Sept. 28, 1965 R. E. TAYLOR ETAL 3,208,604

COLLECTING AND STACKING BIN

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FIG. 1.

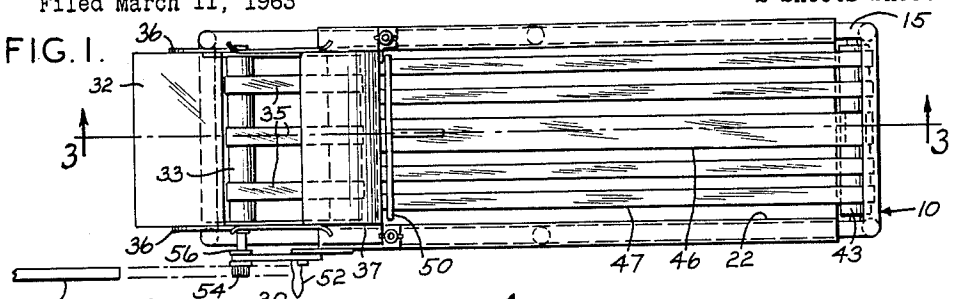


FIG. 2.

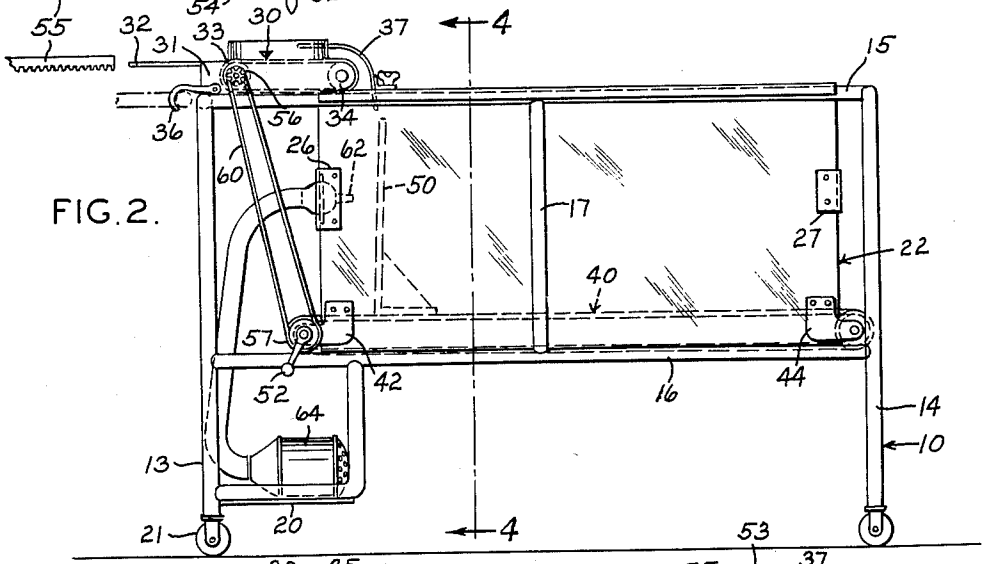


FIG. 3.

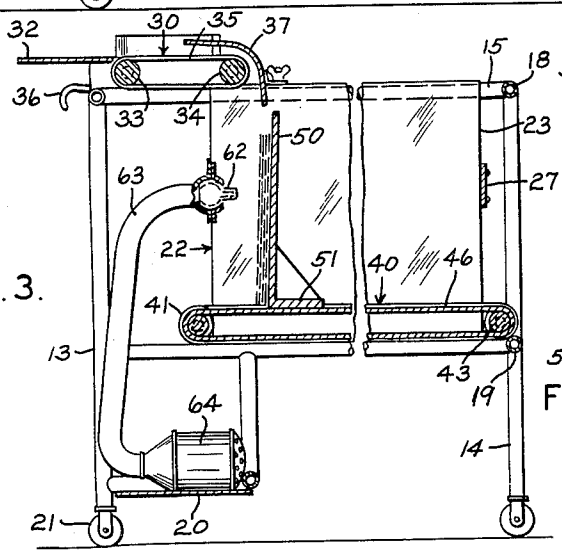
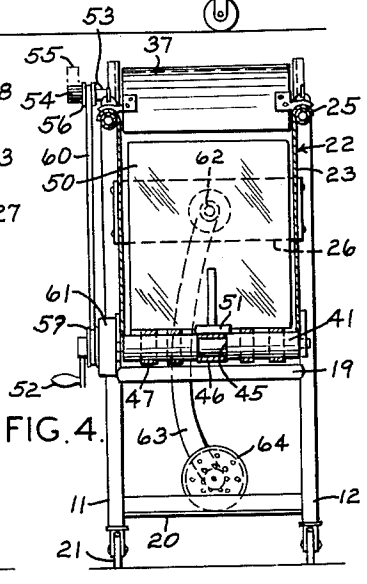


