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Machine for the multi-colour silk-screen printing of cylindrical containers in general.

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Description

The present invention relates to a high productivity printing machine able to carry out multi-colour silk-screen printing on cylindrical containers in general.

US-A-3096709 discloses a decorating machine in which a number of spindles are supported and angularly spaced on a rotatable turret, each of said spindles carrying container-supporting chucks. The turret is rotated intermittently by suitable means to bring the containers carried by the spindles successively to peripheral decorating stations, in each of which a decorating screen is provided. The screen is supported by a support for pivotal movement and for radial movement relative to the turret, in order to consent the container to roll across the screen. Each spindle comprises a gear engaging a rack bar fixed relatively to the rotation of said turret. Said rack bars being located at each of said decorating stations, in order to engage the gears of successive spindles at diametrically opposed points. The position of the spindles carrying the successive containers is registered by means consisting of a stop cooperating with each spindle for limiting rotation to a registering position, and of a clutch incorporated in each spindle driven by a gear oscillated in timed relationship to movement of said turret.

The aforesaid known machines have proved inconvenient due to the fact that it is difficult to obtain perfect positioning (or centering) between the different colour applications, even though complicated systems are provided for registering the position of the container relative to the different screens. The result of this is that relatively poor quality prints are obtained. Moreover, for the aforesaid reasons such machines have to operate at a relatively low production rate.

The main object of the present patent is to provide a high productivity printing machine able to carry out multi-colour silk-screen printing which is unblurred and in which the various colour applications are perfectly centered relative to each other. This is attained by means of a rational and reliable design.

The idea on which the invention is based consists of kinematically linking the screens and the support means for the containers to be printed by a common gear with double toothing which is mounted idly on the vertical shaft supporting the radial support means the said gear being arranged to undergo reciprocating rotation of any angular amplitude, the forward stroke of which is effected while the mandrels are stationary so as to cause the containers to rotate with a peripheral speed equal to and concordant with the linear speed at which the screens slide, and the return stroke of which is effected while the mandrels are undergoing transfer from one station to another so that these latter again become arranged in their starting position.

The structure proposed by the invention comprises a container loading station, at least two printing stations and a discharge station all distributed equidistantly along a horizontal circular path, and a like number of identically distributed horizontal mandrels which support the containers and are caused to follow said circular path by undergoing stepwise motion with an angular amplitude equal to that of their distribution. Moreover, the screens can slide tangentially to said circular path, and on the central shaft of the machine there is idly mounted a gear with which corresponding gears associated with said screens and mandrels are constantly engaged. Said gear according to the invention is rotated with reciprocating motion in steps of any angular amplitude, so that during its return motion, which is completed during the transfer of the mandrels between one station and the next, it causes the mandrels to rotate so as to reposition them in their starting position, whereas during its forward motion it causes rotation of the mandrels while they remain stationary, together with simultaneous concordant sliding of the screens which rest against the containers. As stated, by virtue of the machine constructional characteristics which will be apparent hereinafter, the speed at which the screens slide is equal to the peripheral speed of the containers, thus enabling silk-screen printing to be obtained which is unblurred and in which the different colour applications are perfectly positioned relative to each other, the machine being able to operate at a production rate which is considerably higher than that of known multi-colour silk-screen printing machines.

The constructional characteristics and merits of the invention will be more apparent from the detailed description given hereinafter with reference to the figures of the accompanying drawings, which illustrate a preferred embodiment thereof by way of non-limiting example, in which four printing colours and two loading/discharge stations are provided, and thus comprising six mandrels spaced apart by 60°, and further in which the central drive gear for the mandrels oscillates through 60° steps.

Figure 1 is a partial sectional elevation of the invention.

Figure 2 is a partial plan view of Figure 1, with parts cut away in order to better show parts which would otherwise be hidden.

Figure 3 is a longitudinal section through one of the machine mandrels to an enlarged scale.

It should firstly be noted that any number of printing stations can be provided, as the characteristic elements of the invention illustrated in the
figures are suitable for machines comprising any number of printing stations exceeding two, in addition to a container loading station and a container discharge station. Said stations must be equidistant for the reasons stated hereinafter.

