UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

JJG IP Holdings, LLP
a New Hampshire corporation, and
Green Machine Sales LLC,
a New Hampshire corporation,

Plaintiffs,

v.

Machinex Industries, Inc.,
Machinex Technologies Inc., and
Curbside Management, Inc.,

Defendants.

Civil Action No.1:19-cv-437

COMPLAINT WITH JURY DEMAND

Plaintiffs JJG IP Holdings, LLC ("JJG") and Green Machine Sales LLC ("Green Machine") (collectively, "Plaintiffs"), for their Complaint with Jury Demand against the above-named Defendants Machinex Industries, Inc., Machinex Technologies Inc. (collectively, "Machinex"), and Curbside Management, Inc. ("Curbside") (collectively "Defendants"), allege the following:

I. NATURE OF THE ACTION

1. This is an action for patent infringement arising under the Patent Laws of the United States, 35 U.S.C. § 1 *et seq*.

II. THE PARTIES

2. JJG is a corporation organized under the laws of the State of New Hampshire, having a place of business at 5 Gigante Drive, Hampstead, New Hampshire 03841.

3. Green Machine is a limited liability corporation organized under the laws of the State of New Hampshire, having a place of business at 5 Gigante Drive, Hampstead, New Hampshire 03841.

4. Machinex Industries, Inc. is a Canadian corporation with a place of business at 2121 Oliver Street, Plessisville QC, G6L 3G9, Canada.

5. Machinex Technologies Inc. is a corporation organized under the laws of the State of North Carolina, having a place of business at 716 Gallimore Dairy Road, Suite 103, High Point, North Carolina 27265.

6. Curbside is a corporation organized under the laws of the State of North Carolina, having a place of business at 116 N. Woodfin Avenue, Asheville, North Carolina 28804.

III. JURISDICTION AND VENUE

7. This is an action for patent infringement arising under the patent laws of the United States, Title 35 of the United States Code.

8. This Court has subject matter jurisdiction over the asserted claim under 28 U.S.C. §§ 1331 and 1338.

9. Defendants are subject to personal jurisdiction in this judicial district because: (1) they regularly conduct business within and have had systematic and continuous contacts with this judicial district; (2) the activities giving rise to Plaintiffs' claims occurred, at least in part, within this judicial district; and (3) Plaintiffs have been damaged in at least this judicial district by Defendants' tortious conduct.

10. Venue is proper in this judicial district under 28 U.S.C. §§ 1391 and 1400(b) because Defendants reside in and/or have a physical presence in this district, they have offered infringing product for sale in and sold infringing product into this district, and at least a part of the events giving rise to the asserted claim and of the resulting damage occurred in this district.

IV. GENERAL ALLEGATIONS

A. Green Machine and the Green Eye® Optical Sorter

11. Green Machine was founded in 2005 by John Green, an engineer with well over 40 years of experience designing systems for the recycling industry. Mr. Green's goal in founding Green Machine was to create unique designs for recycling system components, including optical sorters, separation systems, and conveyors. Since then, Green Machine has been in the business of manufacturing and selling innovative recycling, waste processing and sorting equipment and systems for a broad range of applications and for use across industries. Its innovative and category leading products and resultant stellar reputation have been built upon, among other things, its distribution and placement of highly trained engineers at its two manufacturing facilities in New Hampshire and New York. Having engineers on-site to oversee manufacture of its products ensures that Green Machine's products are continually improved, held to the highest standards, and pass multiple quality assurance tests. Over time, Green Machine has come to be known as an innovative and respected leader in the recycling industry, with its "Green" brand of components.

12. One of Green Machine's product lines is directed towards automated identification and sorting of recyclable materials collected by waste management companies and the like. While previous attempts at automating sorting of materials collected by such organizations was attempted, even using optical systems, the systems were either entirely unreliable or limited in material selection capabilities and exhibited poor material separation capabilities.

13. Specifically, in 2008, sorting systems used single trace spectral spectroscopy and color sorter imaging and were primarily single- or dual-use sorters focused on separating plastics from mixed material streams. Around this time, Green Machine customers had a need for multi-use sorters that could be used for multiple sorting applications and that were not limited only to the sorting of plastics. Mr. Green worked with Green Machine's Principal Engineer, Peter Mendre, and set out to develop a sorter system that used hyperspectral analysis to effectively and efficiently sort these variable types of recyclables from a material stream comprised of numerous different material types. At that time, the commercially available vision systems lacked the speed, flexibility and sort quality to be a precise recycling solution for customers.

14. In developing Green Machine's optical sorter, Messrs. Green and Mendre identified that then existing optical sorting systems used single dimension spectroscopy, i.e., capturing only typical bands of the electromagnetic spectrum, like infrared, red, green, and blue. Messrs. Green and Mendre began experimenting with the use of multi-dimensional hyperspectral imaging, involving the collection of the discrete narrow spectra

at every pixel in an image on a multi-dimensional spectral plane, collecting spectra tied to specific locations of each pixel. At the time of this experimentation, hyperspectral imaging was not part of the state of the art in optical recycling systems.

15. Messrs. Green and Mendre found that by looking at many narrow spectral bands, such as ultraviolet or infrared spectra, the devised method could analyze materials much faster and more accurately than existing traditional spectral systems. In addition, Messrs. Green and Mendre found that not all spectral bands were relevant to recyclable material. By taking advantage of this fact, they were able to limit relevant data to be collected and focus on very narrow and group specific wavelengths of information in their sorting process. These developments reduced information processing computations, eliminating unnecessary data that had resulted in increased levels of uncertainty in material classification algorithms.

16. Shortly after Green Machine introduced its new and improved optical sorter and system, with the sorter called the Green Eye® Optical Sorter, a large demand for the product began to emerge in the recycling industry. That demand was due to the fact that customers finally had a solution that provided versatile, reliable and efficient sorting of a host of materials from typical mixed material streams.

17. In particular, the Green Eye® Optical Sorter included hyperspectral imaging technology that was ground breaking in its ability to sort previously unsortable materials. For instance, black plastics, which are important to auto scrap and industrial recyclers, could now be sorted. Chlorine-based plastics, such as PVC and vinyl, could also now be

identified and removed from the waste stream prior to their disposal at waste energy plants, extending the life of the plants' burn chambers and thereby raising the value of the feed stock. Yet another example of enhanced sorting facilitated by this new technology was the ability to identify arsenic-laden pressure treated wood, which could now be differentiated from natural wood and removed prior to power generation. Sorting all recyclable paper grades was also facilitated by the newly invented hyperspectral technologies. All this sorting is accomplished at clean pick rates of up to 99%, meaning the target materials being separated from the material stream contain up to 99% of the target material, enabling acceptance of the collected materials by ever more particular export market participants.

18. Since the introduction of the Green Eye® Optical Sorter, Green Machine has sold many systems that include the Sorter for a multitude of uses, resulting in sales totaling in the tens of millions of dollars. The Green Eye® Optical Sorter's success is directly attributable to its efficiency, speed, and accuracy over products offered by more established companies. Unit sales are usually in the dozens, as the Sorters are large and expensive, as reflected in the photograph of the side of a Green Eye® Optical Sorter:

19. The success of Green Machine's Green Eye® Optical Sorter is also attributable to its multi-application use in a variety of markets and industries, including: 1) municipal solid waste recycling; 2) plastics recovery from various material streams; 3) single stream recycling; 4) construction and demolition waste recycling; 5) mixed scrap metal stream recycling; 6) commercial dry waste recycling; 7) fiber sorting; 8) textile recycling; 9) waste to energy systems; and 10) food and agricultural sorting systems.

20. It is thus of little surprise to Plaintiffs that, subsequent to Green Machine's successful development of its Green Eye® Optical Sorter, Green Machine's competitors have recently adopted the hyperspectral imaging technologies invented by Messrs. Green and Mendre into their own sorting systems.

B. Plaintiffs' Infringed Patent Rights

21. To protect Green Machine's substantial investment in its Green Eye® Optical Sorter technologies, Mr. Green and Mr. Mendre sought and were granted U.S. Patent No. 9,950,346 ("the '346 Patent"), entitled "Method and Apparatus for Sorting Recycled Material," which was duly and legally issued by the United States Patent and Trademark Office ("USPTO") on April 24, 2018 from an application filed on April 23, 2014. The '346 Patent has an earliest priority date of November 18, 2008. (A copy of the '346 Patent is attached as Ex. 1 and is incorporated herein by reference.)

22. Mr. Green obtained the '346 Patent to ensure that competitors would not unfairly copy Green Machine's innovations and incorporate them into a competing product that, due to the copying, could be sold at competitive prices.

23. Messrs. Green and Mendre assigned the '346 Patent to JJG, which at all relevant times has owned and owns all rights, title, and interest in and to the '346 Patent. Green Machine exclusively licenses the '346 Patent from JJG.

24. Representative Figures 1 and 2, along with a key to the components, from the '346 Patent show an embodiment of the disclosed and claimed optical sorting system:

Component No.	Description
1	Conveyor/accelerator belt
2	Air knife
3	Computer system
4	Camera enclosure
5	Array of lights
6	Camera
7	Receiving hood area
8	Blower
9	Collection point

