

IPM International Perforation Management
hi-tech engineering, Germany, Thailand, China
phone/fax: 0049-3212-5375175
<http://www.microperforation.com>
<http://www.microperforation.com.cn>
<http://www.dequodaguan.com/ipm/>
Email: grosse@microperforation.com - perforationpeople@web.de

copyright Mr. Werner Grosse

patent download <http://www.microperforation.com/englishengineerreport.html>
main link <http://www.microperforation.com/ipm-technology.html>

IPM PORTFOLIO [ENGLISH](#)
IPM PORTFOLIO [SPANISH](#)
anti counterfeiting piracy laser treatment solution [MLL-1](#)

High power twin level laser multiplexer with high spins beam splitter for industry applications as well for wide web micro perforation machines.

LPM-1 with tipping, packaging paper, non-woven, spun-bonded, textile, certain plastic films or other materials

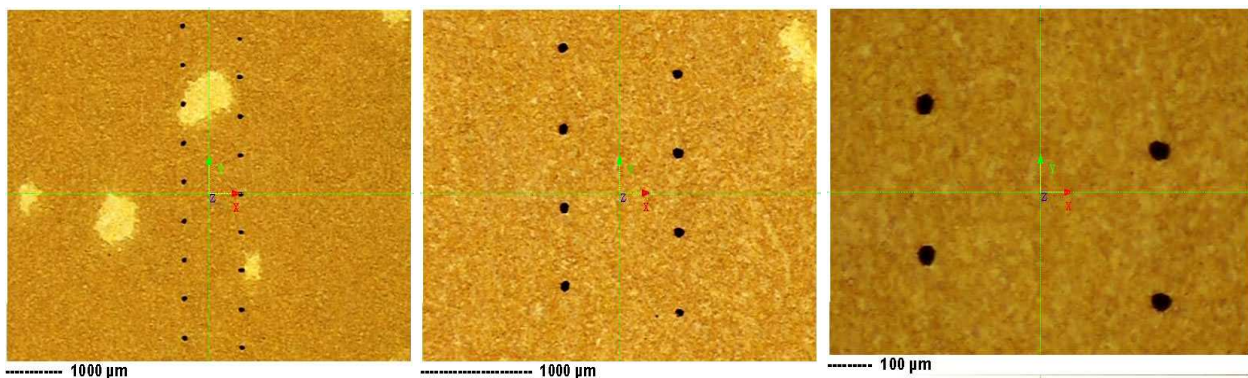
Patent granted DE102004001327 - download [here](#)

Micro laser perforation technology

Laser perforation in general, possible to perforate by pulsed or enlarged focused laser beams are holes sizes from 60-200 microns at density of holes of typically 10-30 holes per cm, holes sequences 100,000-400,000 holes per second at a maximal of 16 punctured rows by laser distributed over the material web width with traditional systems or machines.

Means in cigarette, tipping, plug wrap, filter, packaging, packs, tear tape, plastic and other material webs. With porosity levels from 100-3,000 C. U., normally in web widths from 100-500 mm at web speeds of up to 600 m/min, depending on porosity and material consistency in relation to its ability to perforate.

Micro laser perforated tipping paper

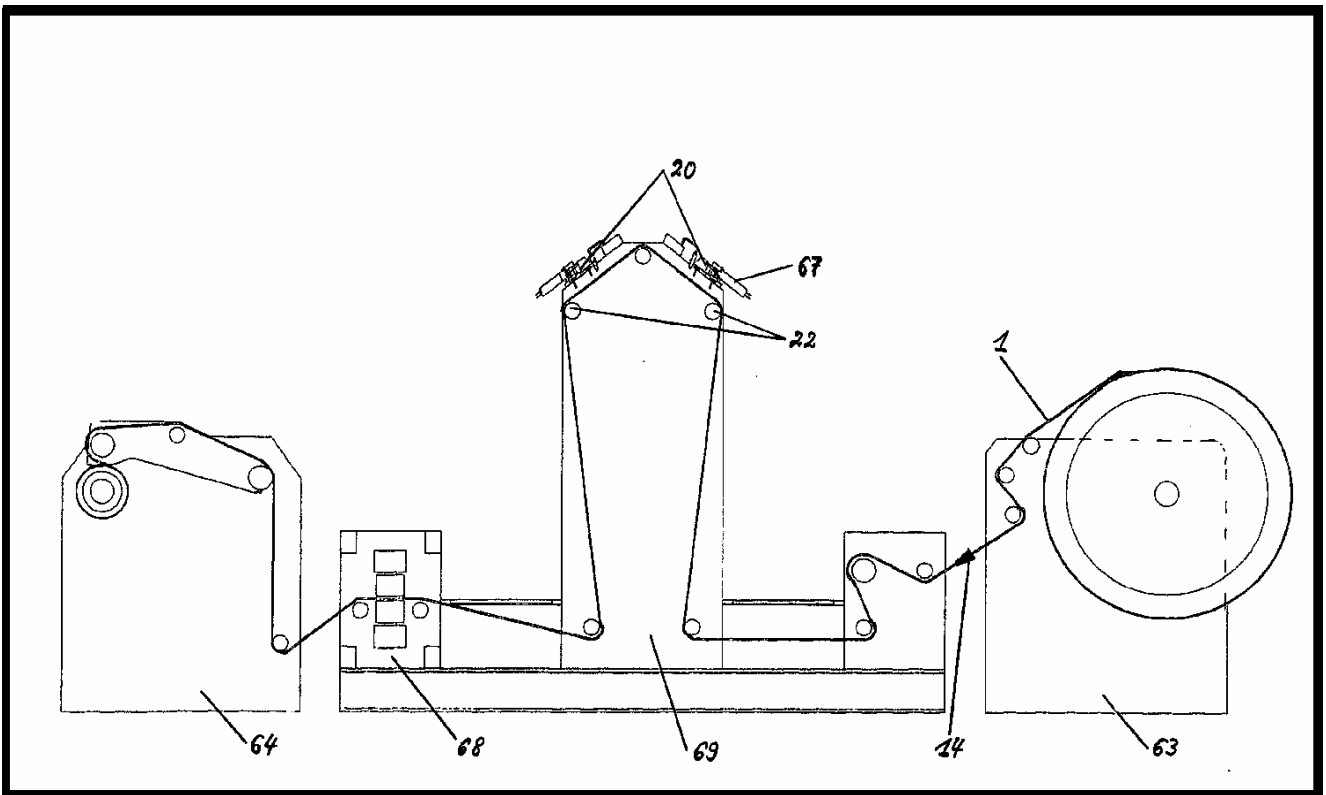
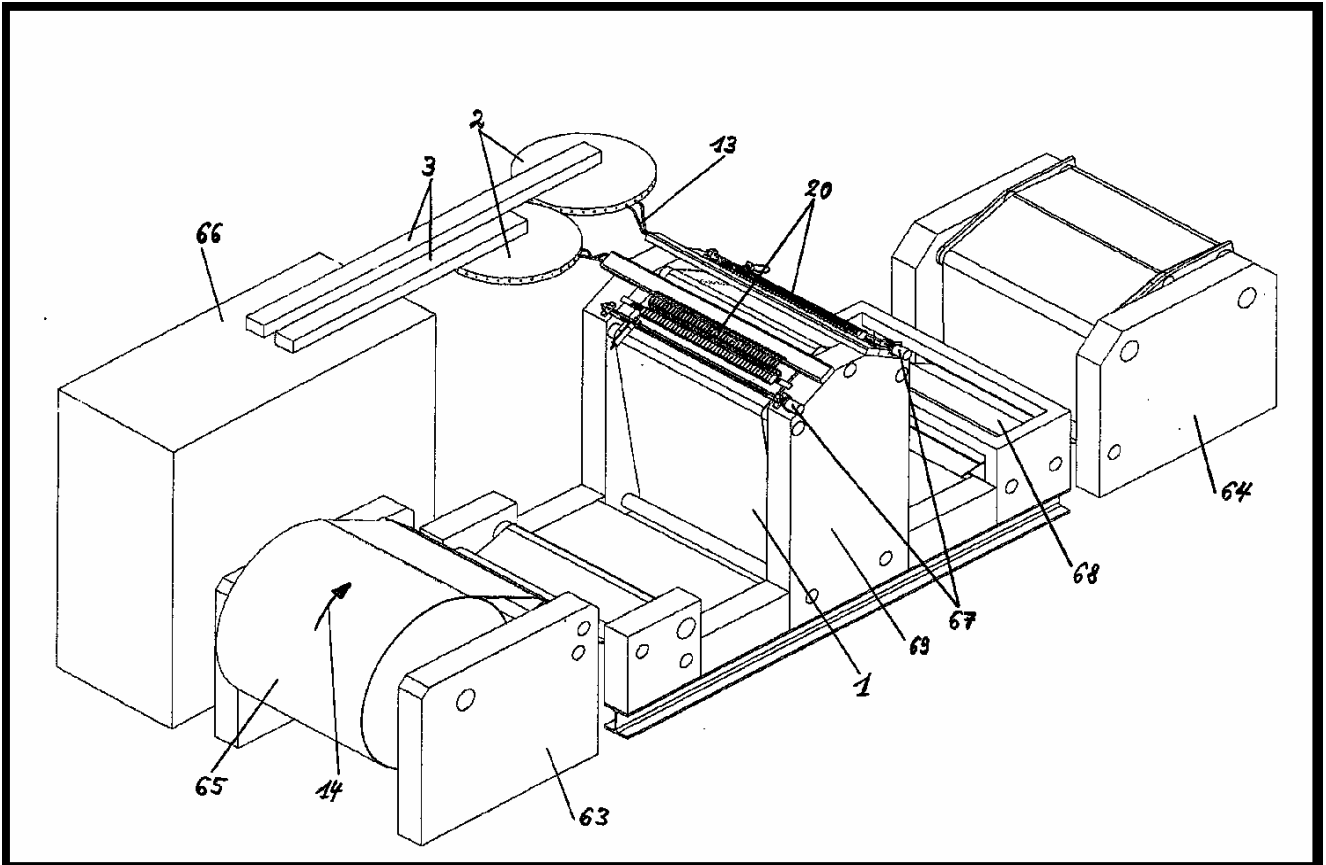