Said figures, and in particular Figure 1, show a hollow vertical shaft 1 which is idly mounted on a fixed platform 2 under which the drive (not shown) for said hollow shaft 1 is located. Said drive consists of an intermittent motion unit suitable for causing the hollow shaft 1 to undergo successive rotations of 60° each. In this respect, as can be seen in Figure 2, the invention comprises four equidistant printing stations indicated overall by 3, a loading station for the containers 4 and a container discharge station, these being indicated diagrammatically only by means of their axes 5 and 6 respectively, as the means proposed for loading/discharging the containers do not form a characterising part of the invention.

For example said loading/discharge means can consist of two gripper members caused to oscillate in the two vertical planes on the lines 5 and 6, either by autonomous control means or by means linked to said drive for the hollow shaft 1.

At the base of this latter there is idly mounted, by way of convenient rolling bearings 7 (see Figure 1), a double ring bevel gear 8 having its lower toothing engaging with four bevel gears 9 pertaining to the four printing stations 3. The bevel gears 9 are fixed onto corresponding shafts 10 positioned radially to the hollow shaft 1 and mounted on convenient supports 11 (see Figure 1). In addition, the four bevel gears 9 have a pitch circle diameter which is equal to 1/6 of the pitch circle diameter of the double ring bevel gear 8. On the opposite end of each shaft 10 there is keyed an interchangeable spur gear 12 which has a pitch circle diameter equal to the outer diameter of the containers 4 to be printed and engages with a height-adjustable rack 13.

This latter is rigid with a horizontal slide 14 positioned orthogonally to the shaft 10 and slidingly mounted on two overlying cylindrical bars 15 which are supported by a bracket 16 fixed to the platform 2. As shown in Figure 1, by means of a height-adjustable horizontal pivot 17, a screen support frame 18 is pivoted to each slide 14 and extends towards the centre of the machine to surmount the circular path followed by the containers 4. At its other end, said frame 18 is supported by an idle wheel 19 which is mounted on a slidable vertical rod 20, this latter being driven with vertical rectilinear to-and-fro translational motion in perfect synchronism with the transfer and printing stages of the containers 4.

Said to-and-fro motion is controlled by a rack and pinion 21, the latter element of which is fixed onto a horizontal shaft 22 idly mounted on a profiled support structure 23. At its other end, said shaft 22 idly carries a second pinion 24 which is in constant engagement with a corresponding rack. This latter is formed on a profiled member 25 which is fixed to the top of a hollow cylindrical bar 26 slidingly contained within the hollow shaft 1. In its turn, the hollow bar 26 contains a slidable rod 27, and said bar 26 and rod 27 are driven with vertical to-and-fro motion by respective linkages connected to the main machine drive. No description is given of said linkages as these are of known type.

From the accompanying figures it can be seen that four linkages 29, which are not described as they are of usual type in the silk-screen printing field, are connected to the upper end of the rod 27 by way of a connecting member 28. As can be seen in Figure 1, each linkage supports at its free end a knife 30 which surmounts the corresponding screen 31.

Below said structure 23, which is rotatably mounted on the top of the hollow shaft 1, there is a disc structure 32 fixed on the hollow shaft 1 and having a descending skirt 33. The skirt 33 supports six angularly equidistant radial mandrels, each comprising a sleeve 34 in which a shaft 35 is rotatably mounted. To the outer end of this latter there is fixed a plug 36 on which the containers 4 are to be tightly fitted, whereas the inner end of said shaft 35 carries a bevel gear 37. This latter has the same pitch circle diameter as the bevel gear 9. The bevel gear 37 is constantly engaged with the upper toothing of the double ring bevel gear 8, and between said shaft 35 and bevel gear 37 there is interposed a front-acting clutch device clearly shown in Figure 3. From this latter figure it can be seen that the bevel gear 37 is mounted idly on the shaft 35, and has fixed to its rear a sleeve 70, the opposite end of which is closed by a ring gear 71. Through this latter there emerges the hemispherical head of a push rod 72 which rests by way of a disc 722 against a bush 74, this latter embracing a sleeve 73 fixed to the shaft 35. The sleeve 73 comprises external cylindrical toothing with which conjugate toothing provided on the inside of the bush 74 engages in an axially slidable manner. Finally, between the bush 74 and bevel gear 37 there is interposed a helical compression spring 75 arranged to maintain two conjugate frontal toothings 721 provided on the facing surfaces of said bush 74 and ring gear 71 in mutual engagement.