FIG. 4.



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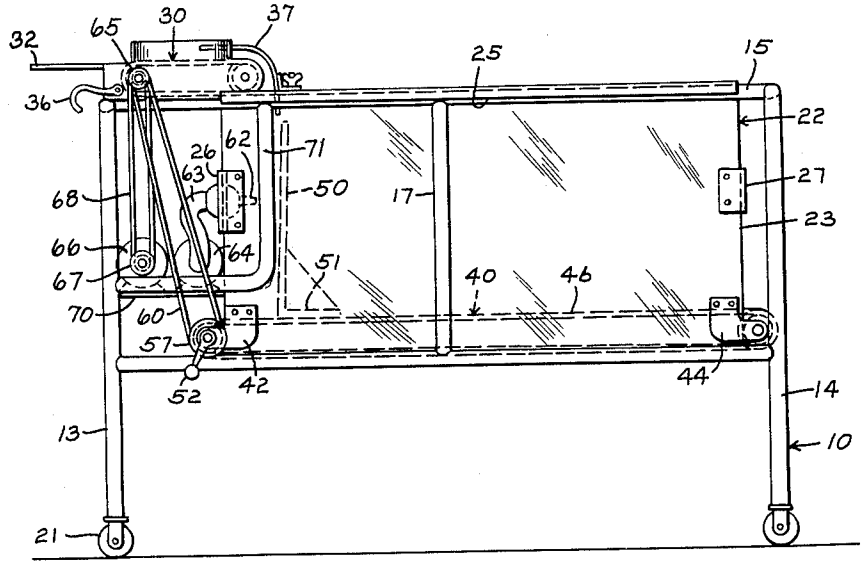


FIG. 5.

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COLLECTING AND STACKING BIN

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This invention relates generally to improvements in a collecting and stacking bin, and more particularly to improvements in a device of this type adapted to faciliate the stacking and handling of material such as cards, paper and the like after some processing procedure.

Heretofore, when material such as cards, paper or the like were processed by the printing unit of a machine such as the well known Addressograph such as that model disclosed in U.S. Patent No. 3,059,922 and model No. 1950 E Class 1950 of the Addressograph-Multigraph Corp., Cleveland, Ohio, such items upon discharge are merely dropped into a tray in a haphazard manner. When the items were removed they had to be arranged in neat piles manually, which action frequently causing mutilation or other damage particularly to the edges.

It is an important objective of the present invention to provide a collecting bin that can be advantageously utilized in conjunction with an existing companion unit, such as the Addressograph, to receive and stack such items after processing in a neat horizontal stack and in a manner that avoids any possible mutilation.

Other important advantages are afforded in that access to the stacked material is readily available, and in that such material is economically handled, such savings being realized by the ease and speed of stacking and by the resulting elimination of any replacement and reprocessing of any damaged items.

An important object is achieved by the provision of a first conveyor that delivers each item separately into a container, guide means directing each item to fall edgewise on to a second conveyor flat against a back-up plate or a preceding item supported by the back-up plate to form a substantially horizontal stack.

Another important objective is realized in that the first and second conveyors are related to move predetermined distances. In response to movement of the first conveyor in delivering each item to the second conveyor, the second conveyor together with its associated back-up plate will move a predetermined distance, usually the thickness of each item, to accommodate and receive the item at the end of the substantially horizontal stack.

Still another important objective is provided by the provision of a nozzle and blower mechanism that directs a flow or stream of air against the end of the stacked material in order to hold the material against the back-up plate in substantially horizontally stacked reltionship.