IPM laser cluster material treatment and micro perforation technology

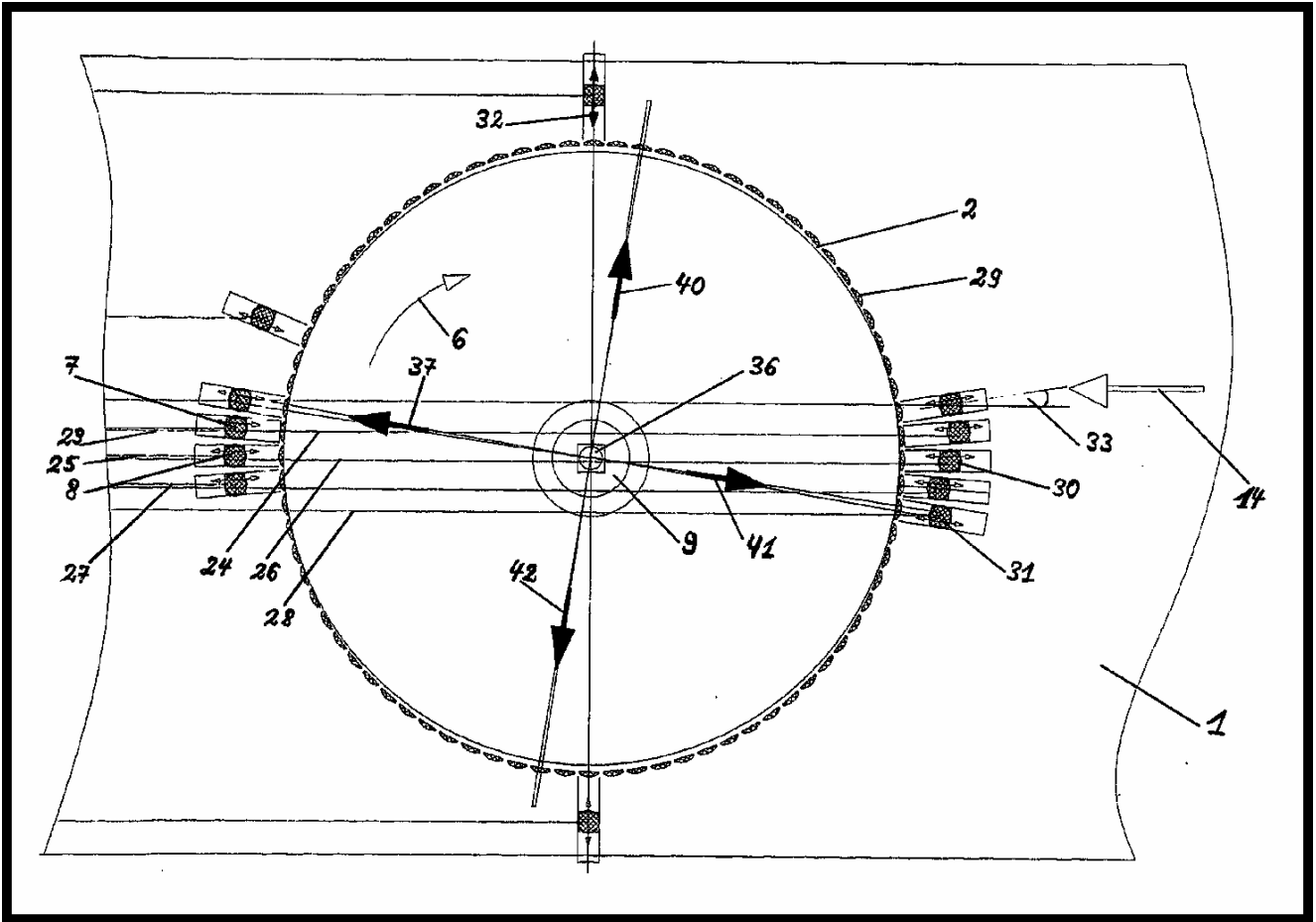
IPM laser cluster material treatment technology LPM-1 is patent granted DE102004001327 and operates with quadruple Co2 carbon or other laser beam inputs up to 4 Kilowatt to a high power twin vacuum level multiplexer to generate up to 200 individual laser output channels, perforation rows across the web material.

Combines automatic positioned laser perforation heads, focus setting, web speeds up to 400 m/min, web widths up to 2,000mm, up to 2,500,000 holes per second, jumbo roll-by-roll production, optical inline permeability as perforation line position control, porosity feedback, hi-tech automation level and other features. Each laser micro perforation lines can archive 100-1,000 C.U.