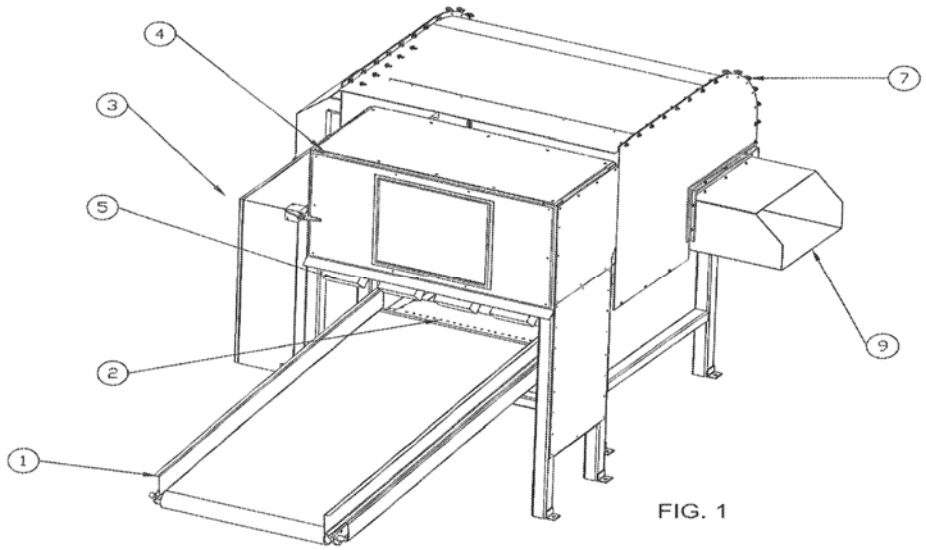

FIG. 1

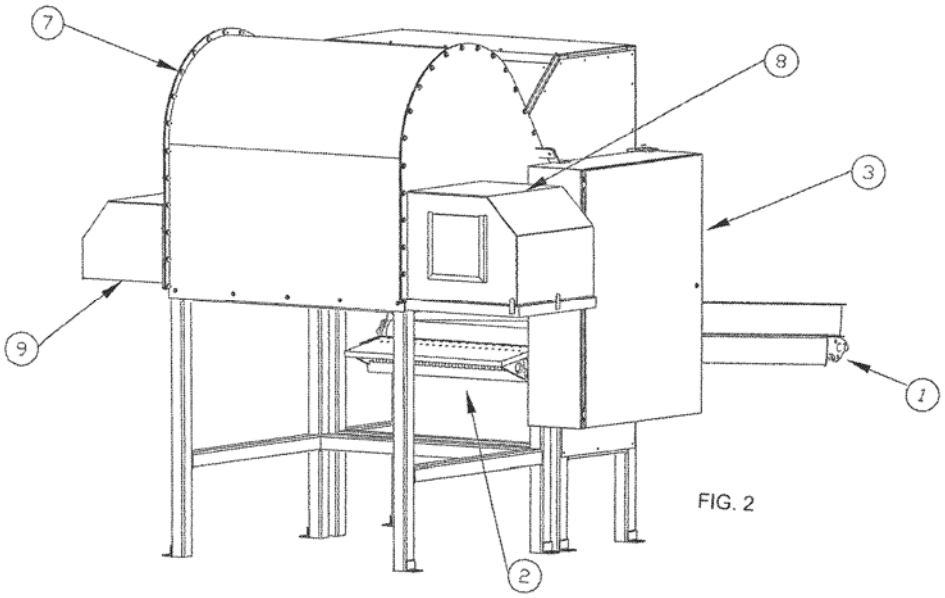

FIG. 2

25. The '346 Patent has two independent claims and sixteen claims overall. Independent claim 1 of the '346 Patent is set forth in its entirety below:

> 1. A system for the identification and sorting of heterogeneous material, the system comprising:
>
> a hyperspectral identification system for capturing spectra of material, said hyperspectral identification system comprises at least one hyperspectral camera said hyperspectral camera configured to receive spectral data from a plurality of selected spectral bands of infrared and visible light corresponding to spectral signatures of target materials to be identified if present in said heterogeneous material and spacial data locating a position of said heterogeneous materials on a solid belt; said camera disposed proximate to a visible or infrared light source, said light source and said at least one hyperspectral camera are disposed on the same side of a stream of said heterogeneous material;
>
> said solid belt having first and second ends, said belt running beneath said hyperspectral identification system and upon which said heterogeneous material is conveyed from said first end to said second end, said belt traveling at a preset rate, said hyperspectral identification system being disposed over said second end of said belt;

a computer configured to receive and analyze data from said hyperspectral identification system, to identify target materials of a first user defined category from among said heterogeneous materials, identify the spatial position of said target materials, and to trigger an ejection system at a preset time delay equal to the distance between said camera and said ejection system divided by the rate of travel of the belt; and

said ejection system disposed immediately after said second end of said belt, whereby said desired materials are separated from said heterogeneous material, said ejection system being triggered by said computer.

26. Independent Claim 14 of the '346 Patent is set forth in its entirety below:

14. A method for sorting heterogeneous material, said method comprising:

reflecting visible or infrared light from the surface of said heterogeneous material disposed on a conveyer from a light source disposed proximate to a hyperspectral imager;

conveying said heterogeneous material at a predetermined rate beneath said hyperspectral imager;

generating hyperspectral images containing both spectral and spatial data of said heterogeneous material by receiving a plurality of selected spectral bands of infrared and visible light corresponding to spectral signatures of target materials to be identified if present in said heterogeneous material as said heterogeneous material passes on said conveyer beneath said hyperspectral imaginer;

comparing said hyperspectral images of said heterogeneous material to hyperspectral images of known materials;

identifying said target materials;

activating an ejection system with a computer, said computer being configured to physically isolate target material with said ejection system from said heterogeneous material by locating said target material within said heterogeneous material and ejecting said target material with said ejection system at a preset time delay equal to a distance between said hyperspectral imager and said ejection system divided by a rate of conveying said heterogeneous material.

27. JJG is also the assignee of one or more continuation patent applications directed to the various technologies disclosed in the original patent application. Those applications will issue in due course and it is anticipated claims thereof will also be relevant to the activities of Machinex.

C. Machinex Copies the Green Eye® Optical Sorter

28. Machinex is a longtime competitor of Green Machine in the area of waste and recycling sorting technologies. At the 2015 Waste Expo, an industry trade show, Machinex introduced its hyperspectral optical sorter. That system infringed Green Machine's Canadian Patent No. 2,688,805. Mr. Green hand delivered a letter to Chris Haan of Machinex, which informed Machinex of its infringement. Later, Mr. Green spoke with Machinex's CEO, Pierre Paré, who assured Mr. Green that Machinex had no prior knowledge of Green Machine's Canadian patent. At that time, Green Machine decided to take no further action as it believed there was no infringement by Machinex in the U.S., but Mr. Green did tell Mr. Paré that U.S. patents were being pursued and the issues would be revisited when those issued.

29. Green Machine recently learned Machinex introduced an optical sorting machine called the MACH Hyperspec into the U.S. market. The system is shown below:

(The product brochure depicting and describing the product is attached hereto as Ex. 2 and is incorporated herein by reference.)

30. Like the Green Eye® Optical Sorter, the MACH Hyperspec also uses hyperspectral optical detection to detect different material types present in a mixed material, material stream, and can also be used in different types of material recovery facilities, such as single-stream, construction and demolition, municipal solid waste and other common industrial sorting applications. Similarly, the MACH Hyperspec touts that its system takes less than 1 millisecond to analyze materials passing under a scanner on a high-speed conveyor belt. (A copy of an article advertising and describing the MACH Hyperspec is attached hereto as Ex. 3 and is incorporated herein by reference.)

31. Upon information and belief, the MACH Hyperspec copies the hyperspectral optical technology developed by Green Machine for the Green Eye® Optical Sorter and the inventive system described in independent Claim 1 in the '346 Patent. Further, use of the MACH Hyperspec copies the method described in independent Claim 14 in the '346 Patent. In short, Machinex has directly and indirectly infringed multiple claims of the '346 Patent.

32. Importantly, Machinex obtained U.S. Patent No. 9,316,596 entitled "Apparatus and Method for Inspecting Matter and Use Thereof For Sorting Recyclable Matter" ("the '596 Patent"). Claim 1 from that patent is shown below:

> 1. An apparatus for inspecting recyclable matter, said apparatus comprising:
>
> a lighting unit for projecting a concentrated diffused lighting onto at least a portion of said recyclable matter to generate a specular reflected light beam representative of the inspected recyclable matter;
>
> an imaging unit mounted according to a given imaging angle with respect to the projected concentrated diffused lighting for imaging at least a portion of the specular reflected light beam to provide spectral data representative of the inspected recyclable matter;
>
> an analyzing unit operatively connected to the imaging unit for analyzing the spectral data and providing recyclable matter characterization databased on the at least a portion of the specular reflected light beam representative of the inspected recyclable matter, and wherein the specular reflected light beam comprises specular rays selected from a group consisting of specular rays of second surface, specular ray of third surface, specular rays of fourth surface and specular rays of a supporting surface supporting said recyclable matter.

33. In short, the '596 Patent is directed to a particularly narrow feature of Machinex's hyperspectral system. Further, it is doubtful Machinex would have even been

granted these patent claims had it bothered to cite to the USPTO, as it had a duty to do, the JJG patents and published applications of which it was made aware in 2015.

34. Also, upon information and belief, in an attempt to take Green Machine's product sales, Machinex is offering the MACH Hyperspec to customers in the U.S. at a similar or lower price than Green Machine can offer the Green Eye® Optical Sorter system. Upon information and belief, Machinex can only offer the MACH Hyperspec for sale at such prices because it copied Green Machine's innovative and patented features, rather than investing in its own research and development to create its own innovative features.

35. In fact, it is believed that Green Machine has already lost sales of its Green Eye® Optical Sorter system to Machinex. Curbside is in the business of collection, processing, and marketing recyclable materials separated from residential, commercial, and industrial mixed material streams collected from various counties in North Carolina. Upon further information and belief, Curbside processes these materials at its Material Recovery Facility, located at 116 North Woodfin Avenue, Asheville, North Carolina, where it processes and ships in excess of 1,000 tons of material of month. It is further believed that sometime in 2018, Curbside decided not to purchase a hyperspectral optical sorting system from Green Machine, instead accepting a proposal from Machinex and then purchasing the MACH Hyperspec from Machinex, and is now using that machine at its Material Recovery Facility.

36. In addition, it is believed that Boulder County Recycle, another Green Machine customer, chose to purchase a MACH Hyperspec over Green Machine's Green

Eye® Optical Sorter. Machinex has also sold the infringing system, upon information and belief, to Progressive Waste of Miami, Florida, Rumpke Waste Systems of Ohio, PDC Area Disposal Services of Peoria, Illinois, and certainly others.

37. Defendants' unauthorized manufacture of, sale of, offers to sell, and/or use of the MACH Hyperspec in the U.S. has caused and will continue to cause substantial and irreparable harm to Plaintiffs, including, but not limited to, irreversible price erosion and loss of market position.

V. FIRST CLAIM FOR RELIEF
(Patent Infringement Under 35 U.S.C. § 271 – U.S. Patent No. 9,950,346)

38. The allegations set forth in the foregoing paragraphs 1 through 37 are hereby realleged and incorporated herein by reference.

39. Defendants have directly and literally, or in the alternative under the doctrine of equivalents, infringed one or more claims of the '346 Patent, in violation of 35 U.S.C. § 271, in this judicial district and elsewhere by making, using, selling, and/or offering for sale a product or products that infringe one or more claims of the '346 Patent ("Accused Products"). Machinex has also induced and contributed to the direct literal, or in the alternative under the doctrine of equivalents, infringement of one or more claims of the '346 Patent, in violation of 35 U.S.C. § 271, in this judicial district and elsewhere by making, using, selling, and/or offering for sale Accused Products.

40. Upon information and belief, Defendants' Accused Products include but may not be limited to the MACH Hyperspec. Discovery will be needed to confirm the full nature and scope of Machinex's infringing conduct.

41. Because of Defendants' infringement of the '346 Patent, Plaintiffs have suffered and will continue to suffer irreparable harm in this judicial district.