An important object is achieved by the drive means operatively interconnecting the first and second conveyors, and by the air-jet mechanism in that the distance between each item at the end of the stack as it enters the container and the source of the air-jet remains substantially constant.

Another important object is realized by the provision of a crank for the second conveyor which can be utilized to return the back-up plate selectively to its initial position at the front end of the second conveyor after the back-up plate has been moved rearwardly and its associated horizontal stack of material has been removed.

Yet another important objective is to provide a collecting bin that is simple and durable in construction, economical to manufacture and assemble, highly efficient in operation, and which can be readily utilized by any one with little or no instruction.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from

the following detailed description of a preferred embodiment, particularly when considered in connection with the accompanying drawing in which:

FIG. 1 is a top plan view of the collecting bin;

FIG. 2 is a side elevational view;

FIG. 3 is a fragmentary, cross sectional view as seen along line 3—3 of FIG. 1;

FIG. 4 is a cross sectional view as seen along line 4—4 of FIG. 2, and

FIG. 5 is a side elevational view of a modified structure.

Referring now by characters of reference to the drawings, and first to FIGS. 1–4, it will be apparent that the collecting bin includes a frame generally indicated at **10** constructed of tubing. The assembly has a pair of spaced side frames **11** and **12** (FIG. 4) the structure of which is best seen in FIG. 2. For example, each of the side frames **11** and **12** has a front leg **13** and a rear leg **14** interconnected by a pair of longitudinal braces **15** and **16**. An intermediate vertical brace **17** interconnects the longitudinal braces **15** and **16**. The side frames **11** and **12** are interconnected by a pair of cross braces **18** and **19** extending between each associated pair of legs **13** at the front of the unit and a pair of legs **14** at the rear of the unit.

Attached to and carried by the front legs **13** and the lower longitudinal braces **16** is a substantially horizontal shelf **20**. The purpose of the shelf will be apparent upon later description of parts.

The frame assembly **10** is made portable in that it can be advantageously and conveniently moved from one location to another by provision of casters **21** attached to the bottom of each of the legs **13** and **14**.

A container referred to at **22** is located between the side frames **11** and **12** and is carried by the frame assembly **10**. The container **22** is of substantially U-shape, open at each end and at the top. The container **22** includes a pair of opposed side walls **23** arranged in substantially parallel relation. The upper margins of the side walls **23** are curved to provide lips **25** that receive and seat on the upper longitudinal braces **15**. The front and rear ends of the container **22** are rigidly braced by end straps **26** and **27** that are attached to the opposed side walls **23**.

A first conveyor generally indicated at **30** is carried by the front end of the frame end and is located above the front end of the container **22**. The conveyor **30** consists of side plates **31** interconnected at their front edges by a top plate **32**. Immediately behind the top plate **32** there are a pair of rollers **33** and **34** rotatively mounted in bearings on the side plates **31**. A plurality of endless belts **35** are disposed over the conveyor rollers **33** and **34** and serve to transport material from one end to the other.

When the frame **10** is rolled up to the companion unit with which it is utilized, the top plate **32** is located at the discharge end of such unit to receive the material after it has been processed. A pair of hooks **36** attached to the side plates **31** of the first conveyor are utilized to latch the frame **10** to the companion unit to hold it in place.

A curved guide plate **37** constituting a guide means is located at the rear end of the first conveyor **30**. Specifically, the guide plate **37** is detachably connected to the longitudinal top braces **15** of the side frames **11** and **12** so that a leading portion of the guide plate **37** extends over the rear roller **34** and over the belts **35**, while the trailing portion extends downwardly into the front of container **22**. For reasons which will appear later, it may be desirable to substitute another guide plate for the one illustrated, the only substantial difference in such substituted guide plate being a longer trailing

portion to assure that the material is directed accurately to the end of the horizontal stack of the material located in the container 22 in the event shorter cards or paper are used.

Located in the top of container 22 is a second conveyor referred to at 40. The conveyor 40 includes a front roller 41 rotatively mounted by brackets 42 to the side walls 23 of container 22. Similarly, a rear roller 43 is rotatively mounted by brackets 44 to the container side walls 23. Each of the rollers 41 and 43 is provided with an intermediate groove 45 adapted to receive an endless belt 46 extending between and interconnecting the rollers 41 and 43.