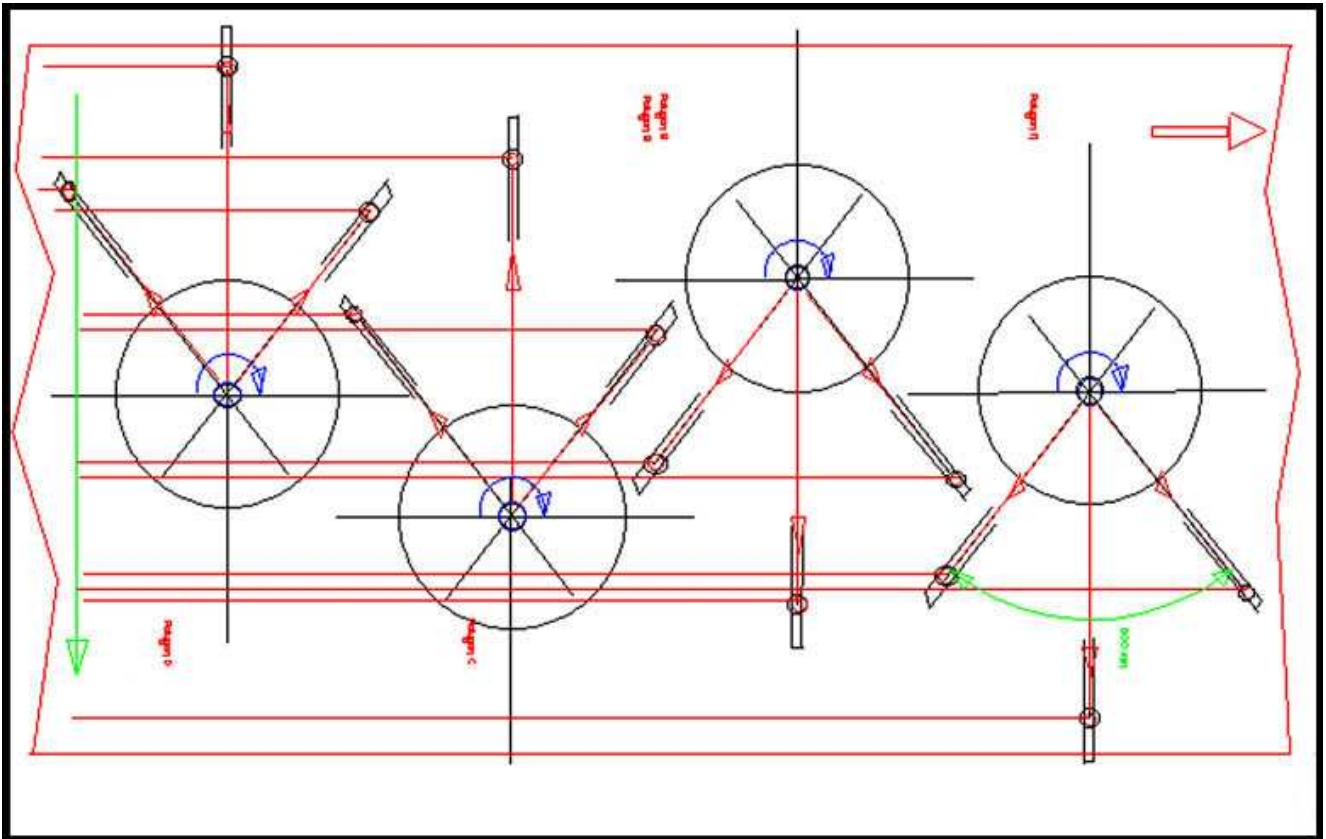
LPM-1 wide web laser perforation machine



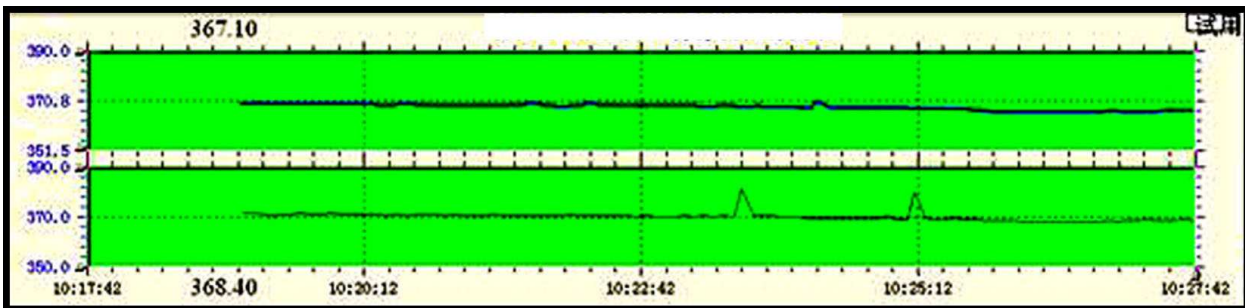
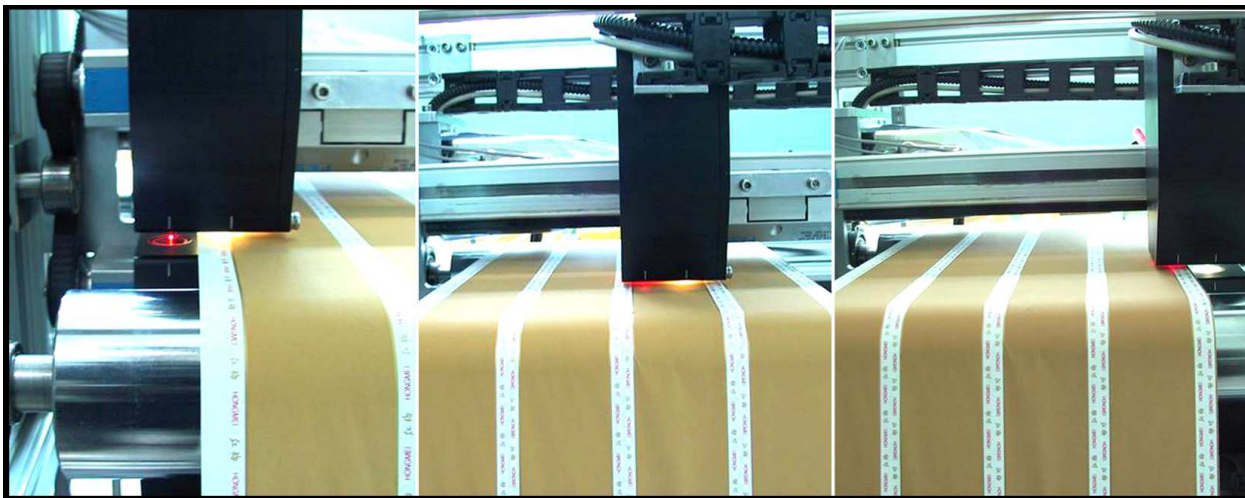
Twin level laser beam vacuum multiplexer up to 200 optical channels, treatment heads



Another option with polygon units e.g. for packaging material webs



OPSS-1 online porosity sensor scanner system



Industry fields

The conception of high power twin level laser beam multiplexer enables hundred options in other industry application fields as cutting, cut-off, welding, surface finishing, high-speed drilling, ablation, cleaning, micromachining, polishing, forming, melting, surface treatment, roughness improvement.

Each of 200 single laser beams is coupled via flexible hollow fibers allows treatment processes or micro perforation heads easy to position in X across and in Y direction of running web or static placed sheet material.