VI. PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray for judgment in their favor and against Defendants as follows:

a. That Defendants have infringed one or more claims of the '346 Patent;

b. That Defendants, their officers, directors, agents, servants, employees, privies, representatives, attorneys, parent and subsidiary corporations or other related entities, successors, assigns, licensees, retail distributors, and all persons in active concert or participation with any of them, be preliminarily and permanently enjoined from further acts of infringement of the '346 Patent;

c. That Plaintiffs be awarded damages in an amount to be determined at trial for Defendants' infringing activities, which are at least a reasonable royalty;

d. That Plaintiffs be awarded treble damages by reason of any willful, wanton, and deliberate infringement found under 35 U.S.C. § 284;

e. That Plaintiffs be awarded their pre-judgment and post-judgment interest;

f. That Plaintiffs be awarded their costs and expenses of suit, including expert witness fees;

g. That Plaintiffs be awarded their attorneys' fees should this be found to be an exceptional case under 35 U.S.C. § 285;

h. That Defendants be ordered to deliver to Plaintiffs, for destruction at Plaintiffs' option, all products that infringe the '346 Patent;

i. That Defendants be required to account for all gains, profits, advantages, and unjust enrichment derived from its violations of law; and

j. That Plaintiffs be awarded other and further relief as the Court deems appropriate and just.

VII. JURY DEMAND

Plaintiffs demand a trial by jury on all issues so triable.

Respectfully submitted,

Dated: April 24, 2019

By: /s/Matthew J. Ladenheim

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US009950346B2

(12) **United States Patent**
Green et al.

(10) **Patent No.: US 9,950,346 B2**
(45) **Date of Patent: Apr. 24, 2018**

(54) **METHOD AND APPARATUS FOR SORTING RECYCLED MATERIAL**

(71) Applicant: **JJG IP Holdings, LLC**, Hampstead, NH (US)

(72) Inventors: **John F. Green**, Baldwinsville, NY (US); **Peter A. Mendre**, Haverhill, MA (US)

(73) Assignee: **JJG IP Holdings, LLC**, Hampstead, NH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/259,584**

(22) Filed: **Apr. 23, 2014**

(65) **Prior Publication Data**

US 2014/0244027 A1 Aug. 28, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/620,909, filed on Nov. 18, 2009, now abandoned.

(60) Provisional application No. 61/115,771, filed on Nov. 18, 2008.

(51) **Int. Cl.**

B07C 5/34	(2006.01)
A61K 9/00	(2006.01)
A61K 31/498	(2006.01)
A61K 47/10	(2017.01)
A61K 47/18	(2017.01)
A61K 47/32	(2006.01)
A61K 47/38	(2006.01)
C07D 403/12	(2006.01)
C07C 51/41	(2006.01)
C07C 65/11	(2006.01)

(52) **U.S. Cl.**

CPC ***B07C 5/34*** (2013.01); ***A61K 9/0019*** (2013.01); ***A61K 31/498*** (2013.01); ***A61K 47/10*** (2013.01); ***A61K 47/183*** (2013.01); ***A61K 47/32*** (2013.01); ***A61K 47/38*** (2013.01); ***C07C 51/41*** (2013.01); ***C07C 65/11*** (2013.01); ***C07D 403/12*** (2013.01)

(58) **Field of Classification Search**

USPC 700/223

See application file for complete search history.

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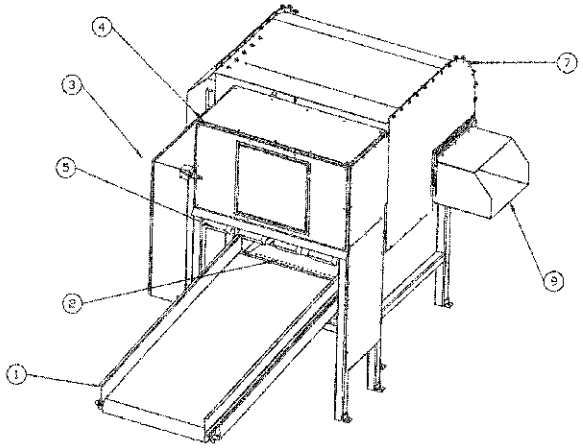
Primary Examiner — Kyle O Logan

(74) *Attorney, Agent, or Firm* — Maine Cernota & Rardin

(57) **ABSTRACT**

A system is provided for the identification and separation of heterogeneous material, the system comprising: a hyperspectral identification system for capturing spectra of material; a computer receiving and analyzing data from the hyperspectral identification system and selecting desired materials from the heterogeneous materials; and an ejection system, whereby the desired materials are ejected from the system.

16 Claims, 7 Drawing Sheets



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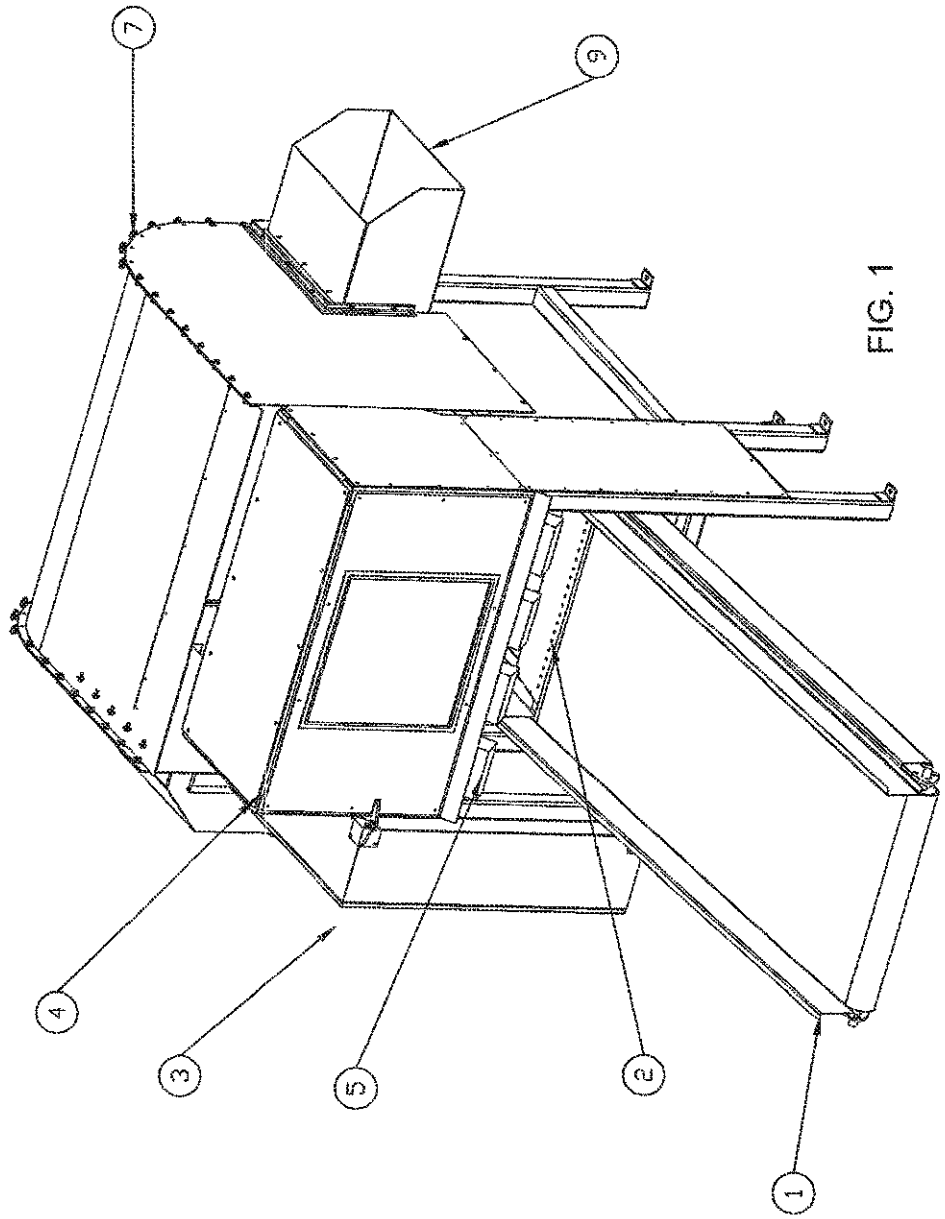

