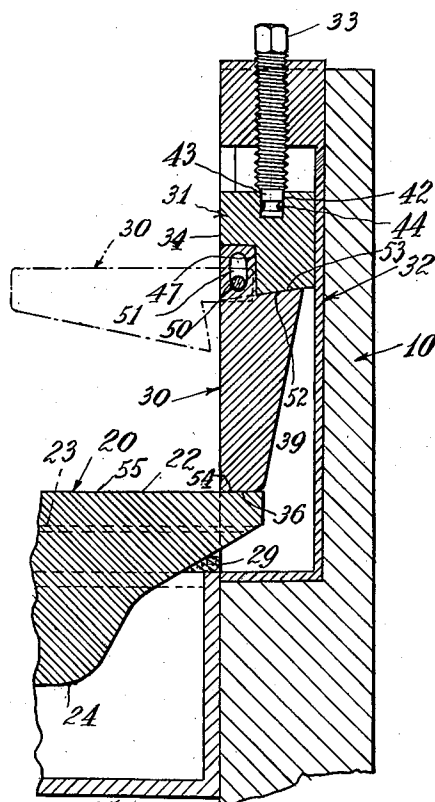
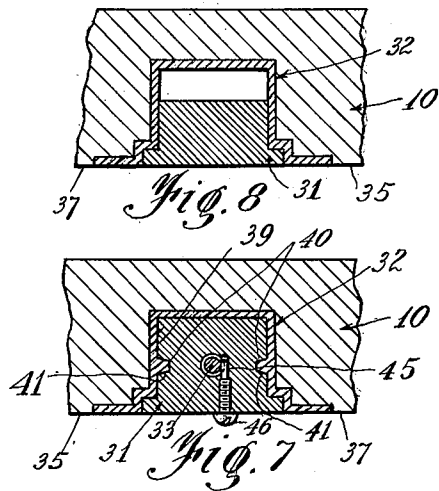
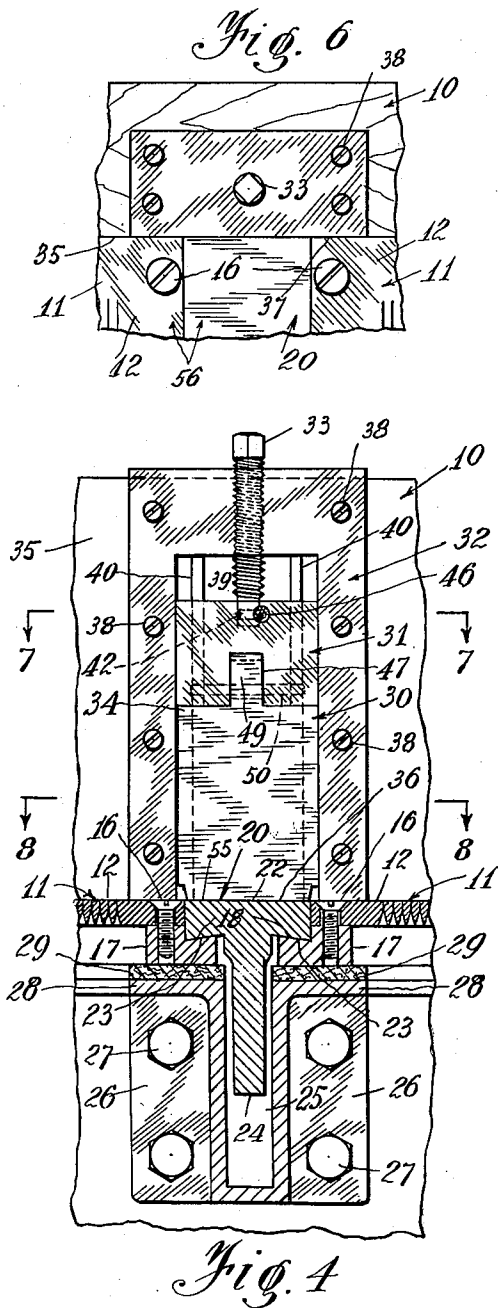
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PAPER PULP SCREEN-PLATES AND SUPPORT MEANS FOR THE SAME

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2 SHEETS—SHEET 2



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PAPER PULP SCREEN PLATES AND SUPPORT
MEANS FOR THE SAME

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6 Claims. (Cl. 92—30)

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This invention relates to improvements in the method of mounting of paper pulp screens and more in particular to a new and useful improvement in means of securely retaining the screen-plates to the frame.