The automatic processes, equipments and devices open now outstanding possibilities in industry, metal, plastic, domestic, tobacco product, medical, hygienic, wall covering, security cards, bank notes or food application. LPM-1 means cluster material treatment at wide web, large area, surface or whole material treatment, high power dual rotation laser beam splitter, twin multiplexer level, CO₂, YAG, EXCIMER, DIODE, SOLID STATE laser with multiple optical inputs, flexible hollow waveguide fiber, HCW, HWG and up to 200 output channels.

Material treatment with robot handling for stainless steel, ceramic, aluminum, wafer, glass, ceramic, brass, copper, wafer, silicon, plastic sheets, titanium, jewelry, silicon, solar, panel, photovoltaic, micromachining, slitting, rewinding, refining, hybrid laser cutting machines or stand along systems.

IPM – online laser perforation - patent granted with high speed laser beam multiplexer DE102004001327

A - laser source and IPM patent grant multiplexer with 8 optical channels

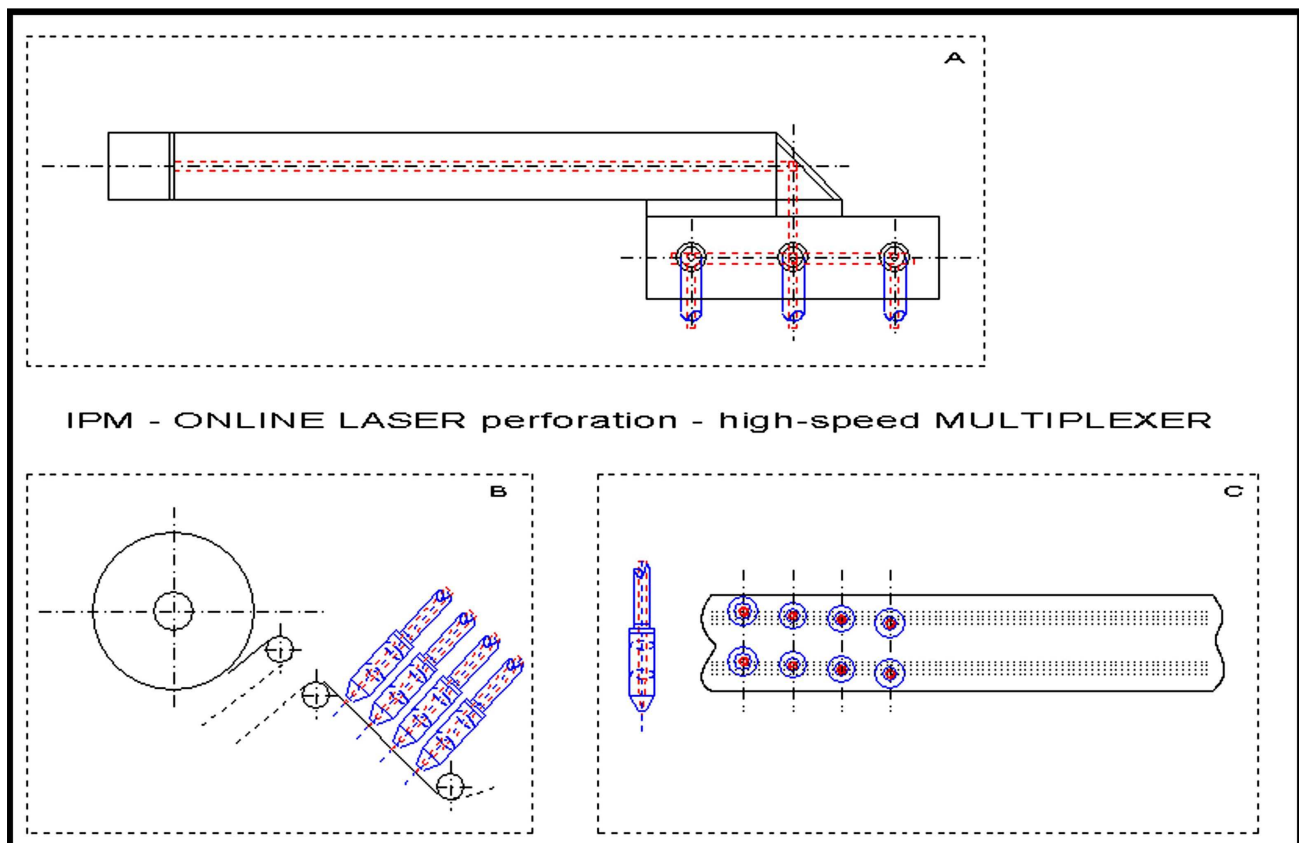
- 10.6 micron wavelength, Co2, sealed off laser, $M2 < 0.9$
- e.g. Coherent, Synrad, PRC, 400 Watt, by 8 laser lines
- 10.6 micron wavelength, Co2 sealed off laser, $M2 < 0.9$
- e.g. Coherent, Synrad, PRC, 250 Watt, by 4 laser lines
- laser source dimensions all over approx: 1,130*260*260 mm, air convection
- output 45 grad divert mirror
- octagonal super high speed rotate laser beam splitter up to 900 rpm/sec.
- IPM laser beam multiplexer
- diameter approx. 400mm, high approx. 200mm
- 8 optical output channels, coupled special hollow fiber, HCW, HWG, each in lengths 1,000-3,000 mm

B - bobbin unwind disc unit, perforation heads

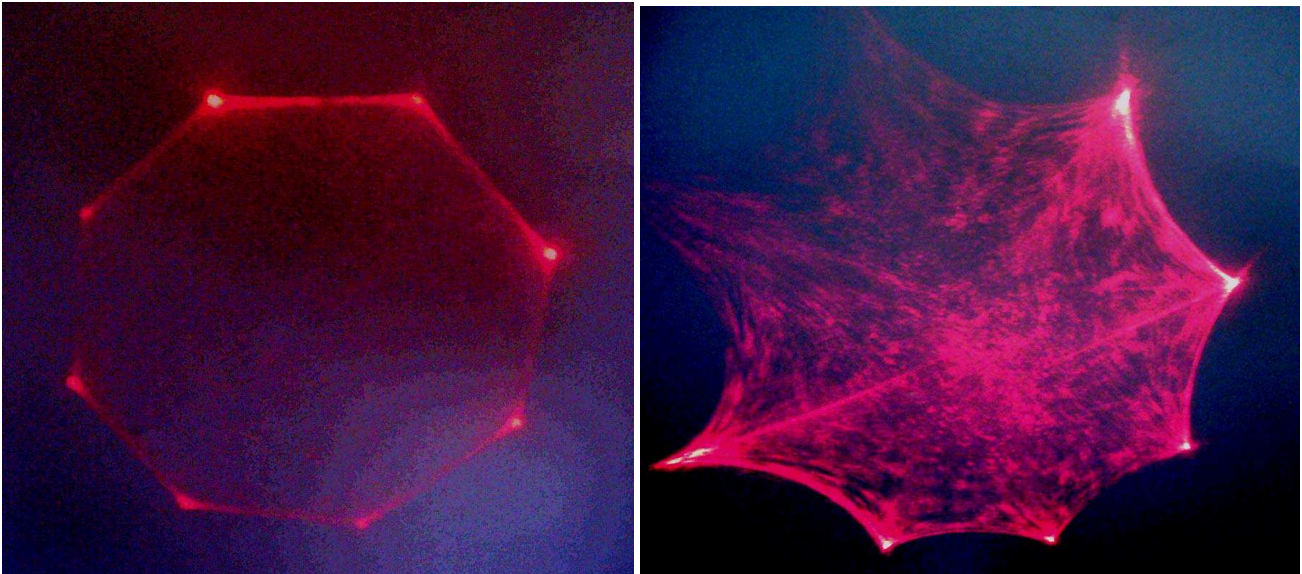
- tipping paper from 48 up 64mm web width
- 8 perforation heads, four at each side
- each laser beam supply with special hollow fibers, HCW, HWG, auto focus devices
- diameter of each focus device around 25mm
- distances in web direction around 50mm
- length of necessary perforation section approx. 200mm by 8 laser lines
- necessary width of perforation section - tipping paper width + 40mm on both sides

