WHAT IS CLAIMED IS:

1. A tramp metal removing device, comprising:

a primary housing including an upper inlet, a bottom outlet opposite the upper inlet and a first internal space disposed between the upper inlet and the bottom outlet to define a product flow path through which a stream of raw materials may pass, a moving path perpendicular to the product flow path and a first length in the direction of the moving path;

a secondary housing connected to the first housing, the secondary housing including a second internal space adjacent to the first internal space and a second length in the direction of the moving path, the second length being shorter than the first length;

a plurality of drawer units sequentially stacked on the primary housing and secondary housing, each of the drawer units comprising a frame, a plurality of magnetic members and a scraping assembly, wherein the frame is supported by the primary housing and the secondary housing in a way that it is moveable along the moving path between a retracted, passaged and extended positions, each of the magnetic members having a magnetic section , a non-magnetic section and a third length shorter than the first length but longer than the second length is secured on the frame in a way that when the frame is located in the retracted position, each of the magnetic members is received in the first internal space and adapted to be in contact with a stream of raw materials, when the frame is moved from the retracted position to the passaged position, each of the magnetic members is moved a first distance approximately equal to the second length of the secondary housing to be in a state that a portion thereof is received within the first internal space and the other portion thereof is received within the second internal space, and when the frame is moved from the passaged position to the extended position, each of the magnetic members is moved a second distance to be in a state that a portion thereof

is positioned outside the second internal space and the other portion thereof including the non-magnetic section is received within the second internal space; the scraping assembly is received in the second internal space and coupled with each of magnetic members to be slidable in a longitudinal direction along each of the magnet members and configured such that

(i) when the frame is in the retracted position, the scraping assembly is located at the side of the second internal space that is proximal to the primary housing,

(ii) when the frame is moved from the retracted position to the passaged position, the scraping assembly is moved synchronously with the frame to be located at the side of the second internal space that is distal from the primary housing for scraping tramp metals attached in a portion of each of the magnetic members to the other portion thereof as the frame is continuously moved in the moving path, and

(iii) when the frame is moved from the passaged position to the extended position, the scraping assembly is still located at the side of the second internal space that is distal from the primary housing such that as the scraping assembly is moved relative to each of the magnetic members in a direction opposite to the moving path, tramp metals attached to the magnetic section of each of the magnetic members are scraped toward the non-magnetic section thereof and discharged.

2. The tramp metal removing device of claim 1, wherein the frame of each of the drawer units includes a front plate, a rear plate opposite the front plate, a face plate opposite the front plate, a pair of guiding rods, and at least a connecting rod; each of the guiding rods has a fourth length in the direction of the moving path and longer than the third length of each of magnetic members and is coupled between the face and rear plates in a way that one of the guiding rods is coupled at a first end thereof to one side of the face plate and at a second end thereof to one side of the rear plate, and the other one of

the guiding rods is coupled at a first end thereof to the other side of the face plate and at a second end thereof to the other side of the rear plate; the at least connecting rod is coupled between the front and face plates in a way that a front end thereof is coupled to the front plate and a rear end thereof is coupled to the face plate.

3. The tramp metal removing device of claim 2, wherein the at least connecting rod has a fifth length approximately equal to the second length of the secondary housing.

4. The tramp metal removing device of claim 2, wherein the magnetic members are mounted on the frame in parallel to each other and located between the guiding rods; each of the magnetic members includes a non-magnetic rod, a magnetic set and a non-magnetic element, the non-magnetic rod has a proximal end coupled to the front plate and a distal end coupled to the rear plate, the magnetic set is received within the non-magnetic rod and extends from the proximal end of the non-magnetic rod to at least a middle portion of non-magnetic rod for forming the magnetic section, and the non-magnetic element is received within the distal end of the non-magnetic rod and extends from the distal end to abut to the magnetic set for forming the non-magnetic section.

5. The tramp metal removing device of claim 4, wherein the non-magnetic rod has a drop-shaped cross section.

6. The tramp metal removing device of claim 4, wherein the scraping assembly comprises a base plate coupled with the guiding rods and having a window, and a first scraper made of a first material with a predetermined hardness, secured on one side of the base plate, and having a plurality of first apertures arranged in an area thereof

corresponding the window for being passed through by each of the magnetic members respectively in a way that the inner peripheral surface of each of the first apertures is in close contact with the outer peripheral surface of an associated one of the magnetic members.

7. The tramp metal removing device of claim 6, wherein the scraping assembly further comprises a second scraper made of a second material with a hardness less than that of the first material, secured on the other side of the base plate, and having a plurality of second apertures arranged in an area corresponding the window, each of the second apertures having an inner diameter smaller than the outer diameter of the non-magnetic rod for being passed through by each of the magnetic members in an interference fit manner.

8. The tramp metal removing device of claim 7, wherein the scraping assembly further comprises an emplacing plate having a plurality of third apertures opposite to the second apertures for being passed through by each of the magnetic members respectively, and secured on the base plate in a manner that the second scraper is emplaced between the base plate and the emplacing plate.

9. The tramp metal removing device of claim 2, wherein the primary housing further comprises a first entrance from which each of the drawer units is pushed into or pulled out the first internal space thereof, two first support plates respectively disposed on each side of the first entrance through which the guiding rods of each of the frames pass so that each of the frames can be moved independently along the moving path between the retracted, passaged position and extended positions.

10. The tramp metal removing device of claim 9, wherein the primary housing further comprises a stopping plate disposed on the first entrance, and including a plurality of guiding bores for being passed through by the each of the magnetic members respectively such that when each of the frame is located in the retracted position, the front plate of each of the frame is stopped by the stopping plate and received in the second internal space, and when each of the frame is located in the extended position, the rear plate of each of the frame is stopped by the stopping plate and received in the first internal space.

11. The tramp metal removing device of claim 9, wherein the secondary housing comprises two side walls defining the second internal space with a second entrance so that each of the drawer units can be pushed into or pulled out the second internal space, and two second support plates respectively disposed on each side of the second entrance through which the guiding rods of each of the frames pass.

12. The tramp metal removing device of claim 11, wherein each of the side walls of the secondary housing comprises a plurality of guiding slots spaced apart from each other and having a predetermined length in the direction of the moving path to define the first distance, and each of the scraping assemblies further comprises a pair of guiding bars, each of the guiding bars connected respectively to each side of the base plate and extending outwardly from each of the guiding slots to which it corresponds so that the scraping assembly can be moved along the guiding slots.

13. The tramp metal removing device of claim 1, further comprising a mechanical latch for selectively locking the drawer unit in a closed position with respect

to the secondary housing.

14. The tramp metal removing device of claim 1, further comprising a plurality of first and second linear actuators disposed respectively on the first housing, wherein each of the first linear actuators is coupled with the frame of each of the drawer units and each of the second linear actuators is coupled with each of the scraping assemblies.