Said front-acting clutch disengages immediately before the printed containers are discharged, and engages immediately after the containers to be printed are loaded, so as to torsionally disengage/engage said shaft 35 and bevel gear 37.
respectively, so as to prevent undesirable rotation of the containers during the loading/discharge stages. Said engagement/disengagement is effected by a rocker lever 38 pivoted to the disc structure 32 and controlled by an annular cam 39 fixed to the structure 23 (see Figure 1).

A tube 40 opens into the bush 34, and thus also into the shaft 35 which is provided at its front with a convenient duct 76 (see Figure 3), said tube communicating at its other end with an annular header 41 fixed to the structure 23. The header 41 comprises a cavity shaped as an open ring in which a vacuum is maintained in order to retain the containers 4 against the plugs 36, and also comprises a small recess which is provided in correspondence with the discharge station 6 and is connected to a compressed air source.

In addition, as shown in Figure 1, with each printing station 3 there is associated as rear support 42 arranged to cooperate with the plugs 36 in order to support the containers 4 during printing. The rear support 42 is held on a slide 43 which is slidingly mounted on two bars 44 fixed to the platform 2 and positioned to the sides of the shaft 10. The slide 43 is connected by a connecting rod 45 to a rocker arm 46 which is controlled by a cam 47, the motion of which derives from the main machine drive.

The same drive provides motion to a crank 49 of adjustable eccentricity (Figure 1). A connecting rod 50 is hinged to said crank 49 as shown in Figure 2, and is further hinged to a rocker lever 51, which is connected to the ring gear 8 by a further connecting rod 52.

The invention operates as follows.
Each time a mandrel faces the loading station 5, where is stops, the loading device positions a container 4 in front of the plug 36, with its mouth resting against this latter. The vacuum induced in the container 4 through 35 draws the container towards the plug 36, which thus supports it.

After this, the hollow shaft 1 undergoes a 60° rotation (in the anticlockwise direction with respect to Figure 2), and at the same time the ring gear 8 undergoes the same rotation under the control of the lever system 50, 51, 52. In short, the elements 1 and 8 rotate rigid with each other so that the gearwheel 9 is rotated in such a manner as to cause the slide 14 to slide upstream with reference to the direction of rotation of the hollow shaft 1. During this operating stage, the screens 31 are moved upwards, and the corresponding knives 30 are spaced apart from these latter. On termination of this rotation, the rear support 42 closes against the end of the container 4, after which the screen 31 is rested against this latter, the knife 30 is lowered, and the ring gear 8 then undergoes rotation through the same angle as the preceding but in the opposite direction, whereas the hollow shaft 1 remains temporarily stationary. The screen 31 thus moves with a linear speed which is identical to the speed of rotation of the outer surface of the container 4, which undergoes a complete revolution.

In this manner, an initial print portion is reproduced on the container 4, after which the knife 30 is raised, then the screen is raised, then the rear support 42 is withdrawn and finally the hollow shaft 1 undergoes a further 60° rotation together with the double ring bevel gear 8.

Thus, the printed region of the container 4 becomes repositioned in its exact original position, which is perfectly centered with respect to the next printing station 3. The aforesaid operations are repeated identically from this moment onwards, with a printed container being discharged at 6 and a container to be printed being loaded at 5 each time the hollow shaft stops.

The machine can obviously be constructed with any number of printing stations, of which only that number corresponding to the number of colours to be printed are activated.

Finally, it should be noted that the invention also teaches how containers provided with a handle, such as jugs, can undergo multi-colour silk-screen printing. To enable such containers to be correctly positioned, a free-wheel device is interposed upstream of the plug 36, and on its fixed part there is fitted a stop which projects beyond the corresponding plug 36.

In addition, between the discharge station 5 and the first printing station 3 an elastic strip is positioned so that it makes contact with the traversing containers and compels them to rotate until their handle rests against said stop. Said rotation is obviously made possible by said free-wheel device, which prevents the containers rotating in the opposite direction once positioned. The subsequent operations are identical to those heretofore described.