A plurality of endless belts 47 extend between and interconnect the rollers 41 and 43. Preferably a pair of such endless belts 47 are located on each side of the middle belt 46.

A back-up plate 50 having a rearwardly extending foot 51 is disposed inside the container 22 between the side walls 23. The foot 51 is attached to the upper span of the middle belt 46 so as to be movable therewith the length of the container 22. The back-up plate 50 is slightly inclined from the vertical in order to support one end of the horizontal stack of material. The lower margin of the back-up plate 50 is provided with recesses to accommodate and receive the endless belts 47. The stacked material rests endwise on the belts 47 and is carried by the belts 47 rearwardly with the back-up plate 50 upon operation of the second conveyor 40.

After the stacked material has been moved rearwardly of the container 22 and back-up plate 50 has reached its limit of movement closely adjacent the rear roller 43, the horizontal stack of material is then remove and the second conveyor is then conditioned for subsequent use by manually turning the roll 41 with a crank 52 so as to bring the back-up plate 50 forward to its initial position at the front of the container immediately behind the trailing portion of guide plate 37 in which it is adapted to receive the first item as it is delivered into the container 22 by the guide plate 37. The crank 52 is removable so as to eliminate any accessible rotating part, but can be easily replaced when the need arises to recondition the second conveyor 40.

Attached to the end of the drive shaft 53 for roller 33 in the upper conveyor 30, is a pinion 54. Intermittently meshing with the pinion 54 is a rack 55 that is operatively actuated by the companion unit. For example, after an item has been printed it is discharged on to the upper conveyor 30 and on to the conveyor belt 35. Simultaneously, the rack 55 will move forward and mesh with pinion 54 to turn the conveyor rolls 33 and 34, and hence transport the item to the end of the conveyor where it is delivered and directed by the guide plate 37 into the container 22.

The upper and lower conveyors 30 and 40 are operatively interconnected by a drive mechanism that moves the conveyors at predetermined and related distances. This drive means includes a pulley 56 drivingly attached to the input shaft 53 of the first conveyor roller 33 and a coacting pulley 57 drivingly attached to the input shaft 58 of the second conveyor roller 41, the pulleys 56 and 57 being operatively interconnected by an endless belt 60. The pulley 57 operates to turn the second conveyor roller 41 through a high-ratio reduction unit 61.

In response to movement of the first conveyor 30 in transporting an item from its front end to its rear end for discharge into the container 22 as determined by the meshing action of rack 55 with pinion 54, the belt and pulley assembly 56, 57 and 60 operates through the reduction unit 61 to move the second conveyor 40, and in particular the attached back-up plate 50, a predetermined distance as each successive item is dropped into the container 22 and on to the second conveyor 40. Preferably, the distance moved by the back-up plate 50 closely approximates the thickness of the item dropped on to the

conveyor 40 at the end of the substantially horizontal stack. Accordingly, each successive item will be directed by the guide plate 37 and follow exactly the same path of travel into the container 22 and on to the belt 47 that supports the item edgewise in the stack.

The support means for the one end of the horizontal stack includes a vertically adjustable nozzle 62 mounted on the front strap 26 and interconnected by a tubing 63 to a blower 64 mounted on frame shelf 20. The nozzle 62 directs an air-jet against the last item in the horizontal stack, thereby holding this item in and all preceding items in place in the stack against the back-up plate 50. The nozzle 62 is vertically adjustable to make sure that the air-jet strikes the items as they are dropped into place at the end of the stack because it will be readily realized that such items may be of different sizes.

It is thought that the operation and functional advantages of the collecting bin are apparent from the foregoing detailed description of parts, but for completeness of disclosure, such usage will be briefly described.

The frame 10 is rolled on the casters 21 to the discharge end of the companion unit with which it is used, the top plate 32 of the upper conveyor 30 being located underneath the rolls of the printing unit and the hooks 36 being attached to appropriate protuberances on such unit to lock the frame in place. The rack 55 is aligned automatically with its coacting pinion 54.