C - tipping paper with 8 laser perforation lines

- up to 10,000 cpm or 135 m/min tipping speed
- four laser perforation lines at each side
- total round or oval hole sizes between 60 up to 150 micron diameter
- up to 8 holes/cm, one hole with e.g. 14 C.U.
- $8 \text{ h/cm} * 14 \text{ C.U./h} * 4 * 2 \text{ cm (Coresta)} = \text{in total around } 900 \text{ C.U.}$
- ventilation grad from 10 up to 80% with twin or quad rows
- by $8 \text{ h/cm} * 8 \text{ holes/rows} * 135 \text{ m/min} = 14,440 \text{ holes/s}$ in total



Octagonal high speed spins laser beam splitter with visible spectrum by 650nm for alignment



more information on request and on websites

Anti piracy product design with laser cluster treatment – ultra high speed Co2 laser beam steering

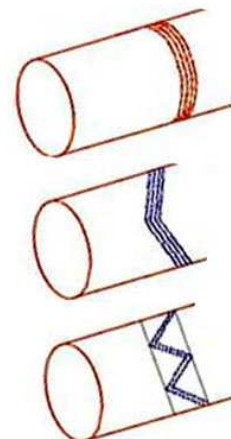
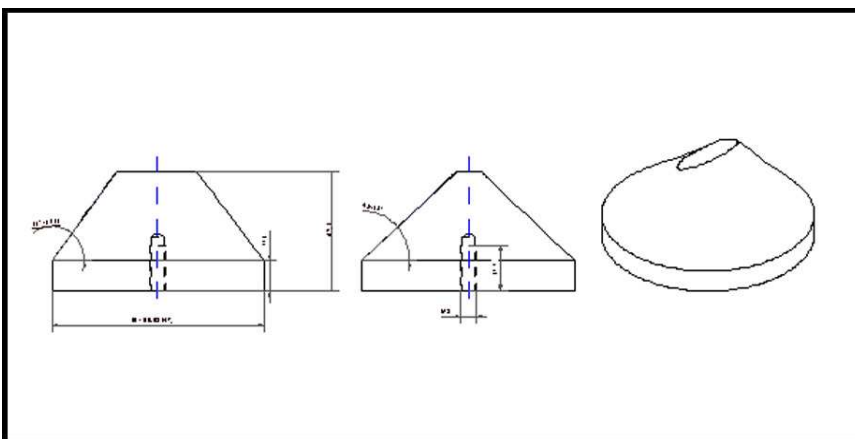
Patent pending DE102004012081 [download](#)

Anti piracy counterfeiting design and cluster system

As known offline laser perforation machines or processes generating straight holes lines in web direction of the running tipping or other material sheets. Excluding spray laser designs which look similar as random holes into certain zone areas as electrostatic perforation. The patent pending DE102004012081 Micro Laser Line technology generating cluster pattern, micro holes, sinus, waves, zigzag, cryptograms, logos, holograms, brand names or other kind of perforation designs in web direction which can look like as a group of micro laser lines. Concerned tipping paper means non coaxial circumference at the cigarette filter.

New beam divert moving, scanning, flipping elements control each single laser perforation lines in across material direction which are precise focused for micro holes in ranges from 50-120 microns. All to uses for laser sources and types as Co2, YAG, EXCIMER, UV, FIBER, SOLID STATE or DIODE.

Super high speed rotated optical divert elements to control laser beams



Technologically as ultra-high scan speeds up to 4,000 Hz or 240,000 rpm with commercial air-bearing motors. REAL galvanometer scanner alternatives, precise laser beam deflection up to 4 Kilowatt Co2 by high dynamic performances. From 8-15mm laser beam aperture diameter, advantage beam quality factor M2 less 0.9 for focus spots down to 60 micron. Absolute diffraction limits, because small focused spot sizes which are proportional inversely of laser beam input diameter.

In other words, larger laser beam apertures will produce smaller focused spot sizes, as especially needed for micro cluster perforation, drilling and other micro machining applications.

Spin actuator with special optical coating, optimized outer shape, very precise rotation balance by inner body laser ablation, hollow body with inner cavities by low mass material condition, excellent relation of stiffness-to-weight, high hardness, adapted total vibration free vacuum cylinder case, asymmetrically rotary reflection cones from 40-80mm base diameter, average mirror surface roughness lower as 0.1 micron, form accuracy lower 0.01 micron, operation sequences are precise synchronize with material speed. Envelope curves of the selected perforation pattern are storage and calculated by PLC control before single holes and holes groups supervised during production processes.

Product process advantages enable total different product indicators and milestones against other laser perforation or material treatment processes which allows significant product property, trademark indications, patent claims, unique company features in micro perforation of tipping, cigarette packaging or other paper or material. E.g. wide range of laser perforation groups as common active ventilation zone to obtain several advances in air stream distributions into cigarette filter, perfect perforation line guiding around cigarette filters or other food, domestic, industry products to assure constant porosity results.

Several pattern or wave line design for different brands, number of holes or pattern with 10 or 20 per cm length are constant, porosity range 100-1,000 C.U., holes sizes 60-120 micron, holes densities from 100,000-500,000 holes per second in total. 1-6 perforation pattern, lines, marks or scripts can combines a group, perforation hole, pattern quality or porosity remains in standard levels.

Other web material, substrate or products are treatable in similar processes, existent laser perforation, treatment machines are able to modify with new optical, micro mechanical and control elements. Low investment and finance budget of technical modifications because exchanges of certain elements, complete devices are adaptable on existent off-line perforation machines or other laser treatment handling systems. Capability to adapt beam divert devices or units at online perforation system at cigarette making machines up 12,000cpm.

Outstanding product applications

For web or sheet material, metal, isolation, foil, film, plastic, substrate, leather, textile and paper enables now large number of possibilities for micro hole position, different pattern, design, wave, zigzag, cryptograms, scripts, marking, scribing, scratching, tear off lines or others which generates. E.g. optimize air distribution characteristics into cigarette filters, unique anti counterfeit piracy indication and not countable product advantages.

Special remark creates fundamentally new product properties, e.g. as final products for mouthpieces with tipping paper at cigarette or other tobacco, packaging, security products, flip-off or hinge-lid packs.

Specific indication of brand names to recognizable for everyone and even for product buyers, if micro design, holes, patterns, holograms are to see with magnified views only. Or sensitive touch able as Braille scripts generated by micro cluster cryptograms or holograms.

MLL-1 targets a large area of existent and new applications with high speed scans of laser beam mirror or optical element diverts, by horizontal or vertical position.

Sophisticated ultra high speed spins optical divert elements allows low budget modifications at existent systems and production machines.