Claims

1. A machine for the multi-colours silk-screen printing of cylindrical containers in general, comprising:
   - a horizontal platform (2) on which a loading station (5), at least two printing stations (3) and a discharge station (6) for the containers (4) are positioned, said stations being angularly equidistant along a circular path, tangential to which the screens (31) of the printing stations can slide,
   - a circumferential series of radial container-support mandrels (34, 36) be-
ing supported by a central vertical shaft (1) rotated with stepwise motion
- a gear (8) mounted on said vertical shaft (1) and with which corresponding gears (37) associated with said mandrels (34, 36) engage characterized by the said gear (8) is idly mounted on said vertical shaft (1), is arranged to undergo reciprocating rotation, the forward stroke being effected while the mandrels are stationary, and the return stroke being effected while the mandrels are undergoing transfer from one station to the other, and has a double toothing with which corresponding gears (37), (9) associated with said mandrels (34) (36) and printing stations (3) engage, so that all the screens and all the support means for the containers are kinematically linked together in order to hold their relative position for the whole revolution of the shaft (1).

2. A machine as claimed in claim 1, characterised in that said printing stations (3) each comprises a screen (31) with its relative overlying knife (30) and which is positioned above the path followed by the containers and is laterally hinged to a slice (14) provided with a height-adjustable rack (13) with which an interchangeable drive gear (12) having a pitch circle diameter equal to the outer diameter of the containers (4) engages.

3. A machine as claimed in claim 1, characterised in that each mandrel comprises a sleeve (34) in which a shaft (35) which is hollow in its front part is rotatably mounted and on the front end of which there is fixed a plug (36) against which the mouth of the containers (4) is to rest, whereas to its rear end there is fixed a bevel gear (37) engaging with said gear (8), the front cavity (76) of said shaft (35) being connected to a fixed header (41) for the distribution of vacuum within the containers, and for the subsequent pressurisation thereof.

4. A machine as claimed in claim 3, characterised in that said bevel gear (37) and said shaft (35) are torsionally coupled by way of a front-acting clutch (721) which is provided at the rear end of this latter and which is disengaged by a rocker lever (38) associated with the corresponding mandrel and controlled by a fixed cam (39).

5. A machine as claimed in claim 1, characterised in that said vertical mandrel support shaft consists of a hollow shaft (1) in which a slideable hollow bar (26) and a slidable rod (27) are coaxially inserted, these latter being designed to respectively raise/lower the screens (31) and knives (30) of the printing stations, said hollow shaft (1) being controlled by an intermittent motion unit.

6. A machine as claimed in claim 1, characterised in that said gear with double toothing consists of a double ring bevel gear (8) controlled by a lever system (51, 52) which comprises a connecting rod-crank linkage (50, 49) with its crankpin (49) of adjustable eccentricity, and is connected to the drive of said hollow shaft (1) so as to cause said gear (8) to rotate in both directions with a speed such that its return stroke is completed during the transfer of the mandrels from one station to another.

7. A machine as claimed in claim 1, characterised in that the gears associated with the printing stations (3) each consist of a bevel gear (9) having a pitch circle diameter equal to that of the bevel gears (37) associated with the mandrels (34, 36), said bevel gear (9) being fixed onto the end of a radial shaft (10) which is disposed on the platform (2) and to the other end of which there is fixed the gear (12) which controls the screen support slide (14).

8. A machine as claimed in claim 1, characterised in that said bevel gears (37), (9) associated with the mandrels (34, 36) and the printing stations (3) respectively have a pitch circle diameter equal to 1/N of the pitch circle diameter of said double ring bevel Gear (8), where N is the total number of stations provided along said circular path.

Revendications

1. Machine pour l'impression sérigraphique polychrome de récipients cylindriques en général, comportant :
   - une plate-forme horizontale (2) sur laquelle sont positionnées une station de chargement (5), au moins deux stations d'impression (3) et une station de déchargement (16) pour les récipients (4), lesdites stations étant équidistantes angulairement selon un trajet circulaire par rapport auquel peuvent coulisser tangentielle les écrans (31) des stations d'impression,
   - une série circonférentielle de mandrins (34, 36) radiaux supports de récipients étant supportés par un arbre central vertical (1) entraîné en rotation pas-à-pas,
2. Machine telle que revendiquée à la revendica-
tion 1, caractérisée en ce que lesdites stations
d’impression (3) comportent chacune une tra-
me (31) avec son couteau correspondant placé
au-dessus d’elle (30) et qui se trouve position-
né au-dessus du trajet suivi par les récipients
et se trouve articulé latéralement à une coulis-
se (14) prévue avec une crémailleure réglable
en hauteur (13) avec laquelle coopère un en-
grènages d’entraînement interchangeable (12)
qui a un diamètre de cercle primitif égal au
diamètre extérieur des récipients (4).