FIG. 1

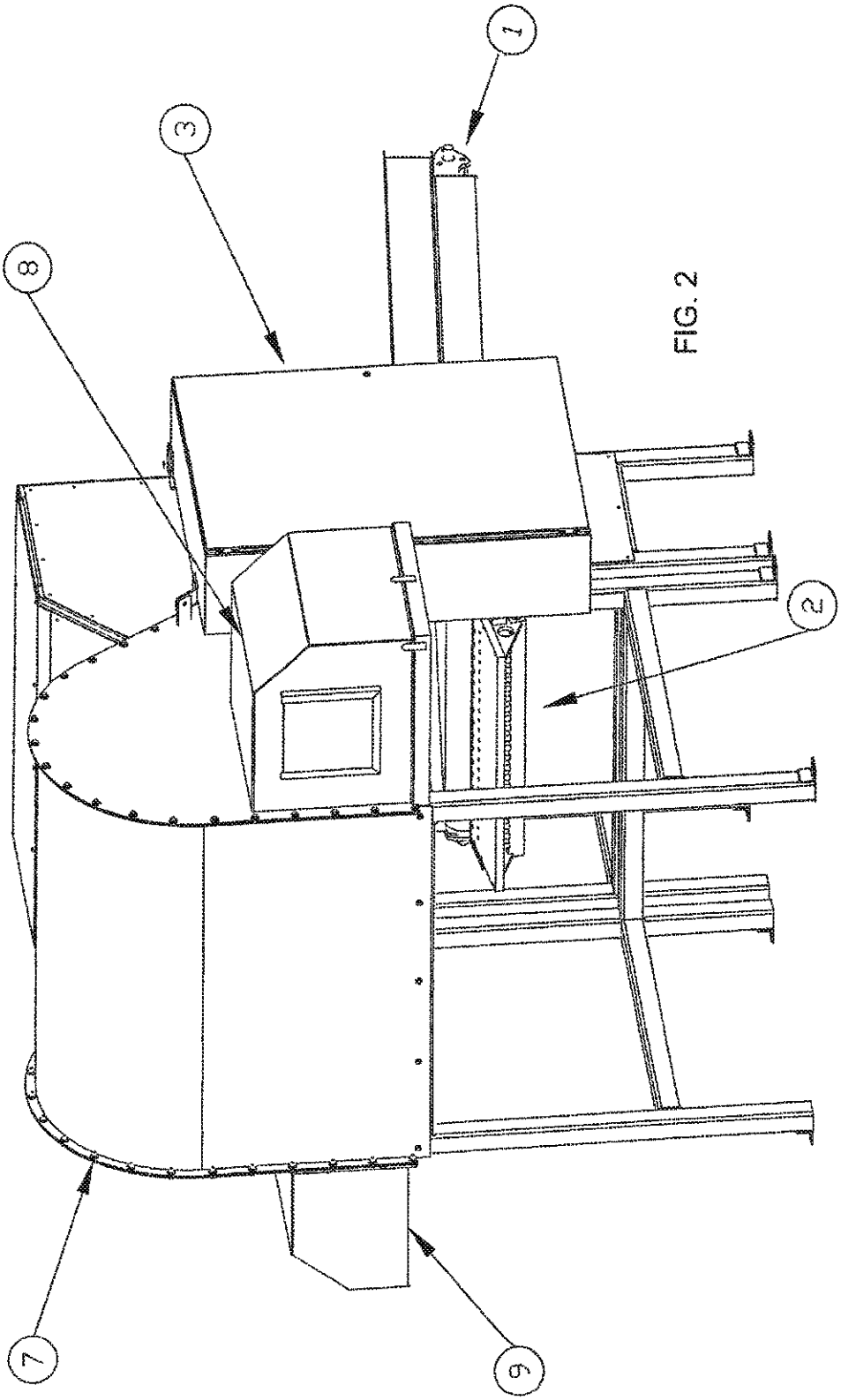

FIG. 2

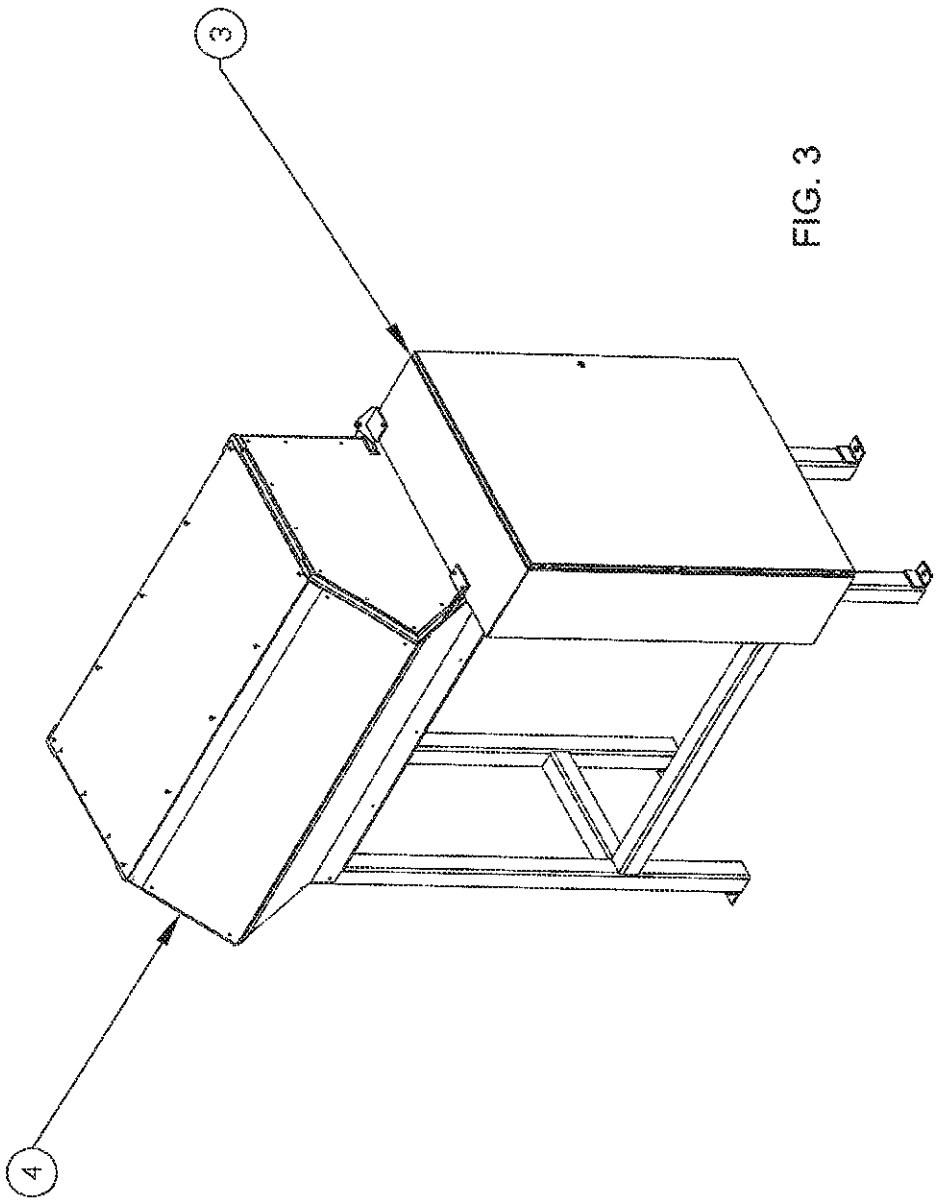

FIG. 3

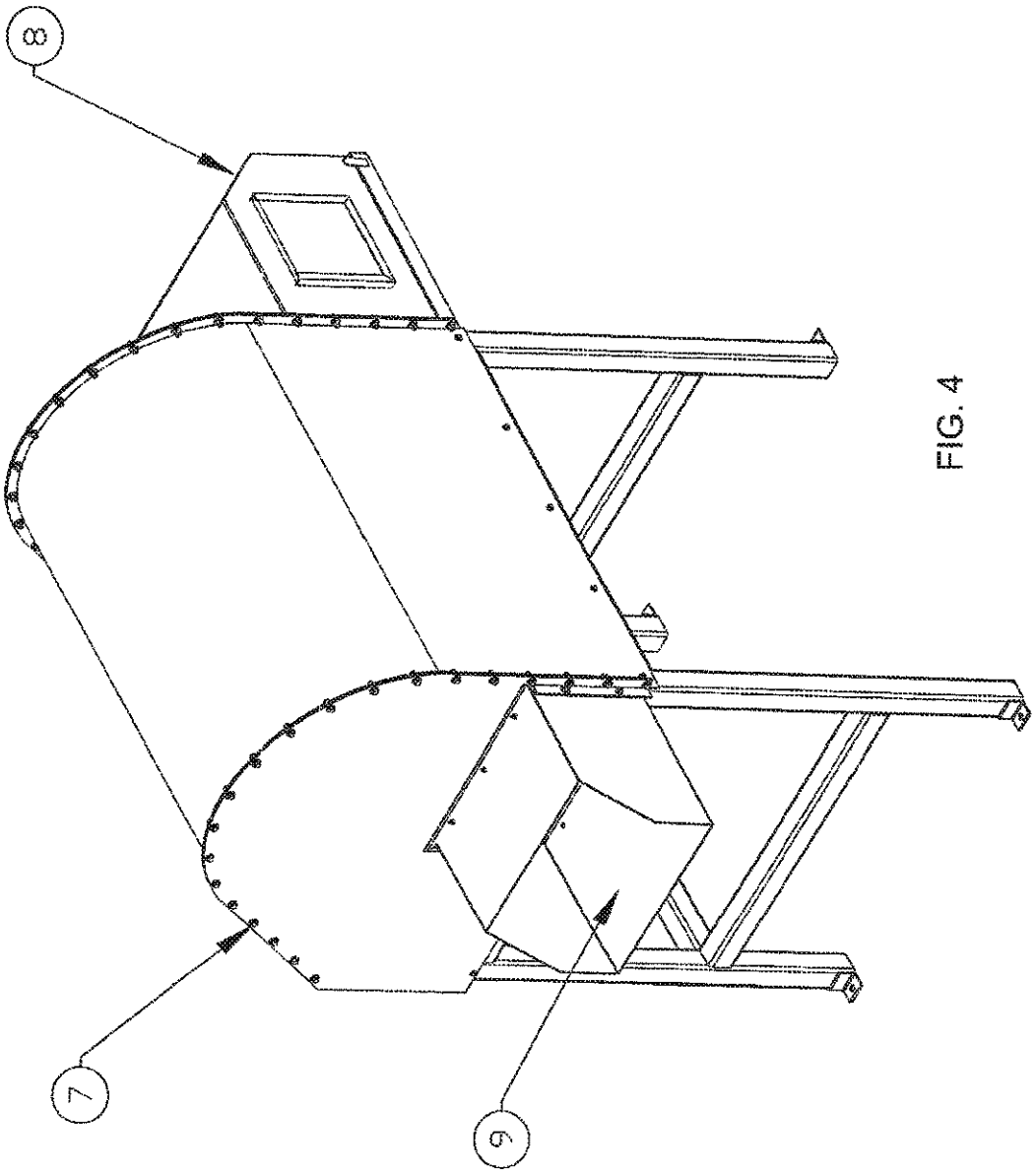

FIG. 4

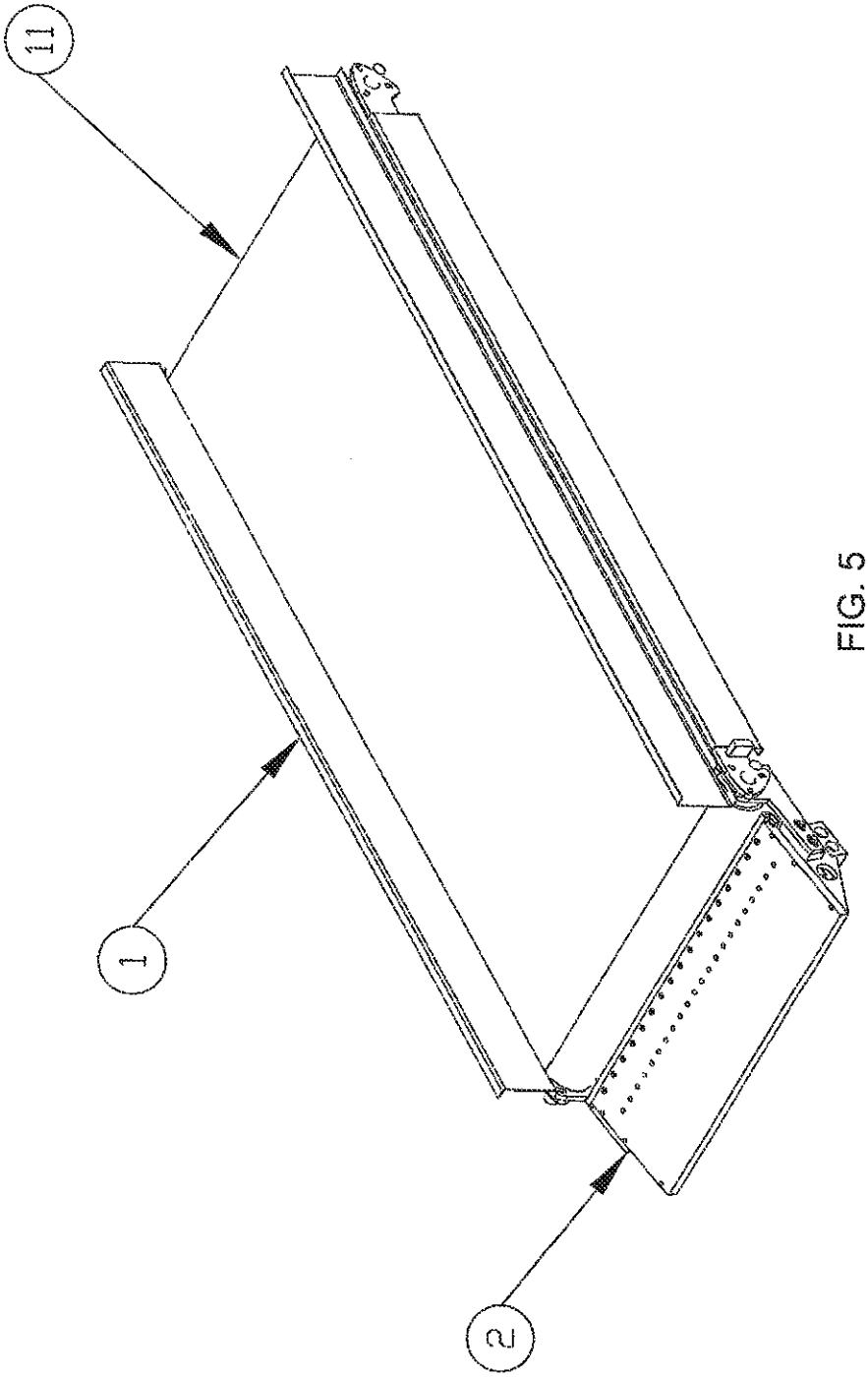

FIG. 5

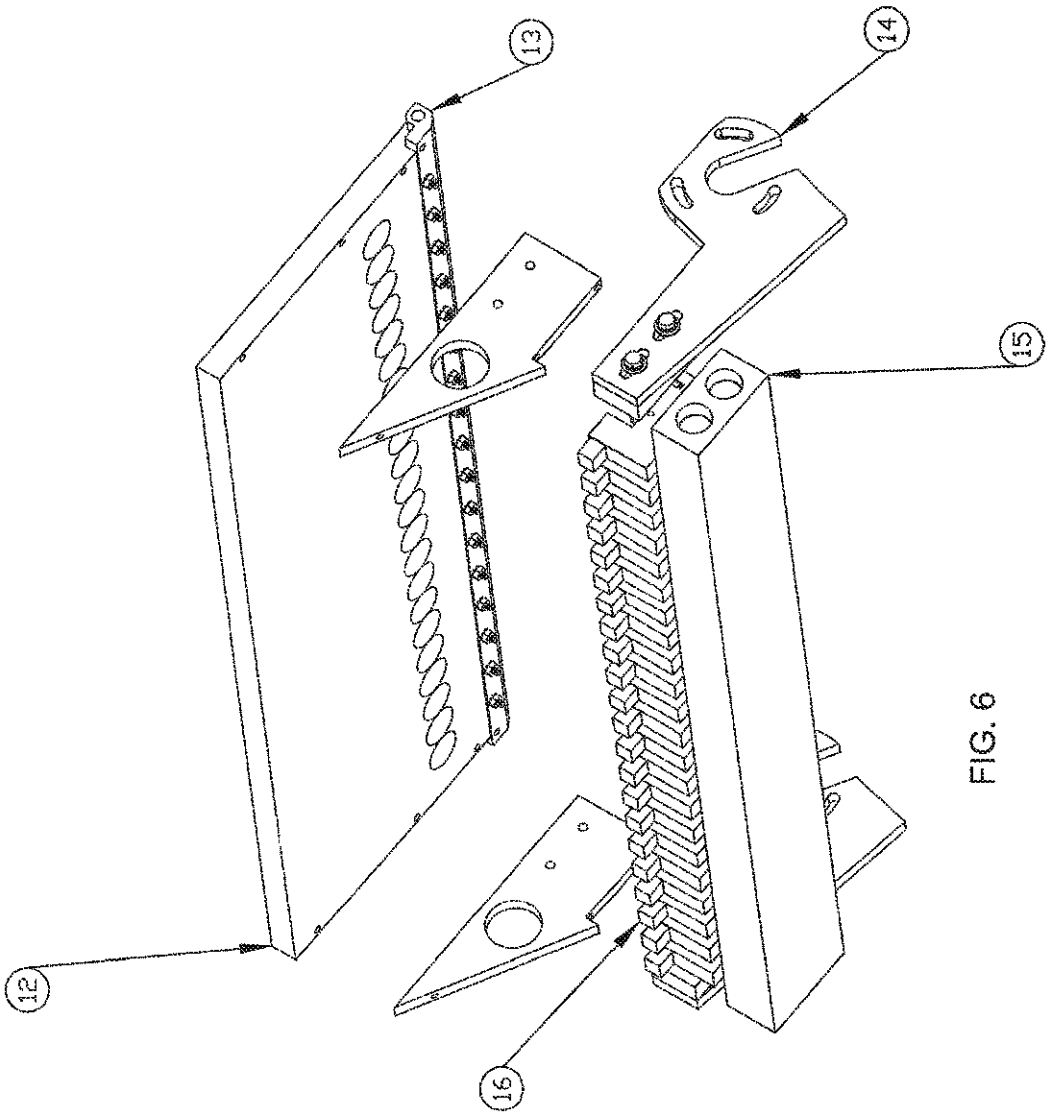

FIG. 6

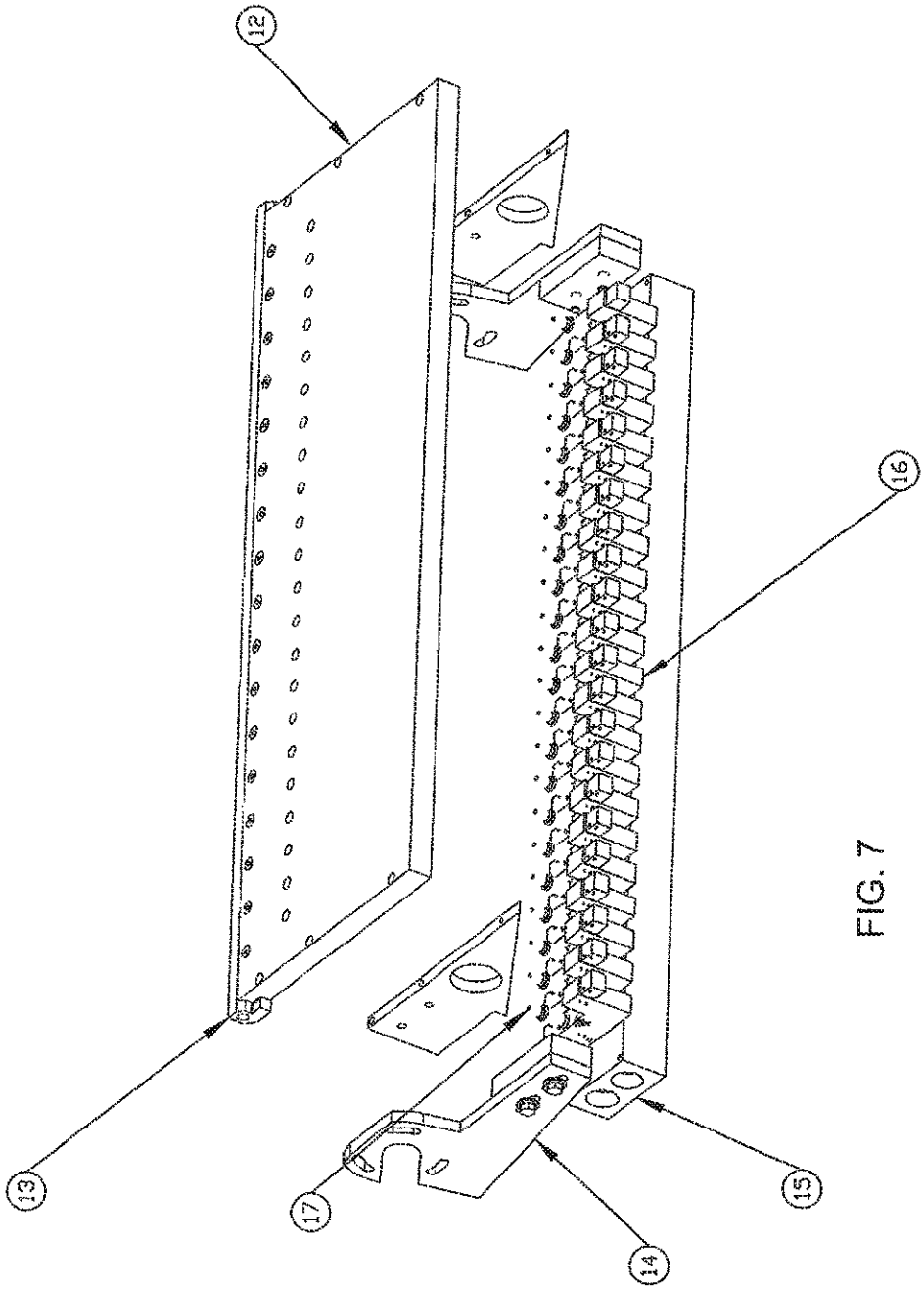

FIG. 7

METHOD AND APPARATUS FOR SORTING RECYCLED MATERIAL

RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 12/620,909 filed on Nov. 18, 2009 which claims the benefit of U.S. Provisional Application No. 61/115,771, filed Nov. 18, 2008. These applications are herein incorporated by reference in their entirety for all purposes.

FIELD OF THE INVENTION

The invention relates to methods and apparatus for sorting heterogeneous material, and more particularly, to an automatic sorting systems for the identification and separation of such material.

BACKGROUND OF THE INVENTION

Recycling of post consumer and industrial material requires that composite materials be sorted and separated according to color, composition, shape, size, or any of several criteria. Such sorting has traditionally been done manually, wherein sorters visually identify objects to be sorted, and transfer them from one conveyer belt to another running parallel to the first. This is labor intensive and expensive. Automated systems have been developed to replace this traditional hand sorting. In such systems, materials are identified by conventional optical scanner and are transferred from a first conveyer by means of a mechanical or pneumatic force to a second conveyer. Such systems typically are imprecise in their sorting, allowing materials to be mixed, which must then be resorted before pelletization. This lack of precision is due both to the optical scanning mechanism, and the imprecise mechanical and pneumatic sorting mechanism.

Known optical sorting techniques carry materials on a conveyor or vibratory deck and then rely on air jet propulsion methods and or finger push methods that lift or push desired picked materials past an outboard barrier. Unselected items typically fall off the end of the optics conveyor or shaker deck and often dropped on a conveyor below that would transport that material to another optical system where the process occurs again. The selected ejected items that have been propelled either land on another belt or vibratory conveyor and deposited in a holding bunker often with some type of post sorting to qualify the material is correctly identified. Such a system requires extensive room, both horizontally and vertically to allow for conveyers and dropping of the materials.