One of the objects of the invention is to provide positive means to prevent the continuously vibrating screen-plates from getting loose from the frame in which they are held.

A further object is to provide a device of the character described in which the screen plates have a plurality of slots of substantially oblong cross sections the areas of which are minimum toward the top of the plates and are gradually increasing toward the bottom inducing maximum velocity of the flow of the pulp at the top regions of the slots accompanied by minimum pressure head and corresponding suction effect so that the flow of the pulp through the slots is enhanced and their clogging is inhibited.

Another object is to provide a device of the type set forth in which the screen plates are clamped to support members associated with the frame by vertically reciprocable followers, guided by rails and mounted in housings, embedded in the frame, the followers coacting with oscillatable clamping members secured for limited relative motion to the followers by a fixed pin and coacting elongated slot.

Another object is to employ a resilient gasket between the support members and the screen plate for sealingly clamping the former to the latter and equalizing the pressures of the individual clamping means to prevent breakage and distortion.

Another object of the invention is to provide paper pulp screens which may be readily replaced.

Still another object of the invention is to provide a paper pulp screen with new and simple means for securely fastening the screens to the frame.

Yet another object of the invention is to provide a paper pulp screen in which the screens are held in position by specially designed clamps which are swivelly mounted in adjustable followers.

Another object of the invention is the improved construction and method of mounting of the paper pulp screens.

Further objects of the invention are to provide a device of the class set forth which is simple in its construction and arrangements, efficient in its use, readily installed and inexpensive to manufacture.

To the accomplishment of these and such other

objects as may hereafter appear the invention consists of the novel construction, combination and arrangement of parts herein specifically described and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which come within the scope of the claims hereunto appended.

In the drawings wherein like numerals of reference designate corresponding parts throughout the several views,

Figure 1 is a top plan view of a series of paper pulp screens mounted in a frame and embodying the invention.

Figure 2 is a horizontal cross section through the screen-plate and the stiffening bars, taken on line 2—2 in Figure 1.

Figure 3 is a sectional view through the side of the frame on line 3—3 in Figure 1.

Figure 4 is a vertical sectional view taken on line 4—4 in Figure 1.

Figure 5 is a vertical sectional view taken on line 5—5 in Figure 1.

Figure 6 is a fragmentary top view of Figure 4.

Figure 7 is a horizontal sectional view on line 7—7 in Figure 4.

Figure 8 is a horizontal sectional view taken on line 8—8 in Figure 4.

Referring now to the drawings, 10 represents the frame which may be made of wood or other suitable material forming the substantially vertical sides of a container. The paper pulp screen 11 comprises of a series of screen-plates 12 mounted in a manner as best shown in Figure 1 of the drawings.

These screen-plates 12 as shown in Figure 2 comprise a plurality of elongated, rectangular plates 13, preferably of bronze or other non-rusting material, having a series of transverse slotted openings 14, the lower ends of which are flared outwardly and indicated by the numeral 15. Openings 14 have substantially oblong cross sections the smallest areas of which are toward the top regions of the slots, the areas gradually increasing toward the bottom.

Secured to the underside of the elongated edges of said plates 13 by means of screws 16, or otherwise, are outwardly extending bars 17, the top face 18 of the exposed portion 19 thereof being sloped up and outwardly to form a seat for the holding-down bar or beam 20.

Rectangular stiffening bars 21 of substantially the same height as bars 17 are secured to the ends of the plates 13 as shown in Figure 3.

The aforesaid holding-down bar 20 comprises

a substantially T-shaped, elongated member having a head 22, the undersides 23 of which conform to the sloped faces 18 of bars 17 of the plates 13, as best shown in Figures 4 and 5.

The reinforcing center rib 24 of bar 20, when in position, extends downwardly into an elongated U-shaped member 25 the ends of which having end-plates 26 which are secured to the inner sides of frame 10 by means of bolt connections 27, as best shown in Figures 3 and 4.