As each item is discharged from the printing unit of the companion unit on to the belts 35 of the upper conveyor 30, the rack 55 moves forwardly into engagement with pinion 54 to move the belts 35 and hence transport the item carried on the belts 35 from the front end of the conveyor to the rear end of such conveyor. The guide plate 37 guides the item off of the top conveyor 30 and downwardly into the container 22. It will be assumed that the back-up plate 50 is in its forwardmost position so that the first item will fall into the container 22 edgewise on to the conveyor belts 47 and flat against the back-up plate 50. The air-jet from nozzle 62 strikes the front face of the item and urges it against the back-up plate 50.

As the pinion 54 is turned by rack 55, the lower conveyor 40 is moved a predetermined distance through the belt and pulley connection 56, 57 and 60, in the manner explained previously, so that each item will drop into the space previously occupied by the preceding item. This means that the distance between each new item at the end of the stack as it enters the container 22 and the nozzle 62 of the air-jet remains substantially constant.

As the lower conveyor 40 is moved, the top span of the middle belt 46 carries the foot 51 of the attached back-up plate 50 rearwardly, while the side belts 47 supporting the edges of the items in the substantially horizontal stack serve to move the stack rearwardly with the back-up plate 50.

It will be realized that some of the items may be of smaller dimension than others, such as some cards may be shorter than others. In such event, it is necessary to substitute another guide plate 37 having a longer trailing portion that will direct and introduce the card at a point lower in the container to assure that each card will be inserted exactly at the end of the stack without striking any preceding cards in such stock. Moreover the nozzle 62 can be vertically adjusted to make sure that the air-jet strikes the face of the card near its upper center region to hold the cards in place in the stack.

After the cards have been stacked in the container 22 in the manner described, and the back-up plate 50 has been moved rearwardly by the lower conveyor 40, the horizontal stack of cards or other items may be lifted from the container 22 through its open top. The collecting bin can then be reconditioned for subsequent use by attaching the crank handle 52, if such handle has been removed previously, in order to turn the front roll 41, and hence move the lower conveyor 40 in a direction to bring the back-up plate 50 forwardly to its initial start-

ing position at the front of the conveyor **40** immediately below the guide plate **37**. The crank handle **52** can then be removed if desired. The bin is now ready for further stacking operation.

FIG. 5 illustrates a modified embodiment of the collecting bin. The structural arrangement and the operation of this embodiment is exactly the same as the embodiment of FIGS. 1–4, but with the exception of the self-contained power means for driving the top conveyor **30** and the lower conveyor **40**. Consequently, reference numerals used to designate corresponding parts in FIG. 5 will be exactly the same wherever possible

For example, in lieu of the pinion **54** of FIGS. 1–4, a pulley **65** is provided on the roller shaft **53**. A drive motor **66** includes a drive pulley **67** that is interconnected to the pulley **65** by an endless belt **68**.

The blower **64**, together with the drive motor **66** is mounted on a supporting shelf **70** located immediately ahead of the container **22**. The shelf **70** is supported by angle braces **71** that are secured to the top longitudinal braces **15**.

The use of the unit of FIG. 5 is very similar to that previously described to FIGS. 1–4. The frame **10** is rolled to the discharge end of the companion unit with which it is used so that the upper conveyor **30** is adapted to receive items discharged from the companion unit. The hooks **36** are attached to appropriate protuberances on such companion unit to lock the frame in place.

The drive motor **66** operates through the pulley and belt connection **65**, **67** and **68** to move the upper conveyor at a predetermined speed. As each item is discharged on to the belts **35** of the upper conveyor **30**, the belts **35** transport the item to the rear of such conveyor at which point the quide plate **37** guides the item downwardly into the container **22**. The air-jet from nozzle **62** strikes the front face of the item and urges it against the back-up plate **50**.

As the upper pulley **65** is turned by the drive motor **66**, the lower conveyor **40** is moved a predetermined distance through the belt and pulley connection **56**, **57** and **60** in the manner previously explained in detail. The operation and functional advantages of this unit is otherwise the same.

Although the invention has been described by making detailed reference to a single preferred embodiment, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereunto appended.