What is needed therefore is a means for automated sorting heterogeneous material with high degrees of precision.

SUMMARY OF THE INVENTION

One embodiment of the present invention provides a system for the identification and sorting of heterogeneous material, the system comprising: a hyperspectral identification system for capturing spectra of material, the hyperspectral identification system comprises at least one hyperspectral camera the hyperspectral camera receiving a plurality of selected spectral bands of infrared and visible light corresponding to spectral signatures of target materials to be identified if present in the heterogeneous material; the camera disposed proximate to a visible or infrared light source, the light source and the at least one hyperspectral camera are disposed on the same side of a stream of the heterogeneous material; a solid belt having first and second ends, the belt running beneath the hyperspectral identification system and upon which the heterogeneous material is conveyed from the first end to the second end, the belt traveling at a preset rate, the hyperspectral identification system being disposed over the second end of the belt; a computer receiving and analyzing data from the hyperspectral identification system and selecting materials of a first user defined category from the materials; and an ejection system disposed immediately after the second end of the belt, whereby the desired materials are separated from the heterogeneous material, the ejection system being triggered by the computer at a preset time delay equal to the distance between the camera and the ejection system divided by the rate of travel of the belt.

A further embodiment of the present invention provides such a system further comprising a conveyer to deliver the heterogeneous material to the system.

Yet another embodiment of the present invention provides such a system further comprising a receiving system, whereby the materials of a first user defined category are segregated and collected.

A yet further embodiment of the present invention provides such a system further comprising an array of lights disposed proximate to the hyperspectral identification system.

Even another embodiment of the present invention provides such a system wherein the lights have a wavelength suitable for hyperspectral imaging.

An even further embodiment of the present invention provides such a system wherein the hyperspectral identification system is configured to collect spectral and spatial information from heterogeneous material entering the system, store the spectral and spatial information as images.

Still another embodiment of the present invention provides such a system wherein the computer comprises software configured to compare the images to images stored in a library of images.

A still further embodiment of the present invention provides such a system wherein the ejection system comprises a plurality of independently controlled air nozzles disposed beneath the material, and a blower hood disposed above the material, the blower hood providing a air current whereby the selected material is blown out of a discharge port.

Yet another embodiment of the present invention provides such a system wherein the heterogeneous materials comprise waste and recyclable materials.

A yet further embodiment of the present invention provides such a system wherein the computer can select a plurality of user defined materials.

Still yet another embodiment of the present invention provides such a system wherein the ejection system comprises a mechanical ejector.

A still yet further embodiment of the present invention provides such a system wherein the ejection system comprises a fluid jet.

Still even another embodiment of the present invention provides such a system wherein the fluid jet is a water jet.

One embodiment of the present invention provides a method for sorting heterogeneous material, the method comprising: reflecting visible or infrared light from the surface of the heterogeneous material disposed on a conveyer; conveying the heterogeneous material at a predetermined rate through a hyperspectral imager; generating hyperspectral images of the heterogeneous material by receiving a plurality of selected spectral bands of infrared

and visible light corresponding to spectral signatures of target materials to be identified if present in the heterogeneous material as the heterogeneous material passes on the conveyer beneath the hyperspectral imaginer; comparing the hyperspectral images of the heterogeneous material to hyperspectral images of known materials; identifying the target materials; after a preset time interval from the identifying the target material, the interval equal to the distance between the hyperspectral imager and a separating system divided by the predetermined rate, physically isolating target material from the heterogeneous material by separating the selected material from the heterogeneous material as it leaves the conveyer immediately after the hyperspectral imager.

Another embodiment of the present invention provides such a method further comprising illuminating the heterogeneous material to optimize the hyperspectral images.

A further embodiment of the present invention provides such a method wherein the hyperspectral images comprise spectral and spatial data for articles within the heterogeneous material.

Even another embodiment of the present invention provides such a method wherein the heterogeneous material comprises waste material and recyclable material in combination.

The features and advantages described herein are not all-inclusive and, in particular, many additional features and advantages will be apparent to one of ordinary skill in the art in view of the drawings, specification, and claims. Moreover, it should be noted that the language used in the specification has been principally selected for readability and instructional purposes, and not to limit the scope of the inventive subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front perspective drawing illustrating a system for the separation of heterogeneous material configured in accordance with one embodiment of the present invention.

FIG. **2** is a rear perspective drawing illustrating a system for the separation of heterogeneous material configured in accordance with one embodiment of the present invention.

FIG. **3** is a rear perspective drawing illustrating an optical scanner of a system for the separation of heterogeneous material configured in accordance with one embodiment of the present invention.

FIG. **4** is a side perspective drawing illustrating a blower hood configured for use in a system for the separation of heterogeneous material configured in accordance with one embodiment of the present invention.

FIG. **5** is a front perspective drawing illustrating a conveyer, air knife and ejector configured for use in a system for the separation of heterogeneous material configured in accordance with one embodiment of the present invention.

FIG. **6** is a bottom, exploded perspective drawing illustrating an air knife and ejector configured for use in a system for the separation of heterogeneous material configured in accordance with one embodiment of the present invention.

FIG. **7** is a top, exploded perspective drawing illustrating an air knife and ejector configured for use in a system for the separation of heterogeneous material configured in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION

In one embodiment of the present invention, a system is provided having a hyperspectral identification system and a positively sorted air ejector.

In one such embodiment, illustrated in FIGS. **1** and **2**, a conveyer **1** carries material to a identification camera enclosure **4**. The identification camera enclosure **4** encloses a camera **6** disposed proximately to an array of lights **5**, highlighting the target area for the camera **6**. In such a system, the camera **6** is a hyperspectral camera. Hyperspectral cameras and sensors such as those employed in the one embodiment of the present invention collect and then combine spatial and spectral information as a set of 'images'. In one embodiment, illustrated in FIG. **3**, the camera **6** may be mounted on camera mounting brackets **10**.

Each image, thus generated, represents a range of the electromagnetic spectrum and is also known as a spectral band. These 'images' are then combined and form a three dimensional hyperspectral cube for processing and analysis.

Hyperspectral sensors also referred to as "imaging spectroscopy" look at objects using a vast portion of the electromagnetic spectrum. Certain objects leave unique 'fingerprints' across the electromagnetic spectrum. These 'fingerprints' are known as spectral signatures and enable identification of the materials that make up a scanned object. Identification systems, can compare the spectral "fingerprint" of a sample with an unknown composition to a known spectra from a library of known exemplars.

Hyperspectral cameras of one embodiment of the present invention, utilize visible light, ultraviolet, and infrared spectral imaging that utilizes spatial information provided by the hyperspectral image. Infrared is, in such an embodiment, the primary band utilized in identifying individual recyclable commodities encompassing sometimes a variety of spectral signatures including color for sorting and commodity segregation purposes. One skilled in the art will appreciate that embodiments of the present invention may be used in sorting heterogeneous materials in other fields including but not limited to agriculture, medicine, and industrial applications.

Hyperspectral data, collected by the camera **6**, comprises a set of contiguous bands. In one embodiment of the present invention, this is collected by a single sensor, interfaced with an ejection method that resides within its field of vision and then used to select the desired item. This is in contrast to conventional multispectral techniques, where a set of optimally chosen spectral bands that are typically not contiguous and need to be collected from multiple sensors. This collection of spectral data is valuable in improving the accuracy of the identification, and is employed in various embodiments of the present invention. A single sensor, in one embodiment of the present invention, performs all the following tasks: Identify items searched for in a large area; searching for multiple items at the same time; identifying items by composition and color all with a higher degree of positive identification. Thus a single system may be programmed to sort all commodities required by a user.

One embodiment of the present invention provides a system equipped with Wedge Jet style high flow ejection air nozzles **17** and high speed real time computer interfaces thus providing an ejection method capable of propelling desired items into an elevated air conveyance system enabling multiple units to be orientated on a straight line.

A straight line orientation enables optical sorting systems to be installed in a smaller area with no vertical grade differential, thus enabling the simple retrofit of existing manual sorting lines with optical automatic sorters with minimal site work. Such an embodiment also enables new systems to be engineered into a much smaller footprint than existing traditional saw tooth designs which require elevation consideration. A system design configured according to one embodiment of the present invention and illustrated in

FIGS. 1 and 2 provides an accelerator rubber belt feed conveyor 1 of varying widths traveling at a rate of between 200 to 600 feet per minute. A light bar system 5 shines a high intensity light down on the belt where the hyperspectral imaging camera 6 collects its data. The camera 6 collects that data and feeds a high speed Lenox computer system or other suitable computer system 3 that has been programmed to receive this data and then provide output signals timed with the ejector nozzles 17 to eject desired product. Immediately after the discharge of the accelerator conveyor 1 is disposed an air knife 2 that helps to levitate materials and decreases the likelihood of material lodging between the accelerator belt 1 and manifold ejector plate 14. The manifold ejection plate 12 houses the wedge jets 17 and enables those jets 17 to be directed to optimal lift. The wedge jets 17 also referred to as vortex, Typhoon, Hurricane or Fixed Flow Air Nozzles are fast acting, resistant to plugging and deliver a high velocity directed air flow that then expands to an 8" diameter air flow. A venturie effect delivered by this style ejection jet positively holds the ejected item within its air flow decreasing the likelihood of the item colliding with competitive items in the air and discouraging turbulence. The additional force generated by these jets 17 propels the picked items into a receiving hood 7 area located above the accelerator belt 1. This receiving hood system 7 is fitted with a high velocity fan type blower 8 that then pushes the selected items toward the collection point 9 at a 90 degree angle. In an alternative embodiment, the ejection system can be configured with at least one flipping lever or other mechanical device whereby desired material is pushed or otherwise segregated. Negative materials not selected continue down the ejector plate 12 and are deposited on another accelerator conveyor (not shown) upon which non-selected materials move in series to additional optical system where another desired item can be sorted and removed from the waste stream. In such an embodiment, each optical sorter may be deployed in line with the previous sorter in a very tight configuration with no change in elevation. The evacuation fan within the collection hood also develops a venture effect that helps to draw light fractional items into its air stream enhancing the collection rate of ejected selected items. An evacuation conveyor could also be positioned in this location and would deliver similar results.

A further embodiment provides an accelerator conveyor enabling the spreading out of materials, a hyperspectral imaging camera designed to positively identify about approximately 100% of the desired item (for example, a recyclable material or other component of a heterogeneous material), items, air nozzle cannons with fast acting solenoid air valves which react to information provided by imaging camera designed to lift desired fractional recyclable material.

Yet another embodiment provides an air conveyance system which develops a Venturi effect drawing in the previously lifted desired items and evacuating those items to a holding bin.

The foregoing description of the embodiments of the invention has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Many modifications and variations are possible in light of this disclosure. It is intended that the scope of the invention be limited not by this detailed description, but rather by the claims appended hereto.