Micro-Laser-Line technology means real alternative for high speed galvanometer scanner to archive micro cluster perforation, pattern design, waves, zigzag, packages line, cryptogram, company logo, hologram, anti counterfeit piracy contours for security paper, safety, bank notes, cards, metal sticker, printing, laminating, coating, fruit, food, bread, vegetable, agriculture covering, transparent films, plastic sheets, holographic paper, cigarette, tipping, filter, aluminum foil, shrinkable film, tear tapes, label, cardboard, matrix, marking, scribing, automotive, pharmacy, smoking, chemical or medical products, electronics part, chips, indicators, writing contours or profiles, embossing or holographic.

The patent of devise, process and product properties are pending as DE102004012081.

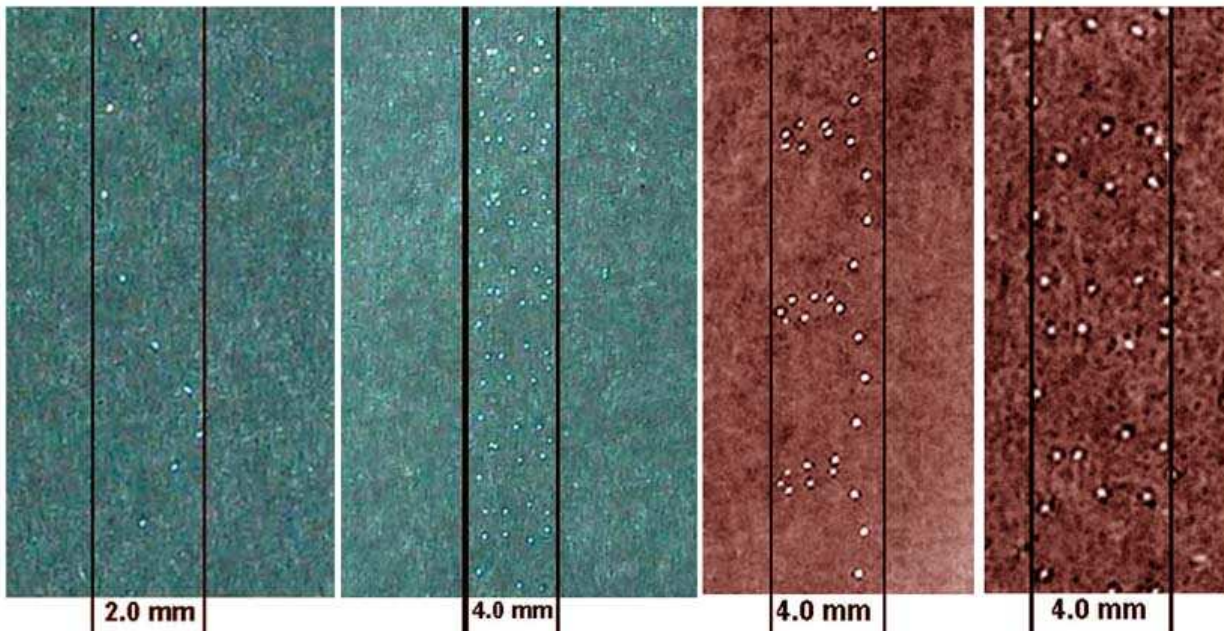
Other industry fields

The conception of high power twin level laser beam multiplexer enables hundred other application fields for cutting, cut-off, welding, surface finishing, drilling, ablation, cleaning, micromachining, polishing, forming, melting, surface treatment, roughness improvement. Each of 200 single laser beam and coupled flexible hollow fiber HWG HCW up to 3,000mm length obtains treatment processes or perforation heads for precise, compact, robotic positioning in X/Y direction of running web or static placed sheet material.

Automatic PLC controlled processes, equipments and devices enables now outstanding possibilities in industry, metal, plastic, domestic, tobacco product, medical, hygienic, wall covering, security cards, bank notes or food application.

LPM-1 means cluster material treatment at wide web, large area, surface or whole material treatment, high power twin or quad rotation laser beam splitter, mirror into a vacuum twin level multiplexer, Co2, YAG, Fiber, Excimer, UV laser with multiple optical inputs, flexible hollow fibers, HCW, HWG up to 200 output channels. Material treatment and robotic handling for stainless steel, ceramic, aluminum, wafer, glass, ceramic, brass, copper, wafer, silicon, plastic sheets, titanium, jewelry, silicon, solar, panel, photovoltaic, micromachining, slitting, rewinding, refining, hybrid laser cutting machines or stand along systems.

MLL-1 micro laser perforation example at packaging material



more information on request and our websites

Production Technologies

Perforation

Web material as regenerated cellulose films, filter, cigarette, tipping, roll-your-own RYO make-your-own MYO, wall, decoration, transparent, coated, laminate, bag or packaging paper, bonded fabrics, spun bonded non-woven, food, medical, under roof house or agriculture vegetable covering, packs, technical textiles, fabrics, laminate with base weights from 20-180g/m², thicknesses from 10-80 microns, up to 20 g/m² LPDE coating are perforate electro statically micro, or by laser with micro holes for wide range of application purposes.

Technology

Electrostatic micro cluster perforation or material treatment, based at micro discharging and sparking, by Bluemlein and Plasma Tunnel effects with gas atomic ionization in Nanosecond time windows. The pores are normally statistical irregularly distributed up to 80 microns and analogically, under laser micro perforation, arranged in sizes from 60-200 microns, at best non-inclined holes und hole rows of diverse arrangement comprehension. For the naked human eye invisible electrostatic micro perforations may be arranged in areas or zone bands with specific distances within its web.

Controlled pores from 0.050-80 micron diameters by sequences up to 16 million pores per second, 0.1-4.0 mJ discharge energy for each pore. Process and power electronics patent granted with DE10328937.

Performance

Arrangements of zones are usually carried out in width from 2-6 mm and pores density of 15-250 pores per square cm whereas the perforation of areas results in pore densities of up to 5 million pores per m² in surface-all-over design. Electrostatic perforations allow porosity levels from 80-2,500 Coresta Units (ml/min/2cm², 1,000 Pa), equality down to 3 Gurley material web widths from 100-2,000mm at web speeds up to 600m/min, depending on porosity and material consistency in relation to its ability to perforate.

Physical properties

One of the foremost postulation which can be applied to many application purposes and products containing bonded fabrics, bag or packaging papers, non-woven and others with gas or steam permeability but water impermeability will be found at the application stage of the electrostatic micro cluster perforation.

Which means pore size 0.050-80 microns by up to 5 million per square meter.

This is due to the water's greater surface tension as hydrophobic property which hampers the permeation through the relatively small micro pores, instead hydrophilic impacts. These and other physical advantages of relatively small pores but high-density range necessarily demand the application of micro cluster perforation method because alternative perforation, web treatment processes as plasma jet, corona, flam, micro needle or laser perforation are not feasible, large pore sizes, low pore density, very expensive or simply uneconomical would not allows successful product application.