We claim as our invention:

1. In a collecting bin for material such as cards, paper, forms and the like:

(a) a container having an opening at the top,

(b) a first conveyor at the front top portion of said container on to which such material is placed,

(c) a curved guide plate extending over the rear end of said first conveyor and extending down into said container for directing each item from said first conveyor into said container,

(d) a second conveyor in said container on to which the material is directed edgewise by said guide plate,

(e) an upstanding, slightly inclined back-up plate in said container and attached to said second conveyor for movement therewith, said back-up plate supporting the material in a substantially horizontal stack.

(f) means operatively interconnecting the said first and second conveyors so as to move the second conveyor and attached back-up plate a predetermined distance in response to a predetermined movement of said first conveyor as each successive item is dropped separately into said container and on to said second conveyor,

(g) means directing an air jet continuously against each successive item to hold the material continuously against the back-up plate in substantially horizontally stacked relationship, the distance between each new item at the end of the stack as it enters the container and the means for directing the air jet remains substantially constant, and

(h) a crank operatively connected to said second conveyor for selectively returning the back-up plate to its initial position at the front end of said second conveyor after the back-up plate has been moved rearwardly and its associated horizontal stack of material has been removed.

2. In a collecting bin for material such as cards, paper forms and the like:

(a) a container,

(b) a first conveyor onto which such material is placed,

(c) guide means directing the material from the first conveyor into the container,

(d) a second conveyor in the container onto which the material is directed edgewise by the guide means,

(e) a back-up plate in the container and attached to the second conveyor for movement therewith, the back-up plate supporting the material in a substantially horizontal stack,

(f) means driving the second conveyor to move the back-up plate and accommodate material delivered to the second conveyor,

(g) means maintaining the material against the back-up plate including a nozzle directing an air jet continuously against the material at one end of the stack to hold the material continuously against the back-up plate in substantially horizontally stacked relationship, and

(h) a crank operatively connected to the second conveyor for selectively returning the back-up plate to its initial position at the front end of the second conveyor after the back-up plate has been moved rearwardly and its associated horizontal stack of material has been removed.

3. In a collecting bin for material such as cards, paper forms and the like:

(a) a container,

(b) a first conveyor onto which such material is placed,

(c) guide means directing the material from the first conveyor into the container,

(d) a second conveyor in the container onto which the material is directed edgewise by the guide means,

(e) a back-up plate in the container and attached to the second conveyor for movement therewith, the back-up plate supporting the material in a substantially horizontal stack,

(f) means driving the second conveyor to move the back-up plate and accommodate material delivered to the second conveyor,

(g) means maintaining the material against the back-up plate including a nozzle directing an air jet continuously against the material at one end of the stack to hold the material continuously against the back-up plate in substantially horizontally stacked relationship, and

(h) means operatively interconnecting the first and second conveyors so as to move the second conveyor and attached back-up plate a predetermined distance as each successive item is dropped into the container and onto the second conveyor in response to movement of the first conveyor, the distance between each new item at the end of the stack as it enters the container and the source of the air jet remaining substantially constant.

4. In a collecting bin for material such as cards, paper forms and the like:

(a) a container having an opening at the top,

(b) a first conveyor at the front top portion of the container onto which such material is placed,

(c) a curved guide plate extending over the rear end of the first conveyor and extending down into the container for directing each item from the first conveyor into the container,

(d) a second conveyor in the container onto which the material is directed edgewise by the guide plate,

(e) an upstanding, slightly inclined back-up plate in the container and attached to the second conveyor for movement therewith, the back-up plate supporting the material in a substantially horizontal stack,

(f) a frame carrying the container and the first and second conveyors,

(g) means operatively interconnecting the first and second conveyors so as to move the second conveyor and attached back-up plate a predetermined distance in response to a predetermined movement of the first conveyor as each successive item is dropped separately into the container and onto the second conveyor,

(h) an air nozzle attached to the front end of the container, the air nozzle directing an air jet continuously against each successive item to hold the material continuously against the back-up plate in substantially horizontally stacked relationship, the distance between each new item at the end of the stack as it enters the container and the air nozzle directing the air jet remaining substantially constant, and

(i) a blower carried by the frame and operatively connected to the air nozzle.

References Cited by the Examiner

UNITED STATES PATENTS

1,696,097	12/28	McArthur	214—7
2,392,746	1/46	Labombarde	271—87
2,944,813	7/60	Smith	271—71

FOREIGN PATENTS

398,900	9/33	Great Britain.

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