What is claimed is:

1. A system for the identification and sorting of heterogeneous material, the system comprising:

a hyperspectral identification system for capturing spectra of material, said hyperspectral identification system comprises at least one hyperspectral camera said hyperspectral camera configured to receive spectral data from a plurality of selected spectral bands of infrared and visible light corresponding to spectral signatures of target materials to be identified if present in said heterogeneous material and spacial data locating a position of said heterogeneous materials on a solid belt; said camera disposed proximate to a visible or infrared light source, said light source and said at least one hyperspectral camera are disposed on the same side of a stream of said heterogeneous material;

said solid belt having first and second ends, said belt running beneath said hyperspectral identification system and upon which said heterogeneous material is conveyed from said first end to said second end, said belt traveling at a preset rate, said hyperspectral identification system being disposed over said second end of said belt;

a computer configured to receive and analyze data from said hyperspectral identification system, to identify target materials of a first user defined category from among said heterogeneous materials, identify the spatial position of said target materials, and to trigger an ejection system at a preset time delay equal to the distance between said camera and said ejection system divided by the rate of travel of the belt; and

said ejection system disposed immediately after said second end of said belt, whereby said desired materials are separated from said heterogeneous material, said ejection system being triggered by said computer.

2. The system according to claim 1, further comprising a conveyer to deliver said heterogeneous material to said system.

3. The system according to claim 1 further comprising a receiving system, whereby said materials of a first user defined category are segregated and collected.

4. The system according to claim 1 further comprising an array of lights disposed proximate to said hyperspectral identification system.

5. The system according to claim 4 wherein said lights have a wavelength suitable for hyperspectral imaging.

6. The system according to claim 4 wherein said computer comprises software configured to compare said images to images stored in a library of images.

7. The system according to claim 1 wherein said hyperspectral identification system is configured to collect spectral and spatial information from heterogeneous material entering said system and store said spectral and spatial information as images.

8. The system according to claim 1 wherein said ejection system comprises a plurality of independently controlled air nozzles disposed beneath said material, and a blower hood disposed above said material, said blower hood providing an air current whereby said selected material is blown out of a discharge port.

9. The system according to claim 1 wherein said heterogeneous materials comprise waste and recyclable materials.

10. The system according to claim 1 wherein said computer can select a plurality of user defined materials.

11. The system according to claim 1 wherein said ejection system comprises a mechanical ejector.

12. The system according to claim 1 wherein said ejection system comprises a fluid jet.

13. The system according to claim 12 wherein said fluid jet is a water jet.

14. A method for sorting heterogeneous material, said method comprising:

reflecting visible or infrared light from the surface of said heterogeneous material disposed on a conveyer from a light source disposed proximate to a hyperspectral imager;

conveying said heterogeneous material at a predetermined rate beneath said hyperspectral imager;

generating hyperspectral images containing both spectral and spatial data of said heterogeneous material by receiving a plurality of selected spectral bands of infrared and visible light corresponding to spectral signatures of target materials to be identified if present in said heterogeneous material as said heterogeneous material passes on said conveyer beneath said hyperspectral imaginer;

comparing said hyperspectral images of said heterogeneous material to hyperspectral images of known materials;

identifying said target materials;

activating an ejection system with a computer, said computer being configured to physically isolate target material with said ejection system from said heterogeneous material by locating said target material within said heterogeneous material and ejecting said target material with said ejection system at a preset time delay equal to a distance between said hyperspectral imager and said ejection system divided by a rate of conveying said heterogeneous material.

15. The method according to claim 14 wherein said hyperspectral images comprise spectral and spatial data for articles within said heterogeneous material.

16. The method according to claim 14 wherein said heterogeneous material comprises waste material and recyclable material in combination.

* * * * *

MACH HYSPEC®

Optical Sorting

MACHINEX

Experience Results

Modern material recovery facilities are faced with everyday challenges to ensure purity and maximize efficiency, all while minimizing operational costs. Delivering accuracy and profitability, the outstanding MACH Hyspec® Optical Sorter is a leap forward in the industry. No material will be left undetected under the unique, hyperspectral recognition technology developed by Machinex.

SIZES & EJECTIONS OPTIONS

Widths	Ejections
(1200 - 1600 - 2000 - 2400 - 2800 - 3200) mm	Single eject separates in 2 streams
	Dual eject separates in 3 streams

FEATURES	BENEFITS
▶ 3D volumetric detection depth up to 430 mm	→ Increased product recognition
▶ MACH fast detection & analysis	→ Outstanding accuracy & capacity
▶ Static acquisition system (no moving parts)	→ Superior reliability & stability

Optical Sorting

MODELS APPLICATION TYPE

CONTACT US FOR YOUR CUSTOM FIT CONFIGURATION	Hyspec® VIS	Hyspec® ShortWave	Hyspec® MidWave	Metal Detector
Single-Stream (Containers)	√	√		*
Single-Stream (Fibers)		√	√	*
Mixed Waste Processing		√	√	*
C&D		√	√	*
Plastics Recyclers	√	√	√	*
RDF/SRF Preparation		√	√	*

* Metal detection can be combined with any other technology based on application and targeted ejection pattern.

APPLICATIONS

PLASTICS
Individual value:

- PET: clear & colored
- HDPE: clear & colored
- PVC, LDPE, PP, PS, and others

FIBERS
Distinctive recognition of:

- Wood products (by grades)
- High Fibers grades
- OCC/OBB cards (brown, grey, white)
- Cartons, Aseptics, and Gable tops sort from stream

GENERAL CHARACTERISTICS

- Unique hyperspectral technology
- Broadest spectrum reading and processing in the industry
- Fast analysis process: 1 millisecond
- Over 28 million measurements per second
- Fast action, pneumatic valves
- User-friendly touch screen interface
- Ethernet support, diagnosis, and updates
- Developed, designed, and manufactured at Machinex headquarters

OPTIONS

- Metal detector (ferrous & non-ferrous)
- High resolution, pneumatic valves
- Additional dual eject configuration

Unique Hyperspectral Camera Technology

Fast Analysis : 1 Millisecond

MACHINEX

MACHINEX INDUSTRIES INC.
North America: 1 877 362-3281
International: +1 819 362-3281

sales@machinextechnologies.com
machinextechnologies.com

(2017-04V)

Equipment & Products

Optical sorters quickly recognize plastics, fibers

Various resins, woods or papers, the MACH Hyspec optical sorters can recognize them all.

The sorters are made more efficient by a high-speed, short-wave infrared hyperspectral detection system, according to product manufacturer Machinex.

The different models available can detect various material types, including plastics (PET, HDPE, PVC, LDPE, PP, PS and more) and fiber products, including cartons and wood. It can also be outfitted with a metal detector and the ability to recognize items' colors.

The MACH Hyspec was produced by a specialized group in the Machinex research and development department.

"For over 12 years, we have integrated optical sorting into the systems we design and were supplied by European manufacturers. For a few years, with the collaboration of the INO services (National Institute of Optics), we have been developing our own range of optical sorting machines," Machinex Group CEO Pierre Pare stated in a press release. "The goal is to become more self-sufficient in our supply and have a machine that better meets our standards."

The machines exceed some industry standards by using a detection system that takes less than 1 millisecond to analyze the belt, according to Machinex. That allows it to process a lot of material in a short time.

Machinex Group
2121 Olivier St.
Plessisville, Quebec G6L 3G9
877-362-3281
machinexrecycling.com

Transform CRT glass into sand-like material for concrete

It's a material that's posed challenges for the e-scrap recycling industry for years: lead-containing glass in cathode ray tubes.

ERS International has developed a processing and equipment line that separates the glass and processes it into a sand-like material that can go into concrete.

"Smelting aims to melt the glass and separate it from the lead in the liquid form," the Toronto-based company states. "Unfortunately, this requires large amounts of energy, is expensive and still produces a lead-containing waste stream."

1 BROKK TANK CUTTER ATTACHMENT. Brokk Inc., Monroe, Washington, has released the TC120 Tank Cutter attachment. Manufactured by its sister company, Germany-based Darda, the TC120 attachment is designed to deliver maximum cutting control and versatility for continuous steel cutting abilities. Features include:

- can be used with the Brokk 160, 260 and 400 models
- exerts 75 tons of cutting force at 7,250 psi, which allows it to cut through one half-inch thick steel plate, says the company
- commonly employed for cutting steel tanks, pipes and vessels, it can also be used in scrap yards and at baler applications

Visit www.brokk.com/us for more information.

1

2 MACHINEX OPTICAL SORTER. Machinex Group, Plessisville, Quebec, has introduced an optical sorting machine, the MACH Hyspec. Features include:

- a high-speed, short-wave infrared (SWIR) hyperspectral detection system detects different material types such as plastics, fiber and wood products
- has the option of color recognition and a metal detector
- can be used in different types of material recovery facilities, such as single-stream, construction and demolition, municipal solid waste and other applications
- a high-speed detection system takes less than 1 millisecond to analyze the belt, says the company

Visit www.machinexrecycling.com for more information.

2

3 GOODYEAR WASTE HAUL TIRE. Akron, Ohio-based Goodyear Tire & Rubber Co. has launched what it says is the company's longest-wearing waste haul tire. Features include:

- new sidewall protector shingles to help resist sidewall scuffing in high-scrub applications
- a steel belt and casing package for enhanced toughness, endurance and retreadability
- an optimized shoulder design to help direct pressure away from the tire's outer tread, which promotes uniform tread wear
- a wide footprint to enhance cornering and handling when used on local streets
- a scrub-resistant compound and a 24/32-inch tread depth
- option of Goodyear's DuraSeal Technology, which instantly seals nail-hole punctures

Visit www.goodyeartrucktires.com for more information.

3

4 VOLVO CRAWLER EXCAVATOR. Volvo Construction Equipment, Shippensburg, Pennsylvania, has introduced the EC220E crawler excavator. Features include:


4

JS 44 (Rev. 02/19)

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. *(SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)*

I. (a) PLAINTIFFS

JJG IP Holdings, LLP and Green Machine Sales LLC

(b) County of Residence of First Listed Plaintiff _____
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys *(Firm Name, Address, and Telephone Number)*

Matthew J. Ladenheim, Trego, Hines & Ladenheim, PLLC,
10224 Hickorywood Hill Ave, Ste 202, Huntersville, NC 28078

DEFENDANTS

Machinex Industries, Inc., Machinex Technologies Inc., and Curbside Management, Inc.

County of Residence of First Listed Defendant _____
(IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED.