Products, applications, advantages with electrostatic micro cluster ventilation, perforation

- breathable, micro ventilated mass products, cigarette, tipping, filter, packaging, plug-wrap, refinish, fine paper
- booklet, bible, printing, magazine, promotion, flyers or newspaper with improved surface property
- decoration or gift paper with thin coating films
- PVC laminate, Vinyl, decoration or wall paper to eliminate one side condensation effects
- enable control gas exchanges, avoid rises of mildew or rottenness
- joints, corner, taps, Kraft paper strips to avoid glue bubbles with enable material diffusion
- fleece bonding material with thin plastic film layers for outdoor, under roof protection, covering, wooden houses which enables gas exchanges
- technical textiles for gas exchanges to avoid condensation processes
- sophisticated hydrophilic but hydrophobic product properties by certain purpose condition
- breathable overalls, heavy duty or disposable work dresses, trousers, aprons, thin PE fleece material
- thin PP or PE contacted Kraft paper bag, multi wall, layers, plies cement sacks, plaster, maize, grain, pet food, granulate or powder for gained air outlet or blowing during filling processes with multiple time reduce efficiency
- keep packed products in the same barrier condition as without micro perforation
- extending storage, live time or durability of certain goods and products
- biotopes and prevention of water pollution
- real or imitate leather, cloth inlets for comfortable non sweat wearing, high humidity, tropical condition
- soap, deodorant, hygiene, beauty creams, baby care or other packaging products which needs smell suggestion for marketing indication and buying advantages
- vegetable, flowers or food with paper packaging replacements for gas exchanges
- bread, rolls, fruits or food to improve the freshness and aroma
- high breathable biodegradable packaging material, environment friendly,
- high-holes-density multilayer foils for industry, medical, bioengineering, filtration purposes
- surface modification or improve roughness
- micro filter, membranes, battery separation layers, bio or lab analytic, alcohol, liquid or blood filtration
- clean room, agriculture plant applications to reduce or gain growth rates of bio processes

Process integration

It is also used especially for additionally treating materials when aiming special characteristics by physical or regular process reasons what cannot be achieved by other process technologies. Moving material web base weights from 20-180 grams per square meters by thicknesses 10-80 microns are possible to use. Including defect inspection, process automation, moisture vapor transmission rate, abrasion resistance of lamination, water proof, ventilated or breathable fabrics.

IPM state-of-the-art industrially approved, sophisticated, compact, multi functional, in-line sensor scanner systems together with electrostatic laser perforation technology operates precise and reliable 24/7, are integrate able into existing rewinding, slitting, spooling, spreading, printing, labeling, complex production manufacturing lines or other machines and production processes.

Also, they can be used as completely independent micro surface-all-over or zone perforation unit.

Full new ranges of applications will be made available total new products with special features and properties.

Laser micro perforation

Laser perforation in general, possible to perforate by pulse or enlarge, focus laser beams are holes sizes 60-200 micron at density of holes of typical 10-30 holes per cm, sequences by 100,000-400,000 holes per second at a maximal of 16 punctured laser rows cross web with traditional systems or machines.

Means for cigarette, tipping, plug-wrap, filter, laminate, printing, flexible packaging or other material webs. By porosity levels of 100-3,000 C.U. normally in web widths 100-1,000mm, by web speeds up to 600m/min, depending on porosity and material consistency in relation to its ability to perforate.

IPM micro laser cluster perforation

IPM laser cluster treatment perforation technology LPM-1, patent granted as DE102004001327, operates with two Co2 or other laser sources inputs, up to 4 Kilowatt twin level vacuum beam multiplexer to generate up to 200 individual laser output channels, perforation or treatment heads cross web or sheet material. Combines automatic head positioning, auto focus setting, speeds up to 400m/min, flexible web width up to 2,000mm by up to 2,500,000 holes/sec.

Jumbo roll-by-roll production, online sensor scanner permeability, porosity, perforation line measurement, trend feed-back, high automation, PLC process visualization and other features. Each laser micro perforation lines can achieves 100-1,000 C.U.

Other industry fields

The conception of high power, twin level, vacuum, high spins laser beam splitter into the multiplexer enables many other options of industry fields as cutting, cut-off, welding, surface finishing, drilling, ablation, cleaning, micromachining, polishing, forming, melting, surface treatment, roughness improvement.

Each up to 200 laser perforation or treatment head are connect via hollow waveguide fibers HWG HCW for flexible laser beam leading cross webs or static sheet material.

To position easy fast in X-cross and Y-down web direction or exact location at static placed sheet material.

That full flexible automatic process with optical devices opening outstanding possibilities in industry, metal, plastic, domestic, tobacco product, medical, hygienic, wall covering, security cards, bank notes or food application. LPM-1 means cluster treatment at wide web, surface-all-over, line, zone or others materials.

Anti piracy, counterfeiting laser product design

As known offline laser perforation machines and processes are generating strait holes line in web direction at running tipping paper or other material sheets. Excluding spray laser designs which looks similar as random holes into certain zone areas as electrostatic perforation.

The patent pending DE102004012081 Micro Laser Line technology generates cluster pattern, micro holes, sinus, waves, zigzag, cryptograms, logos, perforation scripts, holograms, brand names or other kind of micro perforation designs in web direction which can look likes a group of micro laser lines.

Concerned tipping paper means non coaxial circumference at the cigarette filter. High speed spins laser beam divert, steering, mirror scanning, flipping element controls each single laser beam and perforation line cross material which are precise focus for micro holes in ranges from 50-120 micron. Co2 or other laser sources are to use.

Power switching converters

IPM developed a dual high power, high voltage, medium frequency switching converter which works with hybrid drives, full in order of EMI, EMV, NEC, CE restrictions, compact semiconductor power electronics stages, supporting capacitors and ferrite transformers generating ultra short high voltage pulses and sparking bursts. Advantages are based on uses of standard circuits with extended semiconductors for cluster, corona substrate treatment, ac/ac, ac/dc, converter, drives, frequency, upward, downward converter, power electronics supplies. Industry applications for electrostatic micro cluster perforation, converting, drives, others with IGBT, MOSFET, HVFET power stages. In high-power, high-current, high-voltage circuits to obtain micro perforation, surface treatment, modifications, corona treatment, drives or other switching applications by frequencies up to 250 KHz, Uce up to 1,400 Volt, power levels up to 50 Kilowatt.

Higher power efficiencies by low switching losses are further advantages. Precise pulse timing by certain time window with constant or variable frequencies generating high-voltage sparks and holes sequences into fast moving flexible materials. Repeat frequency of entire circuit can up to double switching frequency of each semiconductor. The patent is granted as DE10328937.

Online porosity sensor scanner measurement

Patent pending DE10251610, patent granted in China 200310104764 for stationary or sensor scanner measuring at flexible webs or other material sheets to detect very precise, reproduce their specified product properties while production.

OPSS-1 OPRL-1 sensor control systems are equipped with multiple monolithic color sensors, precision line lasers, CCD image devices and internal ATMEL controller, firmware, high-speed data link, scanning speeds 20-500mm per second, flexible material web widths up to 5,000mm, measuring gaps 2.0-5.0mm.

Online detection of permeability, porosity, spectral transmission, opacity, extinction, particle absorption, porosities 80-5,000 C.U. respective from 50 down to 3 Gurley, speeds up to 600 m/min, position control of perforation lines with 0.1mm accuracy, 0.1-200 microns pore diameter by up to 300 pores per cm². Real time data determining of certain parameters, optical transmission, spectral grades, porosity integrals, envelope curves, internal calculated measuring values. Thus direct with close-loops and feedback to power electronics of fabric treatment units. Micro perforation or other system makes it possible to compensate small changes in web treatment parameters and their partial locations. That each jumbo roll as well single, twin or quad bobbin sets can be quality controlled without intermediate stops in order of ISO 9001/9002 demands.