3. Machine telle que revendiquée à la revendica-
tion 1, caractérisée en ce que chaque mandrin
comporte un fourreau (34) dans lequel est
monté en rotation un arbre (35) qui est creux
da sa partie frontale et sur l’extrémité fronta-
le duquel se trouve un bouchon (36) contre
lequel l’embouchure des récipients (4) vient
reposser alors qu’à son extrémité arrière se
trouve fixé un engrenage d’angle (37) coopé-
rant avec ledit engrenage (8), la cavité frontale
(76) dudit arbre (35) étant connectée à un
collecteur fixe (41) pour la distribution de vide
à l’intérieur des récipients et pour réaliser en-
suite leur mise sous pression.

4. Machine telle que revendiquée à la revendica-
tion 3, caractérisée en ce que ledit engrenage
d’angle (37) et ledit arbre (35) sont couplés en
torsion au moyen d’un embrayage à action
frontale (721) qui est prévu à l’extrémité arrière
de ce dernier et qui est débrayé par un levier
à bascule (38) associé au mandrin correspon-
dant et commandé par une came fixe (39).

5. Machine telle que revendiquée à la revendica-
tion 1, caractérisée en ce que ledit arbre sup-
port de mandrin vertical consiste en un arbre
creux (1) dans lequel une barre creuse coulis-
sante et une tige coulissante (27) sont insérées
coalement, ces dernières étant conçues
pour soulever et abaisser les trames (31) et les
couteaux (30) des stations d’impression, ledit
arbre creux (1) étant commandé par une unité
to mouvements intermittents.

6. Machine telle que revendiquée à la revendica-
tion 1, caractérisée en ce que ledit engrenage
da double denture consiste en un engrenage
d’angle à double bague (8) commandé par un
système de leviers (51, 52) qui comporte une
liaison de connexion bielle-manivelle (50, 49)
avec sa broche de manivelle (49) qui a une
excentricité réglable et se trouve connectée
aux moyens d’entraînement dudit arbre creux
de façon à amener ledit engrenage (8) à tour-
ner dans les deux sens avec une vitesse telle
que sa course de retour est terminée lors du
transfert des mandrins d’une station à une
autre.

7. Machine telle que revendiquée à la revendica-
tion 1, caractérisée en ce que les engrenages
qui sont associés aux stations d’impression (3)
consistent chacun en un engrenage d’angle (9)
ayant un diamètre de cercle primitif égal à
celui des engrenages d’angle (37) qui sont
associés aux mandrins (34, 36), ledit engrenage
d’angle (9) étant fixé à l’extrémité de l’arbre
radial (10) qui est disposée sur la plate-forme
(2) et à l’autre extrémité duquel se trouve fixé
l’engrenage (12) qui commande la coulisse
supportant la trame (14).

8. Machine telle que revendiquée à la revendica-
tion 1, caractérisée en ce que lesdits engrena-
ges d’angle (37), (9) associés aux mandrins
(34, 36) et aux stations d’impression (3) res-
p ectivement, ont un diamètre de cercle primitif
qui est égal à 1/N du diamètre de cercle
primitif dudit engrenage d’angle à double ba-
gue (8), N étant le nombre total de stations
prévues le long dudit circuit circulaire.

Patentansprüche

1. Maschine für den Mehrfarben-Siebdruck von
zylindrischen Behältern im allgemeinen, beste-
hend aus:
- einer waagrechten Plattform (2), auf der
eine Ladestation (5), mindestens zwei Druckstationen (3) und eine Entladestation (6) für die Behälter (4) angeordnet sind und zwar im gleichen Winkelabstand voneinander entlang einer Kreisbahn, tangential zu dieser die Siebe (31) der Druckstationen gleiten können, aus einer Anzahl von auf dem Kreismfang radial angeordneten Haltdornen (34, 36), die von einer zentralen, senkrechten Welle (1) getragen und schrittweise weitergedreht werden, einem Zahnrad (8), das auf dieser Welle (1) gelagert ist und in welches korrespondierende, den Haltdornen zugeordnete Zahnräder (37) eingreifen, dadurch gekennzeichnet, daß das Zahnrad (8) freilaufend auf der senkrechten Welle (1) gelagert ist, angeordnet, um eine Vorund Rückbewegung zu machen, wobei der Volauf bei Stillstand der Haltdorne ausgeführt wird und der Rücklauf, während sich die Haltdorne von einer zur nächsten Station bewegen, und eine doppelte Zahlung aufweist, in welche korrespondierende Zahnräder (37), (9), die den Haltdornen (34) (36) und Druckstationen (3) zugeordnet sind, eingreifen, so daß alle Siebe und alle Halteeinrichtungen für die Behälter kinematisch verbunden sind, um ihre relative Position während dem ganzen Umlauf der Welle (1) zu halten.

2. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß die Druckstationen (3) jeweils ein Sieb (31) mit seinem dazugehörigen darüberliegenden Messer (30) aufweisen und welches oberhalb der Bahn angeordnet ist, auf der sich die Behälter bewegen und welches seitlich schwenkbar zu einem Gleitstück (14) ist, das mit einer höhenverstellbaren Zahnstange (13) versehen ist, in die ein austauschbares Antriebszahnrad (12) eingreift, das einen Teilkreisdurchmesser hat, der gleich dem Außendurchmesser der Behälter (4) ist.

3. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß jeder Haltdorn eine Hüse (34) aufweist, in der eine in ihrem vorderen Bereich hölzte Welle (35) drehbar montiert ist und an deren vorderem Ende ein Stopfen (36) befestigt ist, auf dem die Öffnung des Behälters (4) aufliegt, wohingegen an ihrem hinteren Ende ein Kegelzahnrad (37) befestigt ist, das in das Zahnrad (8) eingreift, wobei die Frontöffnung (76) der Welle (35) mit einem festen Verteilerkopf (41) Luftverbindung hat zur Evakuierung des Behälters und für die anschließende Belüftung derselben.

4. Maschine nach Anspruch 3, dadurch gekennzeichnet, daß das Kegelzahnrad (37) und die Welle (35) mittels einer stirnseitig wirkenden Kupplung (721) drehgumpekt sind, die am hinteren Ende der letzteren angeordnet ist und die durch einen dem entsprechenden Haltdorn zugeordneten einarmigen Kniehebel (38) ausgeklinkt und von einer feststehenden Nocke (39) gesteuert ist.

5. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß die senkrechte Haltdorn-Trägerwelle aus einer Hohlwelle (1) besteht, in der ein verschiebbare Hohlstahl (26) und eine verschubbare Stange (27) koaxial eingefügt sind, wobei diese letzteren dazu vorgesehen sind, die Siebe (31) und Messer (30) der Druckstationen jeweils anzubehen oder zu senken, wobei die Hohlwelle (1) einer intermitterenden Bewegungseinheit gesteuert ist.

6. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß das Doppelzahnrad aus einem Doppelring-Kegelzahnrad (8) besteht, das von einem Hebelsystem (51, 52) gesteuert wird, welches ein Kurbelgetriebe (50, 49) mit einem Kurbelzapfen (49) enthält, dessen Exzentrizität einstellbar ist und mit dem Antrieb der Hohlwelle (1) verbunden ist, um zu bewirken, daß das Zahnrad (8) in beide Richtungen dreht und zwar mit einer Geschwindigkeit, daß der Rücklauf während der Weiterbewegung der Haltdorne von einer Station zur nächsten vollendet ist.

7. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß jedes der den Druckstationen (3) zugeordnete Zahnrad aus einem Kegelzahnrad (9) besteht, dessen Teilkreisdurchmesser gleich dem der den Haltdornen (34, 36) zugeordneten Kegelzahnräder (37) ist, wobei das Kegelzahnrad (9) am Ende einer radialen Welle (10) befestigt ist, die auf der Plattform (2) gelagert ist, und an deren anderem Ende das Antriebswagen (12) befestigt ist, das den Siebhalterungsschieber (14) steuert.

8. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß die Kegelzahnräder (37), (9), die den Haltdornen (34, 36) und den Druckstationen (3) zugeordnet sind jeweils einen Teilkreisdurchmesser gleich 1:N des Teilkreisdurchmessers des
Doppelring-Kegelzahnrades (8) haben, wobei \( N \) die Gesamtzahl der entlang der Kreisbahn angeordneten Stationen ist.