Each leg of said U-shaped member 25 is provided with an outwardly extending horizontal flange 28 which is adapted to support the elongated edge of the screen-plate 12.

When in position, the screen-plates 12 rest on a gasket 29 which in turn rests on the flanges 28 of the U-shaped member 25.

As will be noted in Figures 4 and 5, the ends of the T-shaped holding-down bars 20 are securely held in position by clamping members 30 swivelly mounted in a follower 31 which is mounted for up or down movement in the housing 32 by means of a screw 33.

As shown in dot and dash lines in Figure 5, the clamping member 30 may be swung toward the center of the frame after the follower 31 has been moved upwardly by means of the screw 33.

The clamping mechanism 34 for the screen-plates 12 is preferably embedded in the sides 35 of the frame 10 in a metallic, rust-proof housing 32 in which is slidably mounted the follower 31 which may be raised or lowered by the screw 33, to release or tighten the ends 36 of the holding-down bar 20 by means of the clamping member 30.

The aforesaid housing 32 is recessed into the inner face 37 of the sides 35 of frame 10 and secured thereto by screws 38 as shown, or otherwise.

The rectangular cavity 39 of housing 32 is provided with a pair of oppositely spaced vertical rails 40, preferably integral with housing 32 (Figure 7), which is adapted to guide the follower 31 when the same is being raised or lowered by screw 33.

The follower 31 comprises a substantially rectangular block having vertically disposed slotted ends 41 adapted to slidably engage at each side thereof the rails 40 of the housing 32.

Centrally disposed at the top of said follower is a cylindrical socket 42 into which fits the lower shank portion 43 of screw 33. This shank portion 43 is provided with a horizontally disposed, semi-circular groove 44 which corresponds to the curvature of the shank 45 of the retaining screw 46 shown in Figures 4 and 7.

It is by means of this retaining screw 46 that the screw 33 is rotatably retained in the follower 31 at the same time permitting the follower 31 to be raised or lowered when screw 33 is being turned in said housing in clockwise or counter-clockwise direction respectively.

The said follower 31 is provided with a central rectangular cavity 47 which extends rearwardly sufficiently to receive the male portion of a hinge knuckle 49 of the clamping member 30.

The hinge knuckle 49 is provided with a vertically disposed oblong slot 51 in which freely operates the hinge-pin 50, the ends of which are secured in the follower 31, thereby permitting the lowermost end of the clamping member 30 to be disengaged from its frictional hold on top of the end of the holding-down bar 20 (Figures 4 and 5).

Adjacent the hinge-knuckle 49 of the clamping member 30 is an outwardly inclined follower supporting surface 52 which cooperates with the inclined bottom portion 53 of the follower 31 when in clamped position.

The hinge-knuckle 49 and vertically disposed slot 51 cooperate with the hinge pin 50 and follower supporting surface 52 to form aligning means for keeping the clamping member vertically aligned when in the clamping position.

The function of the above described arrangement will be readily understood by referring to Figures 1, 4 and 5 inclusive.

The U-shaped members 25, preferably of non rusting material, are secured to the inner sides of the frame 10 after which a gasket 29 is placed on the top flanges 28. The screen-plates 12 are then placed on top of the gasket 29 after which the holding-down bars 20 are properly placed between the screen-plates 12.

The clamping members 30 mounted in the inner sides of the frame 10 are thence swung into the position as shown in full lines in Figures 4 and 5, after which the clamping screw 33 is turned in clockwise direction until the inclined bottom portion 53 of the follower 31 engages the inclined portion 52 of the clamping member 30.

The lowermost portion 54 of the clamping member 30 now contacts one of the two ends of the upper face 55 of the head 22 of the holding-down bar 20 and by tightening the clamping screw 33, the holding-down bar 20 forces the screen plates 12 against the gasket 29 and the flanges of the U-shaped member 25 thereby providing a leak-proof joint between the adjoining screen-plates.

It will be noted, that the U-shaped members 25 and the housing 32 for the clamping mechanism 34 are permanently secured to the interior sides of the frame 10, but the screen-plates 12 are readily removable by merely raising the follower 31 including the clamping member 30 by means of the screw 33.