IPM - Products - Services

Electrostatic micro cluster ventilation, perforation machine PS-1000-2, PS-1200-3, PS-1600-2, PS-2000-1 for cigarette, tipping, filter, packaging, plug-wrap, fine, Kraft, cement sack, bag other paper, agriculture or food products with base weights from 30-160g/m², web width 50-2,000mm, porosities from 80-2,500 C.U., or alternative from 50 down to 3 Gurley, hole sizes from 10-100 microns, hole densities from 120-260 holes per cm², zone widths from 2.0-6.0mm, surface-all-over perforation up to 2.5 Million holes/m², up to 16,000,000 holes per second by web speeds up to 500m/min. Up to 60 perforation channels or 30 bobbin sets, jumbo roll-by-roll production up 25,000 meters, automation control, OPSS-1 porosity sensor scanner measurement, PCB unit feedback, PLC process visualization. Annual production output up to 4,000 tons of tipping paper by 220 C.U. with triple perforation sections. Patent granted DE10328937.

Twin bobbin laser perforator L-400 in cooperation with laser system manufactures in China, tipping paper weight 32-38 g/m², up to 8 laser lines, porosities from 100-1,500 C.U., holes sizes 80-150 microns, densities 10-20 h/cm, up to 150,000 holes per second, speeds up to 300 m/min, annual production output up to 30,000 bobbins by 300 C.U.

Quad bobbin electrostatic mirco perforation machine PS-250-4 up to 4,500 meters bobbin tipping paper length, slim rolls up to 25,000 meters at unwind section, roll-by-roll production with 16/24 bobbins non stop, with/without integrated slitting, flying-splice unit for simultaneously quad bobbin set production, OPSS-1 online porosity sensor scanner measuring with close-loop, quality/quantity controls of each perforation zone, porosity range 80-800 C.U., deviation CV <3 % by 260 C.U., tipping web width up to 300mm, speeds up to 600m/min, hole density 120-260 h/cm², zone 2.0-6.0 mm width, holes 10-70 microns, up to 7,000,000 h/sec., annual output up to 120,000 bobbins by 300 C.U. High automation level, patent granted DE10328937.

Online porosity sensor control OPSS-1-A/B, OPRL-1-A/B for electrostatic or laser perforation machines, porosity 80-5,000 C.U., speeds up to 600 m/min, web width up to 2,000mm, feedback of each perforation zone, porosity with multi colour sensor, zone and line position control, accuracy of 0.1mm with precise laser line unit, sensor controller firmware, RS-232 serial link up to 230,400 Bit/s, RS-485, Ethernet, USB, industry PC, C++, process visualization, quantity, quality, statistics, link to PCC/QCC. Patent pending DE10251610, China patent granted 200310104764.

IPM business

Technology expertise, consulting, support, improvement, modification, overhauling, high tech engineering. Sales, manufacturing, installation, commissioning, project management, service. For tailor-made, turn-key electrostatic or laser micro cluster perforation, high-holes-density ventilation machines, online porosity sensor scanner systems for entire production lines world wide.

[Press releases and technical reports are published at websites.](#)

Cooperation with Chinese partners

MLL-1 laser line cluster perforation, ventilation, anti piracy design for tobacco or other mass products, enables advance smoking air streams into cigarette filters by further product advantages, high speed rotation of un symmetrically mirrors, cones for laser beam steering, up to 240,000 rpm, holes sizes from 60-150 microns, densities 10-30 h/cm, porosities from 100-1,500 C.U. by up to 300,000 holes per second. The MLL-1 micro-laser-line perforation and material treatment enables large numbers of capabilities for hole or treatment positioning with different pattern, design, waves, zigzag, cryptograms, scripts, lines for unique anti counterfeiting indication and others.

Special remark of MLL-1 creates fundamentally new product properties, e.g. final products for mouthpieces with tipping paper at cigarette filter or other tobacco, cigarette packs, packaging or security products.
Specific indication of brand names which are recognizable for everyone and product buyer, if the micro holes or pattern are to see with magnified glasses only.
Or touch able as Braille scripts as micro cluster cryptograms. Patent pending DE102004012081.

LPM-1 wide web laser micro perforation machine, sheet material treatment particular for paper products as cigarette, tipping, filter, packaging other mass material production, up to 200 laser perforation or treatment heads cross web or sheet material, automatic head positioning, focus setting, dual 4 Kilowatt Co2 others laser source inputs, beam factor $M2 < 0.9$, twin level multiplexer, flexible hollow fibers, web widths up to 1,200 mm, speeds up to 400 m/min, 25,000 metres jumbo roll-by-roll, fully automatic production, PLC process visualization. Integrated OPSS-1 porosity sensor scanner control, perforation holes from 60-150 microns diameter, densities 10-30 h/cm, porosities from 100-1,000 C.U., up to 2,500,000 holes per second, annual production output up 1,800 tons by 400 C.U. Patent granted DE102004001327.

OESP-1, OLP-1 ventilation for mass products at cigarette makers or packers development with a Chinese firm consortium, uses of IPM mini laser multiplexer and hollow fibers up to 3,000 mm length, see above patent, designed for 4 or 8 laser perforation lines, sealed-off laser source 400 Watt, 48-64 mm bobbin width, precise perforation round or oval holes from 60-150 microns, porosities from 100 up to 900 C.U., cigarette ventilation levels from 10-80% by twin or quad lines at each bobbin strip side, up to 14,440 holes/s in total, up to 12,000 cpm or speeds up to 150 m/min.

Press release example

Flexo & Gravure Asia 1-2008 http://www.flexo.de/download/fqa/1-2008/Inhalt_FGA_1_2008.pdf

On requests - more details about projects references in tobacco and packaging industry.

patent download <http://www.microperforation.com/englishengineerreport.html>

main link <http://www.microperforation.com/ipm-technology.html>

Patent references

<http://www.wikipatents.com/gb/2149092.html>

<http://www.wikipatents.com/de/3332886.html>

<http://www.wikipatents.com/de/2918283.html>

<http://www.freepatentsonline.com/EP0460369.html>

<http://www.freepatentsonline.com/7224447.html>

<http://v3.espacenet.com/publicationDetails/biblio?CC=EP&NR=0460369&KC=&FT=E>

<http://www.inpama.com/index.php?content=invention&id=18>

<http://www.inpama.com/index.php?content=invention&id=19>

<http://www.inpama.com/index.php?content=invention&id=20>

<http://www.inpama.com/index.php?content=invention&id=21>

<http://www.inpama.com/index.php?content=invention&id=22>

<http://www.inpama.com/index.php?content=invention&id=23>

<http://www.inpama.com/index.php?content=invention&id=24>

<https://www.patent-net.de/index.php?content=projekt&id=163>

<https://www.patent-net.de/index.php?content=projekt&id=213>

<https://www.patent-net.de/index.php?content=projekt&id=155>

<https://www.patent-net.de/index.php?content=projekt&id=156>

<https://www.patent-net.de/index.php?content=projekt&id=214>

<https://www.patent-net.de/index.php?content=projekt&id=157>

<https://www.patent-net.de/index.php?content=projekt&id=158>

<https://www.patent-net.de/index.php?content=projekt&id=287>

更多信息请联系

IPM International Perforation Management 国际工程管理公司

hi-tech engineering, China, Germany, Thailand

Mr. Werner Grosse 威尔那.克罗瑟先生

传真 phone/fax: 0049-3212-5097465

网址 : <http://www.microperforation.com>

网站 : <http://www.microperforation.com.cn>

网站 : <http://www.dequodaguan.com/ipm/>

Email: grosse@microperforation.com