Attorneys *(If Known)*

II. BASIS OF JURISDICTION *(Place an "X" in One Box Only)*

- ❒ 1 U.S. Government Plaintiff
- ☒ 3 Federal Question *(U.S. Government Not a Party)*
- ❒ 2 U.S. Government Defendant
- ❒ 4 Diversity *(Indicate Citizenship of Parties in Item III)*

III. CITIZENSHIP OF PRINCIPAL PARTIES *(Place an "X" in One Box for Plaintiff and One Box for Defendant)*

(For Diversity Cases Only)

	PTF	DEF		PTF	DEF
Citizen of This State	❒ 1	❒ 1	Incorporated *or* Principal Place of Business In This State	❒ 4	❒ 4
Citizen of Another State	❒ 2	❒ 2	Incorporated *and* Principal Place of Business In Another State	❒ 5	❒ 5
Citizen or Subject of a Foreign Country	❒ 3	❒ 3	Foreign Nation	❒ 6	❒ 6

IV. NATURE OF SUIT *(Place an "X" in One Box Only)*

Click here for: Nature of Suit Code Descriptions.

CONTRACT
- ❒ 110 Insurance
- ❒ 120 Marine
- ❒ 130 Miller Act
- ❒ 140 Negotiable Instrument
- ❒ 150 Recovery of Overpayment & Enforcement of Judgment
- ❒ 151 Medicare Act
- ❒ 152 Recovery of Defaulted Student Loans (Excludes Veterans)
- ❒ 153 Recovery of Overpayment of Veteran's Benefits
- ❒ 160 Stockholders' Suits
- ❒ 190 Other Contract
- ❒ 195 Contract Product Liability
- ❒ 196 Franchise

REAL PROPERTY
- ❒ 210 Land Condemnation
- ❒ 220 Foreclosure
- ❒ 230 Rent Lease & Ejectment
- ❒ 240 Torts to Land
- ❒ 245 Tort Product Liability
- ❒ 290 All Other Real Property

TORTS

PERSONAL INJURY
- ❒ 310 Airplane
- ❒ 315 Airplane Product Liability
- ❒ 320 Assault, Libel & Slander
- ❒ 330 Federal Employers' Liability
- ❒ 340 Marine
- ❒ 345 Marine Product Liability
- ❒ 350 Motor Vehicle
- ❒ 355 Motor Vehicle Product Liability
- ❒ 360 Other Personal Injury
- ❒ 362 Personal Injury - Medical Malpractice

PERSONAL INJURY
- ❒ 365 Personal Injury - Product Liability
- ❒ 367 Health Care/ Pharmaceutical Personal Injury Product Liability
- ❒ 368 Asbestos Personal Injury Product Liability

PERSONAL PROPERTY
- ❒ 370 Other Fraud
- ❒ 371 Truth in Lending
- ❒ 380 Other Personal Property Damage
- ❒ 385 Property Damage Product Liability

CIVIL RIGHTS
- ❒ 440 Other Civil Rights
- ❒ 441 Voting
- ❒ 442 Employment
- ❒ 443 Housing/ Accommodations
- ❒ 445 Amer. w/Disabilities - Employment
- ❒ 446 Amer. w/Disabilities - Other
- ❒ 448 Education

PRISONER PETITIONS

Habeas Corpus:
- ❒ 463 Alien Detainee
- ❒ 510 Motions to Vacate Sentence
- ❒ 530 General
- ❒ 535 Death Penalty

Other:
- ❒ 540 Mandamus & Other
- ❒ 550 Civil Rights
- ❒ 555 Prison Condition
- ❒ 560 Civil Detainee - Conditions of Confinement

FORFEITURE/PENALTY
- ❒ 625 Drug Related Seizure of Property 21 USC 881
- ❒ 690 Other

LABOR
- ❒ 710 Fair Labor Standards Act
- ❒ 720 Labor/Management Relations
- ❒ 740 Railway Labor Act
- ❒ 751 Family and Medical Leave Act
- ❒ 790 Other Labor Litigation
- ❒ 791 Employee Retirement Income Security Act

IMMIGRATION
- ❒ 462 Naturalization Application
- ❒ 465 Other Immigration Actions

BANKRUPTCY
- ❒ 422 Appeal 28 USC 158
- ❒ 423 Withdrawal 28 USC 157

PROPERTY RIGHTS
- ❒ 820 Copyrights
- ☒ 830 Patent
- ❒ 835 Patent - Abbreviated New Drug Application
- ❒ 840 Trademark

SOCIAL SECURITY
- ❒ 861 HIA (1395ff)
- ❒ 862 Black Lung (923)
- ❒ 863 DIWC/DIWW (405(g))
- ❒ 864 SSID Title XVI
- ❒ 865 RSI (405(g))

FEDERAL TAX SUITS
- ❒ 870 Taxes (U.S. Plaintiff or Defendant)
- ❒ 871 IRS—Third Party 26 USC 7609

OTHER STATUTES
- ❒ 375 False Claims Act
- ❒ 376 Qui Tam (31 USC 3729(a))
- ❒ 400 State Reapportionment
- ❒ 410 Antitrust
- ❒ 430 Banks and Banking
- ❒ 450 Commerce
- ❒ 460 Deportation
- ❒ 470 Racketeer Influenced and Corrupt Organizations
- ❒ 480 Consumer Credit
- ❒ 485 Telephone Consumer Protection Act
- ❒ 490 Cable/Sat TV
- ❒ 850 Securities/Commodities/ Exchange
- ❒ 890 Other Statutory Actions
- ❒ 891 Agricultural Acts
- ❒ 893 Environmental Matters
- ❒ 895 Freedom of Information Act
- ❒ 896 Arbitration
- ❒ 899 Administrative Procedure Act/Review or Appeal of Agency Decision
- ❒ 950 Constitutionality of State Statutes

V. ORIGIN *(Place an "X" in One Box Only)*

☒ 1 Original Proceeding ❒ 2 Removed from State Court ❒ 3 Remanded from Appellate Court ❒ 4 Reinstated or Reopened ❒ 5 Transferred from Another District *(specify)* ❒ 6 Multidistrict Litigation - Transfer ❒ 8 Multidistrict Litigation - Direct File

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing ***(Do not cite jurisdictional statutes unless diversity)***:
35 USC 1 et seq; 28 USC 1331 and 1338(a);

Brief description of cause:
patent infringement

VII. REQUESTED IN COMPLAINT:

❒ CHECK IF THIS IS A **CLASS ACTION** UNDER RULE 23, F.R.Cv.P.

DEMAND $

CHECK YES only if demanded in complaint:

JURY DEMAND: ☒ Yes ❒ No

VIII. RELATED CASE(S) IF ANY

(See instructions):

JUDGE _____ DOCKET NUMBER _____

DATE

SIGNATURE OF ATTORNEY OF RECORD
/s/ Matthew J. Ladenheim

FOR OFFICE USE ONLY

RECEIPT # _____ AMOUNT _____ APPLYING IFP _____ JUDGE _____ MAG. JUDGE _____

INSTRUCTIONS FOR ATTORNEYS COMPLETING CIVIL COVER SHEET FORM JS 44

Authority For Civil Cover Sheet

The JS 44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and service of pleading or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. The attorney filing a case should complete the form as follows:

I.(a) **Plaintiffs-Defendants.** Enter names (last, first, middle initial) of plaintiff and defendant. If the plaintiff or defendant is a government agency, use only the full name or standard abbreviations. If the plaintiff or defendant is an official within a government agency, identify first the agency and then the official, giving both name and title.

(b) **County of Residence.** For each civil case filed, except U.S. plaintiff cases, enter the name of the county where the first listed plaintiff resides at the time of filing. In U.S. plaintiff cases, enter the name of the county in which the first listed defendant resides at the time of filing. (NOTE: In land condemnation cases, the county of residence of the "defendant" is the location of the tract of land involved.)

(c) **Attorneys.** Enter the firm name, address, telephone number, and attorney of record. If there are several attorneys, list them on an attachment, noting in this section "(see attachment)".

II. **Jurisdiction.** The basis of jurisdiction is set forth under Rule 8(a), F.R.Cv.P., which requires that jurisdictions be shown in pleadings. Place an "X" in one of the boxes. If there is more than one basis of jurisdiction, precedence is given in the order shown below.
United States plaintiff. (1) Jurisdiction based on 28 U.S.C. 1345 and 1348. Suits by agencies and officers of the United States are included here.
United States defendant. (2) When the plaintiff is suing the United States, its officers or agencies, place an "X" in this box.
Federal question. (3) This refers to suits under 28 U.S.C. 1331, where jurisdiction arises under the Constitution of the United States, an amendment to the Constitution, an act of Congress or a treaty of the United States. In cases where the U.S. is a party, the U.S. plaintiff or defendant code takes precedence, and box 1 or 2 should be marked.
Diversity of citizenship. (4) This refers to suits under 28 U.S.C. 1332, where parties are citizens of different states. When Box 4 is checked, the citizenship of the different parties must be checked**.** (See Section III below**; NOTE: federal question actions take precedence over diversity cases.**)

III. **Residence (citizenship) of Principal Parties.** This section of the JS 44 is to be completed if diversity of citizenship was indicated above. Mark this section for each principal party.

IV. **Nature of Suit.** Place an "X" in the appropriate box. If there are multiple nature of suit codes associated with the case, pick the nature of suit code that is most applicable. Click here for: Nature of Suit Code Descriptions.

V. **Origin.** Place an "X" in one of the seven boxes.
Original Proceedings. (1) Cases which originate in the United States district courts.
Removed from State Court. (2) Proceedings initiated in state courts may be removed to the district courts under Title 28 U.S.C., Section 1441.
Remanded from Appellate Court. (3) Check this box for cases remanded to the district court for further action. Use the date of remand as the filing date.
Reinstated or Reopened. (4) Check this box for cases reinstated or reopened in the district court. Use the reopening date as the filing date.
Transferred from Another District. (5) For cases transferred under Title 28 U.S.C. Section 1404(a). Do not use this for within district transfers or multidistrict litigation transfers.
Multidistrict Litigation – Transfer. (6) Check this box when a multidistrict case is transferred into the district under authority of Title 28 U.S.C. Section 1407.
Multidistrict Litigation – Direct File. (8) Check this box when a multidistrict case is filed in the same district as the Master MDL docket. **PLEASE NOTE THAT THERE IS NOT AN ORIGIN CODE 7.** Origin Code 7 was used for historical records and is no longer relevant due to changes in statue.

VI. **Cause of Action.** Report the civil statute directly related to the cause of action and give a brief description of the cause. **Do not cite jurisdictional statutes unless diversity.** Example: U.S. Civil Statute: 47 USC 553 Brief Description: Unauthorized reception of cable service

VII. **Requested in Complaint.** Class Action. Place an "X" in this box if you are filing a class action under Rule 23, F.R.Cv.P.
Demand. In this space enter the actual dollar amount being demanded or indicate other demand, such as a preliminary injunction.
Jury Demand. Check the appropriate box to indicate whether or not a jury is being demanded.

VIII. **Related Cases.** This section of the JS 44 is used to reference related pending cases, if any. If there are related pending cases, insert the docket numbers and the corresponding judge names for such cases.

Date and Attorney Signature. Date and sign the civil cover sheet.