After the screen-plates 12 and the holding-down bars 20 are properly placed and securely held in position by means of the clamping mechanism 34 the upper surfaces 56 of the screen-plates 12 and the holding-down bars 20 will be smooth and even, thereby providing a smooth passageway for the pulp stock.

The screen plates having downwardly flared-out slots 14-15 provide for enhanced flow of the pulp through the slots. At the top regions of the slots their cross sectional area is minimum hence the velocity of the flow maximum and the pressure head minimum, according to Bernoulli's theorem. The low pressure head induces a suction effect which helps the flow of pulp through the slots, inhibits their clogging.

Underneath the screen-plates is arranged machinery (not shown) for producing a downward suction which pulls the pulp down through the slotted openings or slits 14 of the screen-plates 12 and also gives an upward pressure, which forces away any dirt covering the slits, this operation is being given additional help by the effect of flared-out slots 14-15.

It is believed that this invention provides superior screen plates and their fastenings to retain their original position, although, as is well known in the art, they are subject to continuous vibration.

From the foregoing description taken in connection with the accompanying drawings, the construction of the device and the method of

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operation will be readily apparent to those skilled in the art to which the invention appertains, and while describing the principle of operation of the invention together with the device which is now considered to be the best embodiment thereof, it is to be understood that various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as defined in the appended claims.

I claim:

1. A paper pulp screen comprising a frame having a plurality of screen-plates therein, said screen-plates having a plurality of slots substantially oblong cross section the areas of which are minimum toward the top of said plates and are gradually increasing toward the bottom thereof inducing maximum velocity of the flow of the pulp at the top regions of the slots accompanied by minimum pressure head and corresponding suction effect whereby the flow of the pulp through said slots is enhanced and their clogging is inhibited; transversely spaced U-shaped screen-plate supporting members secured to the inner sides of said frame; the upper ends of said U-shaped members provided with outwardly extending, horizontal flanges adapted to support said screen-plates; the longitudinal edges of said screen-plates having outwardly extending, upwardly inclined cut-out portions; holding down bars registering with said inclined cut-out portions; said holding down bars provided with a depending center-rib which penetrates, when assembled the U-shaped portion of said U-shaped members thereby serving as a guide for locating the screen-plates in the frame; a gasket between the screen-plates and the flanges of the U-shaped members; clamping mechanisms adapted to bear against the upper ends of said holding down bar and securely tighten the screen-plates against the U-shaped members; said clamping mechanisms embedded in the vertical sides of said frame and in vertical alignment with said U-shaped members; said clamping mechanisms comprising a clamp housing having a pair of oppositely spaced vertical rails adapted to slidably engage a follower; a clamping member hingedly mounted to the underside of said follower; means to raise or lower said clamping member; said follower and said clamping member are attached to each other by a pin secured to said follower; said clamping member having an elongated slot to freely accommodate said pin thereby permitting said clamping member to be swung outwardly.

2. In a paper pulp screening device having a frame forming the substantially vertical sides of a container and being provided with support members and clamping means for releasably attaching screen plates thereto, said clamping means comprising a plurality of housings fastened to said frame each of said housings mounting a follower for vertical reciprocating movement, vertical rails, rigidly fixed to said housing for guiding said follower, a vertical threaded spindle rotatably but axially substantially fixedly mounted in said follower and coacting with a threaded aperture in said housing, a clamping member mounted thereon for laterally oscillating and limited reciprocating motions adapted to contact and bear down upon holding down bars holding said screen plates to said support members and inclined surfaces associated with said

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follower and with said clamping member, for keeping latter, when under pressure, vertically aligned with said follower.

3. In a paper pulp screening device having a frame forming the substantially vertical sides of a container and being provided with support members and clamping means for attaching screen plates thereto, gasket means for sealing between said support members and said screen plates, screening means associated with said screen plates, said screening means comprising a plurality of slots of substantially oblong cross sections the areas of which are minimum toward the top of said plates and are gradually increasing toward the bottom thereof inducing maximum velocity of the flow of the pulp at the top regions of the slots, accompanied by minimum pressure head and corresponding suction effect whereby the flow of the pulp through said slots is enhanced and their clogging is inhibited, said slots being parallel to each other and extending through the greater portion of one surface dimension of said plates and said clamping means comprising a plurality of housings fastened to said frame each of said housings mounting a follower for vertical reciprocating movement, vertical rails, rigidly fixed to said housings for guiding said follower, a vertical screen rotatably but axially substantially fixedly mounted in said follower, and coacting with a threaded aperture in said housing, a clamping member mounted on said follower for laterally oscillating and limited relative reciprocating motions adapted to contact and bear down upon holding down bars holding said screen plates to said support member by means of said screw, and inclined surfaces associated with said follower and with said clamping member, for keeping latter when under pressure, vertically aligned with said follower, said aligning means including wedge-like coacting surfaces, a fixed pin and a cooperating elongated slot for limited relative motion.

4. In a paper pulp screening device having a frame forming the substantially vertical sides of a container and being provided with support members and clamping means for attaching screen plates thereto, gasket means for sealing between said support members and said screen plates, screening means associated with said screen plates, said screen plates comprising a plurality of slots of substantially oblong cross sections the areas of which are minimum toward the top of said plates and are gradually increasing toward the bottom thereof inducing maximum velocity of the flow of the pulp at the top regions of the slots, accompanied by minimum pressure head and corresponding suction effect whereby the flow of the pulp through said slots is enhanced and their clogging is inhibited, said slots being parallel to each other and extending through the greater portion of one surface dimension of said plates and said clamping means comprising a plurality of housings mounted in apertures of said frame and flush with the inside surfaces thereof, said housings being disposed in pairs, located opposite to each other, each of said housings mounting a follower for limited reciprocating movement, vertical rails, rigidly fixed to said housings for guiding said follower, a vertical threaded spindle rotatably but axially substantially fixedly mounted in said follower and coacting with a threaded aperture in said housing, a clamping member mounted on the follower for laterally oscillating and limited relative reciprocating

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cating motions adapted to contact and bear down upon holding down bars holding said screen plates to said support members, and inclined surfaces associated with said follower and with said clamping member, for keeping latter, when under pressure, vertically aligned with said follower, said aligning means including wedge-like coating surfaces, a fixed pin and a cooperating elongated slot for limited relative motion.

5. In a paper pulp screening device having a frame forming the substantially vertical sides thereof and being provided with U-shaped supporting members adapted to support a plurality of transversely extending screen means having beveled edges adjacent the bottom of the frame the improvement in hold down means comprising a screen hold-down bar of substantially T-shaped cross section, the central leg of which lies between successive screen means and extends into the hollow of a U-shaped supporting member upon which the said screen means rest, beveled shoulders on the arms of said hold-down bar whose angle of bevel and bevel face dimensions are substantially equal to the beveled edges of the screen means and whose thickness is such that a substantially smooth exterior surface is formed when said bar is placed in cooperative position between the screen means, said hold-down bar extending beyond the edges of the screen means and have a beveled bottom face extending into a recess in the inner surface of the vertical side of the frame, and clamping means including a follower member slidably mounted in the recess in the vertical sides of the container so that the exposed vertical face of the follower member is flush with the said inner surface of the vertical sides, a clamping member pivotally mounted on said follower in a recess, said engaging member being of such dimensions that its exposed face surface is substantially flush with the face of the vertical sides and the follower member when said clamping member is in clamping position, and screw means in the vertical sides for slidably moving the follower member and

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clamping member in the recess against the screen hold-down bar to hold it in engagement with the screen means.

6. In a paper pulp screening device having a frame forming the substantially vertical sides thereof and provided with supporting members cooperating with a screen fastener bar to retain a plurality of transversely extending screen means a clamping device comprising a follower member slidably mounted in a recess in the inner surface of the vertical sides of the container, a vertically extending rail on each side of said recess, a track in each corresponding side of the follower member adapted to engage and slide upon said rail, a clamping member pivotally mounted on said follower member and adapted to pivot into the recess between the follower member and a screen hold-down bar, said follower member and clamping member being of such dimensions that their exposed vertical face surfaces are substantially flush with the inner vertical surface of the sides and screw means in the vertical sides for slidably moving the follower member and clamping member in the recess and into engagement with the screen hold-down bar.

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